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## *Contents*

---

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---

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---

**Section**

*Corder Enterprises International*

**19**

*Costs / Prices 19*

*Off-site training is currently available at the following USA locations: 20*

*Class Schedule 20*

*Speaking / Lectures 20*

---

Contents

---

<b>Course</b>	<i>L003 - Leadership Not Management!</i>	<b>21</b>
<b>Section</b>	<i>cSAGE UNIX System Administration Certification</i>	<b>23</b>
<b>Section</b>	<i>Solaris 8 Operating Enviroment Certification Prepratory Course</i>	<b>25</b>
<b>Section</b>	<i>UNIX Boot Camp</i>	<b>29</b>
<b>Section</b>	<i>General UNIX</i>	<b>31</b>
<b>Course:</b>	<i>CU115 - UNIX For Programmers</i>	<b>33</b>
<b>Course:</b>	<i>CU002 - UNIX Bourne Shell Programming</i>	<b>35</b>
	<i>IOVERVIEW OF THE SHELL 37</i>	
	<i>IICREATING AND EXECUTING SHELL PROGRAMS 37</i>	
	<i>IIISHELL VARIABLES &amp; PARAMETERS 37</i>	
	<i>IVCONDITIONAL TESTING 38</i>	
	<i>VLOOPING MECHANISMS 38</i>	
	<i>VISIGNALS AND TRAPS 38</i>	
	<i>VIIISUBSHELLS AND FUNCTIONS 38</i>	
	<i>VIIIPROGRAMMING CONSIDERATIONS 38</i>	
	<i>IXCASE STUDY 38</i>	
	<i>XCOURSE CONCLUSION 38</i>	
<b>Course:</b>	<i>CU003 - UNIX Korn Shell Programming</i>	<b>39</b>
	<i>IOVERVIEW OF THE SHELL 41</i>	
	<i>IICREATING AND EXECUTING SHELL PROGRAMS 41</i>	
	<i>IIISHELL VARIABLES &amp; PARAMETERS 42</i>	
	<i>IVCONDITIONAL TESTING 42</i>	
	<i>VLOOPING MECHANISMS 42</i>	
	<i>VISIGNALS AND TRAPS 42</i>	

---

Contents

---

*VIISUBSHELLS AND FUNCTIONS 42*  
*VIIIPROGRAMMING CONSIDERATIONS 43*  
*IXCASE STUDY 43*  
*XCOURSE CONCLUSION 43*

**Course:** *CU019 - UNIX C Shell Programming* **45**

*Course Materials 46*  
*IICREATING AND EXECUTING SHELL PROGRAMS 47*  
*IIISHELL VARIABLES & PARAMETERS 48*  
*IVCONDITIONAL TESTING 48*  
*VLOOPING MECHANISMS 48*  
*VISUBSHELLS 48*  
*VIIIPROGRAMMING CONSIDERATIONS 48*  
*VIIICOURSE CONCLUSION 48*

**Course:** *CU103 - Korn Shell Programming* **49**

**Course:** *CU215 - Shell Programming / Scripting* **51**

*UNIX Processes 52*  
*Getting Started 52*  
*Variables 52*  
*The Login Process 53*  
*Conditional Statements 53*  
*Loops 53*  
*Special Variables 53*  
*Quoting Mechanisms 54*  
*Functions 54*  
*Advanced Programming 54*  
*Debugging Techniques 54*  
*Shell IPC 55*

**Course:** *CU030 - Advanced UNIX Programming* **57**

*ITECHNICAL Description OF THE UNIX OPERATING SYSTEM 59*  
*IIUNIX SYSTEM STARTUP 59*  
*IIIUNIX SOFTWARE DEVELOPMENT TOOLS OVERVIEW 59*

---

Contents

---

*IVTHE UNIX FILE SYSTEM 60*  
*VUNIX PROCESSES 60*  
*VII/O SUBSYSTEM 61*  
*VIIIINTERPROCESS COMMUNICATIONS 62*  
*VIIISYSTEM PERFORMANCE, MANAGEMENT AND SECURITY 62*  
*IXCOURSE CONCLUSION 62*

**Course:** *CU011 - UNIX Tools* **63**

*ICOURSE OVERVIEW 64*  
*IIUNIX REGULAR EXPRESSIONS 64*  
*IIIADVANCED EDITING USING VI 65*  
*IVINFORMATION RETRIEVAL COMMANDS 65*  
*VFILE EXAMINATION/PRINTING 65*  
*VIFILE MANIPULATION COMMANDS 65*  
*VIIITHE STREAM EDITOR (sed) 65*  
*VIIITHE AWK LANGUAGE 66*  
*IXPUTTING IT ALL TOGETHER 66*  
*XCOURSE CONCLUSION 66*

**Course:** *CU007 - VI Screen Editor (Basic)* **67**

*IINTRODUCTION TO VI 68*  
*IIGETTING STARTED USING VI 68*  
*IIIMOVING AROUND IN VI 68*  
*IVCREATING NEW TEXT 68*  
*VCOPYING TEXT 69*  
*VIGLOBAL SUBSTITUTIONS 69*  
*VIIICUSTOMIZING THE EDITOR ENVIRONMENT 69*  
*VIIICOURSE CONCLUSION 69*

**Course:** *CU008 - VI Screen Editor (Advanced)* **71**

*Review of VI Editor Basics 72*  
*Using EX Sub-Commands 72*  
*Advanced VI Commands 72*  
*Setting VI Options 73*  
*Abbreviations and Macros 73*  
*Using VI as a Programming Editor 73*

---

Contents

---

*Course Conclusion 73*

<b>Course:</b>	<b><i>CU012 - UNIX awk Programming</i></b>	<b>75</b>
	<i>IIINTRODUCTION TO AWK PROGRAMMING 76</i>	
	<i>IIRECORDS, FIELDS, AND VARIABLES 76</i>	
	<i>IIIPATTERN SPECIFICATIONS AND OPERATORS 76</i>	
	<i>IVPRINT STATEMENTS 77</i>	
	<i>VCONDITIONAL TESTS AND LOOPING MECHANISMS 77</i>	
	<i>VIAWK FUNCTIONS 77</i>	
	<i>VIIAWK AND THE SHELL 77</i>	
	<i>VIIICOURSE CONCLUSION 77</i>	
<b>Course:</b>	<b><i>CA002 - AWK Programming</i></b>	<b>79</b>
	<i>Introduction to awk 80</i>	
	<i>awk Patterns 80</i>	
	<i>awk Actions 80</i>	
	<i>awk Input andOutput 81</i>	
	<i>awk Functions 81</i>	
	<i>awk Arrays 81</i>	
<b>Course:</b>	<b><i>CU005 - UNIX System Security</i></b>	<b>83</b>
	<i>IWHY UNIX SECURITY? 85</i>	
	<i>IIUSERS, PASSWORDS, GROUPS, AND THE SUPERUSER 85</i>	
	<i>IIIFILE SYSTEM SECURITY 85</i>	
	<i>IVPROGRAMMING SECURITY 85</i>	
	<i>VNETWORK SECURITY 85</i>	
	<i>VICOMMON SECURITY PROBLEMS ON UNIX 86</i>	
	<i>VIIPROTECTING YOUR SYSTEM 86</i>	
	<i>VIIICOURSE CONCLUSION 86</i>	
<b>Course:</b>	<b><i>CU006 - Unix Security for Users</i></b>	<b>87</b>
	<i>IUNIX SECURITY CONCERNS 88</i>	
	<i>IIUNIX SECURITY FEATURES 88</i>	
	<i>IIIMETHODS USED TO GAIN UNAUTHORIZED ACCESS 89</i>	

---

Contents

---

*IVPROTECTING YOUR LOGIN, FILES, AND DIRECTORIES 89*  
*VCOURSE CONCLUSION 89*

**Course:** *CU001 - Fundamentals of UNIX* **91**

*IUNIX OVERVIEW 92*  
*IUSING UNIX 92*  
*IIITHE UNIX FILE SYSTEM 93*  
*IVTEXT EDITING 93*  
*VTHE UNIX SHELL 93*  
*VIUNIX UTILITIES 94*  
*VIICOURSE CONCLUSION 94*

**Course:** *CU018 - Concepts of UNIX Internals* **95**

*IUNIX SYSTEM OVERVIEW 96*  
*IITHE SHELL 97*  
*IIITHE UNIX PHYSICAL FILE SYSTEM 97*  
*IVTHE UNIX LOGICAL FILE SYSTEM 97*  
*VPROCESS CONTROL 98*  
*VII/O SUBSYSTEM 98*  
*VIIIINTERPROCESS COMMUNICATIONS 98*  
*VIIICOURSE CONCLUSION 98*

**Course:** *CU110 - Fundamentals of UNIX* **99**

*Introduction 100*  
*Getting Started 100*  
*The File System - Files 100*  
*The File System - Directories 101*  
*Editing With vi 101*  
*Inserting text 101*  
*More Editing With vi 102*  
*Personal Utilities 102*  
*Text Handling Utilities 103*  
*File System Security 103*  
*File permissions 103*  
*File System Management Utilities 103*  
*Communication Utilities 103*



---

## Contents

---

*Using the Shell 104*  
*Filename Generation 104*  
*Introduction to Shell Programming 104*  
*UNIX Processes 105*  
*Shell Programming Concepts 105*  
*Variables 105*  
*Special Variables 106*  
*More Flow Control 106*  
*Appendix: Korn shell features 106*

**Course:** ***CU200 - UNIX System Administration*** **107**

*Overview of System Administration 108*  
*User Administration 108*  
*File System Basics 109*  
*Advanced File System Concepts 109*  
*Disk Management 109*  
*Backups 110*  
*UNIX Processes 110*  
*UNIX System Security 112*  
*Performance Monitoring and Tuning 112*  
*IP Addressing 112*  
*Configuring TCP/IP 112*  
*The LP Print Service 114*  
*Network Utilities 114*  
*Kernel Reconfiguration 114*  
*Overview of NIS 114*

**Course:** ***CU214 - Advanced UNIX Tools*** **117**

*ex and vi Options 118*  
*vi Buffers 118*  
*Shell Interaction - Extending vi 118*  
*vi Macros 118*  
*Regular Expressions 119*  
*Shell Programming 119*  
*Korn Shell Features 119*  
*Introduction to sed 120*  
*Using sed 120*  
*Introduction to awk 120*

---

Contents

---

*Awk Patterns 120*  
*Overview of Perl 120*

**Section**   *AIX*   *121*

**Course:**   *CA601 - Fundamentals of AIX*   *123*

*IAIX OVERVIEW 124*  
*IUSING AIX 125*  
*IIITHE AIX FILE SYSTEM 125*  
*IVTEXT EDITING 125*  
*VTHE AIX SHELL 125*  
*VIAIX UTILITIES 126*  
*VIICOURSE CONCLUSION 126*

**Course:**   *CA602 - AIX System Administration*   *127*

*IOVERVIEW OF SYSTEM ADMINISTRATION 128*  
*IISYSTEM STARTUP AND SHUTDOWN 128*  
*IIIAADDING AND DELETING USERS 129*  
*IVMAINTAINING FILE SYSTEMS 129*  
*VADDING PERIPHERALS TO THE SYSTEM 129*  
*VIDISK/TAPE MANAGEMENT 129*  
*VIIIPERFORMING FILE BACKUPS AND RESTORES 129*  
*VIIITASK SCHEDULING 129*  
*IXOPERATING SYSTEM INSTALLATION 130*  
*XCOURSE CONCLUSION 130*

**Course:**   *CA603 - AIX Network Administration*   *131*

*INetwork Overview 132*  
*IISetting up the Network 132*  
*IIICONFIGURING THE NETWORK 132*

---

Contents

---

<b>Course:</b>	<i>CA611 - AIX System Administration</i>	<b>133</b>
<b>Course:</b>	<i>CA612 - Advanced AIX System Administration</i>	<b>135</b>
<b>Course:</b>	<i>CA613 - AIX Network Administration</i>	<b>137</b>
<b>Section</b>	<i>HP-UX</i>	<b>139</b>
<b>Course:</b>	<i>CH701 - Fundamentals of HP-UX</i>	<b>141</b>
	<i>IHP-UX OVERVIEW 142</i>	
	<i>IIUSING HP-UX 142</i>	
	<i>IIITHE HP-UX FILE SYSTEM 143</i>	
	<i>IVTEXT EDITING 143</i>	
	<i>VTHE HP-UX SHELL 143</i>	
	<i>VIHP-UX UTILITIES 144</i>	
	<i>CFile information commands 144</i>	
	<i>DFile comparison commands 144</i>	
	<i>VIICOURSE CONCLUSION 144</i>	
<b>Course:</b>	<i>CH702 - HP-UX System Administration</i>	<b>145</b>
	<i>IOVERVIEW OF SYSTEM ADMINISTRATION 146</i>	
	<i>IISYSTEM STARTUP AND SHUTDOWN 146</i>	
	<i>IIIAADDING AND DELETING USERS 147</i>	
	<i>IVMAINTAINING FILE SYSTEMS 147</i>	
	<i>VADDING PERIPHERALS TO THE SYSTEM 147</i>	
	<i>VIDISK/TAPE MANAGEMENT 147</i>	
	<i>VIIIPERFORMING FILE BACKUPS AND RESTORES 147</i>	
	<i>VIIITASK SCHEDULING 147</i>	
	<i>IXOPERATING SYSTEM INSTALLATION 147</i>	
<b>Course:</b>	<i>CH7003 - HP-UX Network Administration</i>	<b>149</b>
	<i>INETWORK OVERVIEW 150</i>	
	<i>IISETTING UP THE NETWORK 150</i>	

---

## Contents

---

*III CONFIGURING THE NETWORK 150*  
*A Network Control Files 150*

<b>Section</b>	<i>Linux</i>	<b>151</b>
<b>Course:</b>	<i>CL010 - Fundamentals of LINUX</i>	<b>153</b>
	<i>Getting Started 154</i>	
	<i>The File System - Files 154</i>	
	<i>The File System - Directories 154</i>	
	<i>Directory 155</i>	
	<i>Directories 155</i>	
	<i>Editing With vi 155</i>	
	<i>Deleting a Character or Line 155</i>	
	<i>Undo Last Command 155</i>	
	<i>More Editing with vi 156</i>	
	<i>Personal Utilities 156</i>	
	<i>Text Handling Utilities 157</i>	
	<i>File System Security 157</i>	
	<i>File System Management Utilities 157</i>	
	<i>Communication Utilities 157</i>	
	<i>Using the Shell 158</i>	
	<i>Filename Generation 158</i>	
	<i>Processes 158</i>	
	<i>Shell Programming Concepts 159</i>	
	<i>Flow Control 160</i>	
	<i>Variables 160</i>	
	<i>Special Variables 160</i>	
	<i>More Flow Control 160</i>	
	<i>Appendix: Bash Shell Features 161</i>	
<b>Course:</b>	<i>CL020 - Advanced Linux and UNIX Programming</i>	<b>163</b>
	<i>UNIX Standards 164</i>	
	<i>Files and Directories 164</i>	
	<i>System I/O 164</i>	
	<i>Processes 165</i>	
	<i>Process Management 165</i>	
	<i>Pipes - Basic IPC 165</i>	

---

## Contents

---

*Signals 166*  
*Overview of Client/Server Programming 166*  
*The Berkeley Sockets API 166*  
*Algorithms and Issues in Client Design 167*  
*TCP Client Algorithm 167*  
*Server Design 167*  
*System V Interprocess Communication 167*  
*Date and Time Functions 168*  
*Standard I/O 168*

**Course:** ***CL030 - LINUX System Administration*** **169**

*Overview of System Administration 170*  
*User Administration 170*  
*File System Basics 171*  
*Advanced File System Concepts 171*  
*Disk Management 171*  
*Backups 172*  
*Linux Processes 172*  
*System Startup and Shutdown 173*  
*Linux System Security 173*  
*Performance Monitoring and Tuning 173*  
*Networking Utilities 174*  
*Configuring TCP/IP 174*  
*The Print System 174*  
*Package Management 175*  
*Server Configuration and Management 175*  
*Overview of NIS 175*

**Section** ***Perl*** **177**

**Course:** ***CP050 - Perl Programming*** **179**

*Overview of Perl 180*  
*Perl Variables 180*  
*Arrays and Hashes 180*  
*I/O: Input Operations and File I/O Filehandles 180*  
*Operators 181*  
*Flow Control 181*

---

## Contents

---

*Regular Expressions 181*  
*Subroutines 182*  
*Quoting and Interpolation 182*  
*References 182*  
*Complex Data Structures 182*  
*Packages and Modules 183*  
*Object-Oriented Programming in Perl 183*  
*Advanced Regular Expressions 183*  
*Binary Data Structures 183*  
*Multitasking with Perl 184*  
*Sockets Programming in Perl 184*  
*Appendix 1 - The Perl Distribution 184*  
*Appendix 2 - The Perl Debugger 185*

**Course:** *CP150 - Advanced Perl Programming* **187**

*Expert List Manipulation 188*  
*Blocks and Code References 189*  
*Packages 189*  
*Objects and Classes 190*  
*Tied Variables 190*  
*Installing and Using Perl Modules 191*  
*Introduction to DBI/DBD 191*  
*DBI/DBD SQL Programming 192*  
*Introduction to Perl/Tk 192*  
*Perl/Tk Programming 193*  
*Extending Perl with C/C++ 193*  
*Embedding the Perl Interpreter 194*  
*Module Development and Distribution 194*  
*Design and Implementation 195*

**Course:** *CP040 - Perl Programming* **197**

*IIntroduction to Perl 197*  
*IIPerl Variables 198*  
*IIIEnvironment Variables 198*  
*IVCreating Web Pages Dynamically 198*  
*VErrror Handling 198*  
*VICreating, Reading and Writing Files 198*  
*VIIUsing the Perl Debugger 199*

---

**Contents**

---

*VIII Regular Expressions (Part 1) 199*  
*IX Regular Expressions (Part 2) 199*  
*X Controlling Program Flow 199*  
*XI Functions and Subroutines 199*  
*XII Packages (Encapsulation) 199*  
*XIII The Standard Perl Library 200*  
*XIV Other Library Packages 200*  
*XV Common Tasks and Solutions 200*  
*XVI The Common Gateway Interface (CGI) 200*  
*XVII Networking With Perl 200*  
*XVIII Processing Form Input 200*  
*XIX Logging Software 200*

**Course:** *CP140 - Introduction to Perl Programming* **201**

**Section:** *Solaris Operating Environment* **203**

**Course:** *CS500 - Intro. To Solaris 8 Operating Environment* **205**

*II. Using UNIX 206*  
*III. The UNIX File System 206*  
*IV. Text Editing 207*  
*V. The UNIX Shell 207*  
*VI. UNIX Utilities 207*

**Course:** *CS501 - Basic Solaris Sys. Admin. Certification Prep.* **209**

*I. System Administration Overview 211*  
*II. Solaris Installation 211*  
*III. Startup and Shutdown 212*  
*IV. The Solaris File System 212*  
*V. Filesystem Management 212*  
*VI. Filesystem Maintenance 213*  
*VII. The cron and at Facilities 213*  
*VIII. File Backup & Restore 213*  
*IX. User Account Management 214*  
*X. Printer Administration 214*

---

**Contents**

---

**Course:** *CS502 - Advanced Solaris 8 OE System Administration 217*

- I.Process Management 219*
- II.System Logging syslogd() 219*
- III.Hard Drive Management 219*
- IV.Network File Systems 220*
- V. Automounting Filesystems 220*
- VI.Software Management 220*
- VII.Solaris Management Console 221*
- VIII.Access Control 221*
- IX.System Security 221*
- X.Troubleshooting 221*
- XI.Fault Recovery 222*
- XII.Jumpstart Installation 222*

**Course:** *CS503 - Solaris Network Administration* **223**

- I. Network Hardware and Software 224*
- II. Network Configuration and Administration 225*
- III. Network Information Service 226*
- IV. DHCP 226*
- V. Domain Name Service 226*
- VI. SendMail 227*
- VII. Network Time Protocol (NTP) 228*
- VIII. Secure Shell 228*
- IX. Solaris Network Security 228*
- X. IPv6 229*
- XI. Network Trouble Analysis 229*

**Section** *Internet and Web Development* **231**

**Course:** *CW011 - Beginning HTML* **233**

- Introduction: HTML and the Web 233*
- The Basic Structure of HTML Documents 234*
- Laying Out Text in HTML 234*
- Enhancing Your Tags: HTML Attributes 234*
- Images and Backgrounds 234*
- Links to Other Pages, E-mail, and More 234*



---

**Contents**

---

*Adding Color to Your Pages 235*

*HTML Tables 235*

**Course:** ***CW012 - Intermediate HTML*** **237**

*Introduction 237*

*An Introduction to Frames 238*

*Adding Links Between Frames 238*

*Client-Side Image Maps 238*

*Review of HTML Tables 238*

*Using Tables to Create a More Complex Design 238*

*Fluid Tables vs. Fixed-Width Tables 239*

*Nested Tables 239*

*The <META> Tag 239*

*The Future: XHTML 239*

**Course:** ***CW013 - Advanced HTML*** **241**

*HTML Forms and Scripting 241*

*Building HTML Forms 242*

*Fine-Tuning Your Form 242*

*More Types of Form Fields 242*

*Server-Side Scripting 242*

*Using If Conditionals to Process Checkboxes 242*

*Sending Email From Your ASPs 242*

*An Introduction to JavaScript 242*

*In-line Form Validation Using JavaScript 243*

**Course:** ***CW001 - Beginners Internet*** **245**

*Introduction to the Internet 245*

*IIE-Mail 245*

*IIISearching 246*

*IVUsing Internet Explorer 246*

*VReview - Q & A Session 246*

---

Contents

---

**Course:** *CW002 - Intermediate Internet* **247**

*I*Introduction - Overview 247  
*II*FTP 247  
*III*Installing Applications 247  
*IV*Configuring Internet Explorer 248  
*V*Favorites 248  
*VI*RealPlayer 248  
*VII*Review - Q & A Session 248

**Course:** *CV003 - Advanced Internet* **249**

*I*Introduction - Overview 249  
*II*Internet Servers 249  
*III*Programming Languages 249  
*IV*Diagnostic Utilities 249  
*V*Creating a Simple Home Page 250  
*VI*Review - Q & A Session 250

---

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We have found that many companies are not willing to openly talk about their technical needs in a classroom environment where their fellow students might be the competition. Therefore, we operate on a one client per class philosophy.

Discounts rates are based on the number of weeks pre-purchased, with the greatest discounts to clients re-selling our services.

We found it most cost effective to offer on-site training. However, we do offer off-site courses with facilities costs depended on the size of the suite you require.

**Off-site training is currently available at the following USA locations:**

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Cincinnati, OH	Houston, TX	Tampa, FL
Cleveland, OH	Indianapolis, IN	Washington, DC
Columbus, OH		

*Class room sizes varies between cities.*

**Class Schedule**

C.E.I. has a one company per class philosophy. Therefore, we do not maintain an open schedule. There is a 6 student minimum for an off site class.

The number of students at off-site locations are limited to class facilities, usually between 10 and 20.

**Speaking / Lectures**

- Leadership not Management
- Building a World Class IT Team
- IT Mentor Programs

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Course

*L003 - Leadership Not  
Management!*

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**Duration:** 3 days

**Audience:**

Team Leads, Managers, and Executives that want to lead a world class group instead of simply managing fellow staff members

**Description:**

This seminar teaches the participant the advanced concepts of Leadership. With an emphasis on IT teams that support both technical and non-technical personnel.

**Topics:**

- What You Say Is What You Get!
- Planning and Setting Goals!
- Professional / Technical Writing
- What is Success
- Making A Difference!
- The Winning Spirit!
- Your Future Begins With You!
- Leadership
- The Successful Meeting!
- Mentorship!
- Everything in life is a sales game!

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Section

## *cSAGE UNIX System Administration Certification*

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The goal of certification is to evaluate whether one has successfully attained specific skills and/or knowledge. The goal of education is to impart skills and/or knowledge. The two go hand-in-hand.

As such, SAGE Certification partners with Corder Enterprises International (CEI) to offer practical, hands-on instruction on material covered by our cSAGE exams. Only carefully reviewed programs and courses are allowed to carry the SAGE Certification Preferred Training Provider logo.



SAGE Certification recommends the following course tracks as part of preparation for cSAGE exams:

- CU001 Fundamentals of UNIX
- CU214 Advanced UNIX Tools
- CA611 AIX System Administration
- CA612 AIX Advanced System Administration

- CU001 Fundamentals of UNIX
  - CU214 Advanced UNIX Tools
  - CS502 Solaris System Administration
- 
- CU001 Fundamentals of UNIX
  - CU214 Advanced UNIX Tools
  - CL030 Linux System Administration

*These courses do not guarantee in any way that you will receive cSAGE certification, and do not negate meeting all of the requirements for cSAGE certification, however the courses may provide you with refreshers in weaker areas of your skill set, or knowledge in an area previously unknown to you. These courses were selected after review by SMEs (Subject Matter Experts) from both Corder Enterprises International and SAGE Certification.*



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Section

## *Solaris 8 Operating Environment Certification Preparatory Course*

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Columbus, OH 43230

### **Introduction**

The Solaris 8 Operating Environment Certification Preparation Program is a three week program designed to assist students in preparing to take the Solaris 8 Operating Environment Certification Exams, 310-011 and 310-012. The program consists of three to four courses:

- CS500 - Introduction To Solaris 8 Operating Environment
- CS501 - Basic System Administration Certification Preparation
- CS502 - Advanced Solaris 8 OE System Administration
- CS503 - Solaris Network Administration

### **Program Objectives**

Upon completion of this program, the attendee will be able to combine the knowledge and skills gained in this course with their own practical experience to:

1. pass the Solaris 8 OE Certification Exam - Part 1 (310-011)
2. pass the Solaris 8 OE Certification Exam - Part 2 (310-012)

## Prerequisites

The attendee should have

- Experience in using an operating system
- Experience in installing and administering an operating system

Additional prerequisites that are helpful are:

- Programming skills
- Logic Analysis skills
- Database skills

## Suggested Course Materials

Each student should receive the following materials, *If purchased*:

1. Three comprehensive student guides consisting of over 2000 pages of detailed technical content. Throughout the student materials the attendee will find numerous hands-on review and end-of-unit exercises and practice questions which will help prepare them for the certification exams.
2. A complete CD set of the Solaris 8 Operating Environment Operating System.
3. Student Training Files Installation CD
4. The Solaris Sun Certified System Administrator for Solaris 8.0 Study Guide (Exam 310-011 and 310-012) Textbook, Osborne, ISBN 0-07-212369-9.
5. Access to the C.E.I. Solaris 8 Operating Environment Certification Preparation Program support web site.

## Instructors

The instructors for the **Solaris 8 Operating Environment Certification Preparation Program** are carefully selected industry consultants and experienced technical trainers. They bring practical experience to the classroom, giving students an invaluable perspective on the professional world.

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## **About Certification**

This program provides exposure to most of the information needed to successfully pass the certification exams. However, attending a certification program alone does not guarantee that the attendee will pass the certification exam. There are numerous circumstances beyond the control of the course provider that can have an effect on the successful passing of an exam. In addition to completing this preparation program, the successful certification exam student will have their own Solaris 8 Operating Environment System on which to perform various tasks. It is also highly recommended that students use the Internet and technical publications to study about additional Solaris 8 Operating Environment topics.

## **Disclaimer**

*This program nor any of the materials contained herein is associated in any manner with Sun Microsystems.*



See also our 3-Day UNIX for Programmers' Boot Camp CU115!

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### **4 Week UNIX Boot Camps**

C.E.I. offers intense 4 week UNIX Boot Camp is designed for the company and/or department that is migrating to UNIX. It is designed for Managers, Programmers, and System Administrators:

**Managers** will benefit from understanding the day to day requirements of their staff. Moreover, they will learn the terminology of the UNIX environment and have a sufficient knowledge bank to lead their UNIX IT teams.

**Programmers** - Some programmers need more than a working knowledge of the UNIX environment from which they will develop their thoughts and ideas. They will need a keen understanding of the UNIX operating system itself. The C.E.I. UNIX Boot Camp will benefit them in assisting them to develop souper code more closely integrated within the UNIX platform.

**System Administrators**, whether coming to UNIX for the first time or simply implanting a new flavor of the UNIX environment one will benefit from the C.E.I. UNIX Boot Camp. It is an intense 4 to 5 week training program, depending on OS, designed to bring your staff up to speed in the short possible time.

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## UNIX Boot Camp

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<i>Week</i>	<i>UNIX Boot Camp</i>	<i>AIX</i>	<i>Linux</i>	<i>Solaris</i>
(1a)	UNIX for Programmers	CU300	CU300	CU300
(1b) <sup>1</sup>	Fundamentals of UNIX	CU001	CU001	CU001
(2) <sup>1</sup>	Advanced UNIX Tools	CU214	CU214	CU214
(3) <sup>1</sup>	System Administration	CA611	CL030	CS502
Opt.	Advanced System Admin.	CA612		
(4)	UNIX System Security	CU005	CU005	CU005

Courses within the UNIX Boot Camp<sup>1</sup> were selected after review by SMEs (Subject Matter Experts) from both Corder Enterprises International and SAGE Certification. Therefore, successful completion of the C.E.I. UNIX Boot Camp can assist you and your staff in becoming cSAGE certified.

### **Solaris Certification Preparatory Course!**

C.E.I. is developing Sun Solaris Certification Preparatory Courses for Sun Microsystems' 310-011 and 310-012 exams.

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1. Course curriculum for cSAGE Certification

2. This program nor any of the materials contained herein is associated in any manner with Sun Microsystems.

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## Shells

- CU115 - UNIX for Programmers (**Boot Camp**)
- CU002 - UNIX Bourne Shell Programming
- CU003 - UNIX Korn Shell Programming
- CU019 - UNIX C Shell Programming
- CU103 - UNIX Korn Shell Programming
- CU215 - UNIX Shell Programming / Scripting
- CU030 - Advanced UNIX Programming

## Tools

- CU011 - UNIX Tools
- CU007 - VI Screen Editor (Basic)
- CU008 - VI Screen Editor (Advanced)
- CU012 - UNIX awk Programming
- CA002 - AWK Programming

## Security

- CU005 - UNIX System Security
- CU006 - UNIX Security For Users

## Misc

- CU001 - Fundamentals of UNIX
- CU018 - Concepts Of UNIX Internals
- CU110 - UNIX Fundamentals
- CU200 - UNIX System Administration



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**Course:**

*CU115 - UNIX For Programmers*

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P.O. Box 307218  
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**Duration: 3 days**

**Audience:**

Programmers of other Operating Systems coming to UNIX for the first time and anyone needing to learn how to read and write Born shell scripts of a simple to medium level of complexity.

**Description:**

This hands-on course teaches the participant how to use the programming constructs of the Born shell language to write scripts that may be used to simplify or automate tasks.

**Prerequisites:**

An understanding of structured computer programming.

**Topics:**

1. The History of UNIX
2. Understanding the UNIX Kernel
3. Logging On UNIX
4. The VI Editor
5. UNIX Tools & Commands
6. Command Line Execution
7. The UNIX “sh” Shell
8. Shell Script Structures
9. Programing in sh
10. Manipulating Data
11. Regular Expressions
12. Solving Shell Script Problems
13. The UNIX Filesystem
14. Network Commands
15. Programing in sh source listings!

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Course:

*CU002 UNIX Bourne Shell  
Programming*

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<http://www.corder.com/courses.pdf>

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**Length:** 4 Days

**Description**

This course teaches attendees how to use the Bourne shell to design and develop command language programs. Topics include an overview of the shell and its functions, command line processing, control constructs (for, while, case, etc.), conditional branching, quoting, positional parameters, command substitution, pipelines, use of built-in shell commands, functions, sub-shells, signals, traps, shell programming efficiencies, and debugging. This course is applicable to all releases of UNIX which have the Bourne shell.

## Course Objectives

Upon completion of this course the attendee will be able to:

1. state how the shell functions as a user interface and command line interpreter;
2. modify built-in shell variables and create and use user-defined shell variables;
3. use I/O redirection, pipes, quoting, and filename expansion mechanisms;
4. create structured shell programs which accept and use positional parameters and exported variables;
5. use the shell flow control and conditional branching constructs (while, for, case, if, etc.);
6. create shell programs which process interrupts, pass signals, invoke subshells and functions, and trap signals;
7. use shell debugging mechanisms to improve shell program efficiency and detect and correct errors.

## Course Materials

1. UNIX Bourne Shell Programming Student Guide and course notes.
2. UNIX Shell Programming, Revised, Stephen G. Kochan and Patrick H. Wood.

## Prerequisites

1. CU001 - Fundamentals of Unix or equivalent experience using UNIX.

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## Course Content

### I OVERVIEW OF THE SHELL

- A Command interpretation.
- B Processes
  - 1. Process Creation
  - 2. fork and exec.
  - 3. Process invocation
- C User Environment
  - 1. Login Shell Variables
  - 2. Setting Variables from the Login Prompt
  - 3. The /etc/profile and .profile files.
- D Setting and Printing Variables
- E I/O Redirection
- F Pipelines
- G File Name Generation
- H Quoting
- I Command Substitution
- J Background Processing

### II CREATING AND EXECUTING SHELL PROGRAMS

- A Creating a Shell Program
- B Executing a Shell Program
- C Debugging Shell Programs

### III SHELL VARIABLES & PARAMETERS

- A Assigning Variables
- B Printing Variables
- C The read command.
- D Variable Types
- E Exporting Variables
- F Shell Parameters
- G Conditional Parameter Substitution
- H Positional Parameters
- I shift Command
- J The set and unset commands
- K The . (dot) Command

**IV CONDITIONAL TESTING**

- A The test Command
- B The if, else, and elif statements.
- C The case statement.
- D The exit command

**V LOOPING MECHANISMS**

- A The for, while, and until loops.
- B The true and false statements
- C The break and continue statements

**VI SIGNALS AND TRAPS**

- A Signals
- B Traps

**VII SUBSHELLS AND FUNCTIONS**

- A Subshells
- B Functions

**VIII PROGRAMMING CONSIDERATIONS**

- A Resource Consumption
- B Processes and Files
- C Programming Hints

**IX CASE STUDY**

**X COURSE CONCLUSION**

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**Course:**

## *CU003 - UNIX Korn Shell Programming*

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<http://www.corder.com/courses.pdf>

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**Length: 4 Days**

### **Description**

The korn shell implements job control, command line editing, aliases, and new built-in commands and functions in addition to those features found in the bourne shell. Topics include an overview of the shell and its functions, control constructs (for, while, case, etc.), conditional branching, quoting, positional parameters, command substitution, pipelines, use of built-in shell commands, job control, command line editing, alias mechanisms, functions, sub-shells, signals, traps, shell programming efficiencies, and debugging. This course is applicable to all releases of UNIX which support the Korn shell.

## Course Objectives

Upon completion of this course the attendee will be able to:

1. state how the shell functions as a user interface and command line interpreter,
2. modify built-in shell variables and create and use user-defined shell variables,
3. use I/O redirection, pipes, quoting, and filename expansion mechanisms,
4. create structured shell programs which accept and use positional parameters and exported variables,
5. use the shell flow control and conditional branching constructs (while, for, case, if, etc.),
6. create shell programs which process interrupts, pass signals, invoke subshells and functions, and trap signals,
7. use shell debugging mechanisms to improve shell program efficiency and detect and correct errors,
8. develop a user interface menu system using shell programming constructs.

## Course Materials

1. UNIX Korn Shell Programming Student Guide and course notes.
2. Learning The Kornshell, by O'Reilly & Associates.

## Prerequisites

1. CU001 - Fundamentals of Unix or equivalent experience using UNIX.



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## **Course Content**

### **I OVERVIEW OF THE SHELL**

- A Command Interpretation
- B Processes
  - 1. Process creation
  - 2. fork and exec
  - 3. Process invocation
- C User Environment
- D Setting and Printing Variables
- E I/O Redirection
- F Pipelines
- G File Name Generation
- H Quoting
- I Command Substitution
- J Background Processing
- K Aliases
- L Tilde Substitution
- M Arithmetic Evaluation
- N Job control
- O Command Re-entry
- P In-line Editing Options

### **II CREATING AND EXECUTING SHELL PROGRAMS**

- A Creating a Shell Program
- B Executing a Shell Program
- C Debugging Shell Programs

### **III SHELL VARIABLES & PARAMETERS**

- A Variables
- B Assigning Variables
- C Printing Variables
- D Reading Input
- E Variable Types
- F Exporting Variables
- G Variable Arrays
- H Special Shell Parameters
- I Conditional Parameters
- J Positional Parameters
- K shift command
- L set and unset commands
- M The . (dot) Command

### **IV CONDITIONAL TESTING**

- A The test Command
- B if, else, and elif statements
- C The case statement
- D The select statement
- E The expr statement
- F The let statement
- G The exit statement

### **V LOOPING MECHANISMS**

- A The for, while, and until loops
- B The true and false statements
- C The break and continue statements

### **VI SIGNALS AND TRAPS**

- A Signals
- B Traps

### **VII SUBSHELLS AND FUNCTIONS**

- A Subshells
- B Functions

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## **VIII PROGRAMMING CONSIDERATIONS**

- A Resource Consumption
- B Processes and Files
- C Programming Hints

## **IX CASE STUDY**

## **X COURSE CONCLUSION**



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Course:

## *CU019 - UNIX C Shell Programming*

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**Length: 4 Days**

### **Description**

The C shell is the optional user interface on Berkeley UNIX systems and implements features such as job control, command line editing, aliases, and additional built in commands not found in the standard Bourne shell. Topics include an overview of the C Shell and it's functions, control constructs (foreach, while, switch, etc.), conditional branching, quoting, positional parameters, command substitution, pipelines, use of built-in shell commands, job control, history and alias mechanisms, sub-shells, shell programming efficiencies, and debugging. After completion of this course the attendee will be able to use the C Shell to design and develop complex command language programs.

## Course Objectives

Upon completion of this course the attendee will be able to:

1. state how the shell functions as a user interface and command line interpreter;
2. execute commands using foreground and background processing;
3. modify built-in shell variables and create and use user-defined shell variables;
4. use I/O redirection, pipes, quoting, and file name expansion mechanisms;
5. create structured shell programs which accept and use positional parameters and exported variables;
6. use the shell flow control and conditional branching constructs (while, foreach, switch, if, etc.);
7. state the order in which command line arguments are evaluated;
8. use shell debugging mechanisms to improve shell program efficiency and detect and correct errors.

## Course Materials

1. UNIX C Shell Programming Student Guide and course notes.
2. The UNIX C Shell Field Guide by Gail Anderson and Paul Anderson.

## Prerequisites

1. UX001 - Fundamentals of UNIX, UX021 - Fundamentals of AIX, or equivalent experience using UNIX.

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## Course Content

### IOVERVIEW OF THE SHELL

- A Shell Overview
- B Interpreting Commands
- C Logging In
- D Processes
  - 1 Process Creation
  - 2 fork and exec
- E User Environment
- F Setting and Printing Variables
- G I/O Redirection
- H Pipelines
- I File Name Generation
- J Quoting
- K Command Substitution
- L Background Processing
- M Tilde Substitution
- N Arithmetic Evaluation
- O Environment
- P Job Control
- Q History and Alias Mechanisms
- R Command Line Editing
- S Login and Setup Files
  - 1. .login, .cshrc, and .logout

### II CREATING AND EXECUTING SHELL PROGRAMS

- A Creating a Shell Program
- B Executing a Shell Program
- C Debugging Shell Programs

### **III SHELL VARIABLES & PARAMETERS**

- A Variables
- B Assigning Variables
- C Printing Variables
- D Reading Input
- E Variable Types
- F Exporting Variables
- G Variable Arrays
- H Predefined Variables
- I Environment Variables
- J Special Shell Parameters
- K Positional Parameters
- L shift Command
- M set and setenv Commands
- N unset Command
- O The source Command

### **IV CONDITIONAL TESTING**

- A if Statement
- B The switch Statement
- C exit Command

### **V LOOPING MECHANISMS**

- A The foreach Loop
- B The while Loop
- C break, continue, and goto Statements

### **VI SUBSHELLS**

### **VII PROGRAMMING CONSIDERATIONS**

- A Resource Consumption
- B Processes and Files
- C Programming Hints

### **VIII COURSE CONCLUSION**



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**Course:**

## *CU103 - Korn Shell Programming*

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**Duration:** 3 days

**Audience:**

Anyone needing to learn how to read and write Korn shell scripts of a simple to medium level of complexity.

**Description:**

This hands-on course teaches the participant how to use the programming constructs of the Korn shell language to write scripts that may be used to simplify or automate tasks.

**Prerequisites:**

Introduction to UNIX (or equivalent experience)

**Topics:**

1. Introduction to the Shell
2. Korn Shell Variables and Arrays
3. Command Line Execution
4. Shell Script Structures
5. Solving Shell Script Problems
6. Expecting the Unexpected
7. Manipulating Data
8. Regular Expressions

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Course:

*CU215 - Shell Programming /  
Scripting*

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**Course Description:**

Students learn to read, write, and debug shell scripts, thus increasing productivity by taking full advantage of the UNIX shell.

**Audience:**

UNIX users, programmers, and system administrators.

**Prerequisites:**

Fundamentals of UNIX

## **Course Contents**

### **UNIX Processes**

- What is a Process?
- Process Structure
- The ps Utility
- Options to the ps Utility
- Background Commands (&)
- Killing Background Processes
- Redirecting the Standard Error

### **Getting Started**

- What is a Shell?
- Running Scripts
- Specifying the Script's Interpreter
- The PATH Environment Variable
- Sub-shells

### **Variables**

- Shell Variables
- The read Command
- The export Command
- The Shell Environment
- Variable Substitution
- Command Substitution

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## **The Login Process**

- The Login Process
- The System Profile Script
- Your .profile Script
- The . Command

## **Conditional Statements**

- The Exit Status of Commands
- Command Line Examples
- The test Command
- The if-then-else Construct
- The elif Construct
- case Statements

## **Loops**

- The for Loop
- The while Loop
- Reading Lines From Files
- Using Arrays with Loops

## **Special Variables**

- \$\$ - PID of Shell
- Command-Line Arguments
- \$# - Number of Arguments
- \$\* - All Arguments
- The shift Command
- The set Command
- Getting Options

### **Quoting Mechanisms**

- Single vs. Double Quotes
- What is a Here Document?
- Using a Here Document
- Here Document Quoting
- Ignoring Leading Tabs

### **Functions**

- Shell Functions
- Passing Arguments to Functions
- Returning Values from Functions
- Function Libraries

### **Advanced Programming**

- Shell Arithmetic
- The select Statement
- Terminal Independence in Scripts
- The eval Command

### **Debugging Techniques**

- Using echo
- Using Standard Error
- Options for Debugging
- Script Tracing
- Conditional Debugging

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## Shell IPC

- Co-processes
- The print and read Commands
- Signals
- The trap Command
- Named Pipes
- The wait Command





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Course:

*CU030 - Advanced UNIX  
Programming*

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Columbus, OH 43230

**Length: 5 Days**

**Description**

This course is designed for system and application programmers, system analysts, and engineers responsible for supporting a UNIX operating system and/or for system and application software development. The course provides detailed discussions and hands-on examination of the structure of a UNIX system, the physical and logical file system implementation, process control mechanisms, I/O subsystem, kernel operations, memory management, interrupt handling, and interprocess communications. Throughout the course the information presented is related to the attendee through: 1) the execution of common UNIX user/administrator commands; and, 2) writing, compiling, and executing example 'C' language programs which examine and display internal system data structures on a live UNIX system.

## Course Objectives

Upon completion of this seminar the attendee will be able to:

1. state the architecture of the UNIX operating system;
2. describe how a UNIX system is initialized and identify the various run levels;
3. use selected UNIX software development tools for program development and maintenance;
4. describe the logical and physical file system;
5. perform UNIX system commands which manipulate files and directories and control processes;
6. define processes and state how they are controlled;
7. describe the I/O subsystem to include block and character device and streams implementation;
8. describe the interprocess communications facilities;
9. write, compile, and execute C language programs which examine UNIX internal data structures and display information about processes, the file system, and kernel operations; and,
10. write and execute programs which illustrate the use of the UNIX pipe, messages, semaphores, shared memory, and signals interprocess communications facilities.

## Course Materials

1. Advanced UNIX Programming Student Guide and course notes.
2. Advanced Programming In The UNIX Environment, W. Richard Stevens, Addison-Wesley.
3. Diskette containing sample C programs used in class.

## Prerequisites

1. CU001 - Fundamentals of UNIX or equivalent experience using UNIX.
2. CU002 - Bourne Shell Programming or CU003 - Korn Shell Programming or equivalent experience using the UNIX shell.
3. CU004 - Introduction to C Programming or equivalent experience using the C programming language.

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## **Course Content**

### **I TECHNICAL Description OF THE UNIX OPERATING SYSTEM**

- A History Of UNIX
- B Major UNIX Features
- C System Architecture
  - 1. Kernel
  - 2. Shell
  - 3. File System
  - 4. Application Program Relationship
  - 5. C Language Interface
- D Hardware Considerations
- E UNIX System Documentation
- F POSIX Standardization

### **II UNIX SYSTEM STARTUP**

- A System Initialization Sequence
- B Startup Programs and Scripts
- C Startup Control Files
- D Run Levels
- E Modifying System Startup

### **III UNIX SOFTWARE DEVELOPMENT TOOLS OVERVIEW**

- A make
- B sccs
- C sdb
- D lint
- E ar

## IV THE UNIX FILE SYSTEM

- A Physical File System
  - 1. File System Format
  - 2. Super Block
  - 3. Inodes
  - 4. Structure of a Regular File
  - 5. Structure of a Directory
  - 6. Structure of Other File Types
  - 7. Creation/Deletion of a Physical File
  - 8. Mountable File Systems
- B Logical File System
  - 1. File Concept
  - 2. Types Of Files
  - 3. Hierarchal File System
  - 4. Directories
  - 5. Path Names
  - 6. File Attributes
  - 7. File Access Permissions
  - 8. File Manipulation Commands
  - 9. Directory Manipulation Commands
  - 10. Special Files
  - 11. Efficient Use Of File Systems

## V UNIX PROCESSES

- A Process Definition
- B Process Creation and Termination
- C Process States and Transitions
- D Process Control
- E Process Scheduling and Timing
- F Process Priorities
- G Daemon Processes
- H Process Performance Limitations

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## **VI I/O SUBSYSTEM**

- A I/O Devices
  - 1. Block (Disk) Device Drivers
  - 2. Character (Terminal) Device Drivers
- B Driver Interfaces
- C Streams
- D I/O Error Handling

## **VII INTERPROCESS COMMUNICATIONS**

- A Overview of UNIX IPC Facilities
- B Pipes
- C Messages
- D Semaphores
- E Shared Memory
- F Signals

## **VIII SYSTEM PERFORMANCE, MANAGEMENT AND SECURITY**

- A Shells and User Environment
- B System Configuration, Tuning, Generation
- C System Performance Analysis
- D System Accounting
- E Security
- F System Error Logging
- G Analyzing and Correcting System Errors

## **IX COURSE CONCLUSION**

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**Course:**

*CU011 - UNIX Tools*

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P.O. Box 307218  
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**Length: 3 Days**

**Description**

In this course the attendee will learn how to use more than 50 UNIX commands and their various options and will then be able to interface them together using shell programming constructs. This is an extensive hands-on course and is supported by the excellent UNIX Desktop Guide to Tools textbook by Peter Holsberg. Attendees are encouraged to bring example problems to class so they can be assisted with developing correct solutions. The overall objective of this course is to provide the attendee with the knowledge about UNIX commands so that they can select the appropriate commands for many types of data processing applications.

## Course Objectives

Upon completion of this course the attendee will be able to:

1. state the UNIX “tool” philosophy;
2. construct and use regular expressions;
3. select, format, and process data selected from specified files;
4. display and print information from files;
5. use the sed command to apply editing commands to files from an input stream;
6. use the awk programming language to scan files and process patterns;
7. use the commands learned in the course to interact with the shell to create user tools for information processing.

## Course Materials

1. UNIX Tools Student Guide and handouts.
2. UNIX Desktop Guide to Tools, Peter Holsberg, Sams, 1992.

## Prerequisites

1. CU001 - Fundamentals of UNIX
2. CU002 - Bourne Shell Programming or CU003 - Korn Shell Programming

## Course Content

### I COURSE OVERVIEW

- A The tool philosophy
- B The UNIX file system
- C The system and user environments
- D UNIX shell constructs

### II UNIX REGULAR EXPRESSIONS

- A What are regular expressions?
- B Where are regular expressions used?
- C Regular expression characters and construction
- D Regular expression examples



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### **III ADVANCED EDITING USING VI**

- A ex sub-editor
- B Replacement strings
- C Substitution examples
- D Shell interface and fi ltering
- E Editor options
- F Abbreviations
- G Macros

### **IV INFORMATION RETRIEVAL COMMANDS**

- A The wc, fi le, fi nd commands.

### **V FILE EXAMINATION/PRINTING**

- A Displaying and Printing Files
  - 1. The cat, pg, more, tail, head, tee, and lp commands
- B The grep family

### **VI FILE MANIPULATION COMMANDS**

- A File Formatting
  - 1. The nl, fold, fmt, newform, pr, and tr commands
- B Field-Oriented Commands
  - 1. The cut, paste, sort, join, uniq, split, and csplit commands
- C File Comparison
  - 1. The diff, comm, sum commands.
- D File Compression
  - 1. The pack and compress commands.
- E File Archiving
  - 1. The cpio and tar commands.

### **VII THE STREAM EDITOR (sed)**

- A What is sed?
- B sed commands, actions and syntax
- C sed pattern space and addresses

## **VIII THE AWK LANGUAGE**

- A Overview of awk
- B Format of an awk program
- C Records and fields
- D Variables, patterns, operators, conditional statements, and loops
- E String manipulation
- F Mathematical Functions
- G Arrays
- H Shell Interaction

## **IX PUTTING IT ALL TOGETHER**

- A Shell script constructs
- B Useful shell script commands
- C Example programs and case studies

## **X COURSE CONCLUSION**

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Course:

*CU007 - VI Screen Editor (Basic)*

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<http://www.corder.com/courses.pdf>

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**Length: 1 Day**

### **Description**

This course is designed for current UNIX users who need to upgrade their ed (line editor) skills or for those who will only be using vi as part of another application (Informix, etc.). It covers the same vi topics found in CU001 - Fundamentals of Unix and the material in either of these courses is considered the prerequisite to the Advanced vi Editing course. Topics include the fundamental vi commands, moving around within a file, adding and inserting text, rearranging text, global substitutions (ex sub-mode), and setting up the editing environment.

### **Course Objectives**

Upon completion of this course the attendee will be able to:

1. Use the vi editor to create a new text file;
2. add, insert, delete, change, and move text within a file; and
3. set up your editing environment.

### **Course Materials**

1. UNIX VI Text Editing Student Guide and course notes.
2. Learning the VI Editor, by Linda Lamb, O'Reilly & Associates, Inc.

### **Prerequisites**

None

### **Course Content**

#### **I INTRODUCTION TO VI**

- A Types of Editors
- B Editing Concepts

#### **II GETTING STARTED USING VI**

- A Entering VI
- B Editing Modes
- C Saving Text and Leaving vi

#### **III MOVING AROUND IN VI**

- A Cursor Movements
- B Scrolling
- C Moving By Objects
- D Moving Around the Screen
- E Counts
- F Special Characters
- G Searching

#### **IV CREATING NEW TEXT**

- A Append and Insert Modes
- B Deleting Text
- C Changing Text

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## **V COPYING TEXT**

- A Yank and Put
- B Copying Objects
- C Moving Text

## **VI GLOBAL SUBSTITUTIONS**

## **VII CUSTOMIZING THE EDITOR ENVIRONMENT**

## **VIII COURSE CONCLUSION**



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Course:

*CU008 - VI Screen Editor (Advanced)*

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**Length:** >2 Days

### **Description**

This course teaches how to use the more advanced features of the visual (vi) text editor. Topics include a brief review of the fundamental vi commands, searching/goto commands, ex (line editor) interface, defining macros, and customizing the editing environment.

### **Course Objectives**

Upon completion of this course the attendee will be able to: use ex sub-commands for global search and replace; use advanced vi commands to rearrange and duplicate text, recover lost text, and edit multiple files; execute UNIX commands from within the editor and read the output into the current file; set vi editing options; use abbreviations and macros; use the programming features built into the vi editor.

## **Course Materials**

UNIX Advanced VI Text Editing Student Guide and course notes. The Ultimate Guide to the VI and EX Text Editors by Hewlett-Packard.

## **Prerequisites**

- CU001 - Fundamentals of UNIX or
- CU006 - UNIX VI Text Editing (Basic)

## **Course Content**

### **Review of VI Editor Basics**

1. Entering the Editor
2. Command Mode vs. Insert/Append Mode
3. Entering Text
4. Scrolling and Searching
5. Text Substitution, Replacement, Deletion
6. Moving Text
7. Saving Files and Exiting

### **Using EX Sub-Commands**

1. Global Search and Replace
2. Line Substitution
3. Writing Files to Disk

### **Advanced VI Commands**

1. Marking Text
2. Rearranging and Duplicating Text
3. Recovering Lost Text
4. Reading in Other Files
5. Writing Sections to Another File
6. Editing Multiple Files
7. Escaping to the Shell



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### **Setting VI Options**

1. The .exrc File
2. Editor Options
3. Line Numbering
4. Auto Wrap
5. Tab Stops

### **Abbreviations and Macros**

1. Setting Abbreviations
2. Using Abbreviations
3. Defining Macros
4. Using Macros

### **Using VI as a Programming Editor**

1. Auto Indenting
2. Auto Searching
3. Programming Macros

### **Course Conclusion**



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Course:

## *CU012 - UNIX awk Programming*

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**Length: 2 Days**

### **Description**

AWK is a pattern matching and processing utility which is excellent for data base scanning, processing, and conversion. Because AWK uses 'C' language syntax, it is also an excellent tool for 'C' program prototyping. This course teaches attendees how to use AWK to perform these functions. Examples of data base manipulation using AWK will be provided and attendees will develop AWK programs to perform these functions.

### **Course Objectives**

Upon completion of this course the attendee will be able to:

1. Design and develop AWK programs;
2. Use AWK for file processing and report generation.

### **Course Materials**

1. UNIX AWK Programming Student Guide and course notes.
2. The AWK Programming Language, Alfred Aho, et. al.

### **Prerequisites**

1. CU001 - Fundamentals of Unix
2. CU002 - Bourne Shell Programming or CU003 - Korn Shell Programming
3. A knowledge of C programming is helpful although not necessary.

### **Course Content**

#### **I INTRODUCTION TO AWK PROGRAMMING**

- A Format of awk Programs
- B Basic awk Syntax
- C Comments in awk Programs
- D Executing awk Programs

#### **II RECORDS, FIELDS, AND VARIABLES**

- A Records and Fields
- B Positional Variables
- C Predefined Variables
- D User Defined Variables

#### **III PATTERN SPECIFICATIONS AND OPERATORS**

- A Pattern Specifications
- B Special Symbols Tables
- C Relational Operators
- D Arithmetic Operators
- E Compound Assignment Operators
- F Incremental Operators

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#### **IV PRINT STATEMENTS**

- A Unformatted Print
- B Printing Variables
- C Printing Character Strings
- D Formatted Print
- E Output Redirection
- F Pipes

#### **V CONDITIONAL TESTS AND LOOPING MECHANISMS**

- A if, if-elseStatements
- B while Loops
- C for Loops
- D breakand continue Statements
- E nextand exit statements

#### **VI AWK FUNCTIONS**

- A String Handling Functions
- B Mathematical Functions
- C Arrays

#### **VII AWK AND THE SHELL**

- A Passing Shell Arguments to AWK
- B Passing AWK Output to the shell

#### **VIII COURSE CONCLUSION**



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Course:

## *CA002 - AWK Programming*

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### **Course Description:**

The objective of this course is to develop the programming skills required to write applications using the awk programming language.

### **Audience:**

Unix system application developers, administrators, and advanced users.

### **Prerequisites:**

The ability to write programs in a high level language (such as C or shell) is very helpful in completing the lab exercises and understanding the lectures. A good working knowledge of the UNIX environment is necessary.

## **Course Contents**

### **Introduction to awk**

- What is awk and Why?
- How awk Programs Work
- Running awk Programs
- Examples

### **awk Patterns**

- Summary and Patterns
- BEGIN and END
- Expressions
- String-Matching Patterns
- Extended REs in awk
- Range Patterns

### **awk Actions**

- Summary of Statements
- Expressions
- Operators
- Flow Control
- More Flow Control
- The next, break, continue, and exit statements
- Built-in Variables



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## **awk Input andOutput**

- Formatted Output with printf
- Output into Files
- Output into Pipes
- Input Separators
- Multi-Line Records
- The getline Function
- More getline
- Command Line Parameters

## **awk Functions**

- Built-In Arithmetic Functions
- Built-In String Functions
- More String Functions
- User Defined Functions
- Local Variables

## **awk Arrays**

- Arrays
- Associative Arrays
- The Array for Statement
- The Array in Operator
- Deleting Array Elements
- The Split Function
- Multi-Dimensional Arrays
- Command Line Parameter Passing



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Course:

## *CU005 - UNIX System Security*

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**Length: 5 Days**

### **Description**

This course discusses UNIX security and how system managers and administrators can implement security measures on UNIX. The focus of the course is on the inherent security vulnerabilities commonly found on UNIX systems and how to correct them. Examples are presented which illustrate how to insure a high level of security confidence against unauthorized users from accessing the system. The common methods used to penetrate UNIX systems, gain unauthorized root access permission, become another user, plant trojan horses or spoofs, and other ways of circumventing the normal system protection are disclosed. Each attendee will receive detailed audit checklists and a diskette containing UNIX shell and C programs which will assist in performing security auditing and risk analysis.

## Course Objectives

Upon completion of this seminar the attendee will be able to:

1. state the built-in UNIX security control mechanisms;
2. state the security vulnerabilities inherent to UNIX systems;
3. determine common methods used to gain unauthorized access to the system or data;
4. identify the bugs contained in UNIX system and application programs and how they are exploited by unauthorized users;
5. identify how trojan horses and spoofs are planted into the system and methods of detecting them;
6. state the minimum recommended file and directory access permissions;
7. perform a risk analysis and analyze the results; and
8. execute audit programs which will assist in maintaining system security.

## Course Materials

1. UNIX System Security Student Guide and course notes.
2. Practical UNIX Security, by Simson Garfinkel and Gene Spafford, O'Reilly & Associates, Inc.
3. Security Auditing Software Diskette (source code only).

## Prerequisites

1. CU001 - Fundamentals of Unix
2. CU002 - Bourne Shell Programming or CU003 - Korn Shell Programming
3. Unix System Administration
4. A knowledge of shell and C programming is helpful.

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## **Course Content**

### **I WHY UNIX SECURITY?**

- A UNIX Security Features
- B UNIX Security Problems
- C UNIX Security Levels
- D The Trusted Computing Base
- E The Orange Book

### **II USERS, PASSWORDS, GROUPS, AND THE SUPERUSER**

- A User Accounts
- B Passwords
- C Groups
- D Substitute User
- E User Security Checklist

### **III FILE SYSTEM SECURITY**

- A The UNIX File System
- B Changing File Access Permissions
- C Changing Owner and Group
- D Set UID/Set GID
- E Device Special Files
- F Mountable File Systems
- G File System Security Checklist

### **IV PROGRAMMING SECURITY**

- A Input and Output Functions
- B Writing Secure Programs
- C Compiling and Installing SUID/SGID Programs
- D Programming As root
- E Programming Security Checklist

### **V NETWORK SECURITY**

- A UUCP Security
- B TCP/IP Network Security
- C Network Security Checklist

## **VI COMMON SECURITY PROBLEMS ON UNIX**

- A System Problems
- B System Accounts Without Passwords
- C System Directories With Wrong Permissions
- D System Files with Wrong Permissions
- E Planting Trojan Horses
- F Spoofing Methods
- G Known Bugs, Trapdoors, and Viruses
- H Intelligent Terminals
- I Physical Access
- J Security Problem Checklist

## **VII PROTECTING YOUR SYSTEM**

- A Security Administration
- B Security Compromises
- C Restricted Environments
- D Log Files
- E Recommendations for Securing Your System
- F Administrator Awareness
- G Auditing
- H What To Do If Your System Is Compromised
- I Using the Trusted Computing Base for Auditing
- J System Security Checklist

## **VIII COURSE CONCLUSION**

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Course:

*CU006 - Unix Security for Users*

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**Length: 1 Day**

### **Description**

This seminar is designed to make all users aware of the UNIX security vulnerabilities and show them how to prevent an unauthorized user from compromising their login account or data. The security features which are provided as part of the operating system are first discussed. Then, some of the ways in which unauthorized people may use to gain access to a UNIX system or another users files and directories are discussed. Next, the ways of preventing unauthorized access are described in detail, along with exact descriptions of each UNIX command and the way it is used. Each attendee will be provided with a self-assessment checklist and sample programs which will allow them to perform a personal audit on their account. The seminar concludes with a discussion of the actions a user should take if they suspect compromise of their login and/or files.

## Course Objectives

Upon completion of this seminar the attendee will be able to:

1. state the security features of UNIX;
2. identify methods used to gain unauthorized access;
3. describe how unauthorized access can be prevented;
4. perform a self-audit on your login, files and directories;
5. state the actions to take if compromise is suspected.

## Course Materials

1. UNIX Security for Users Student Guide and course notes.
2. User Security Checklist
3. Sample Audit Programs

## Prerequisites

None

## Course Content

### I UNIX SECURITY CONCERNS

- A Unauthorized Access by Trusted Users
- B Unauthorized Access by Hackers

### II UNIX SECURITY FEATURES

- A Login
- B Passwords
- C File/Directory Access Permissions
  1. User
  2. Group
  3. Other
- D umask
- E Terminal Security
- F Network Security



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### **III METHODS USED TO GAIN UNAUTHORIZED ACCESS**

- A Loaned Out Logins
- B Password Compromise
- C File/Directory Permissions
- D Tricking Authorized Users/System Administrators
- E Problems in System Programs
- F Intelligent Terminals

### **IV PROTECTING YOUR LOGIN, FILES, AND DIRECTORIES**

- A What to Look For
- B User Responsibilities
  - 1. Setting Up The Environment (PATH)
  - 2. Changing File Access Permissions
  - 3. Changing File Ownership
  - 4. Changing File Group
  - 5. Checking File/Directory Access Permissions
  - 6. Last Login
  - 7. Auto Logoff
  - 8. Terminal Locking
  - 9. Data Encryption
- C System Administrator Responsibilities
  - 1. Audits
  - 2. Access Modes
  - 3. Preventing Use of System Program Problems
- D What to do if compromise is suspected

### **V COURSE CONCLUSION**



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Course:

## *CU001 - Fundamentals of UNIX*



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<http://www.corder.com/courses.pdf>

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**Length: 4 Days**

### **Description**

This course introduces attendees to the UNIX Operating System and provides the initial knowledge and hands-on experience to get them started using UNIX quickly and efficiently. Subjects covered include an overview of operating system concepts and UNIX architecture, how to log on and off, UNIX system documentation, communications and status inquiry commands, the structure of the UNIX file system, file and directory manipulation commands, how to use the vi (visual) text editor, the use of the shell as a command interpreter and programming language, and the use of over 25 commands for data manipulation.

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## Course Objectives

Upon completion of this course the attendee will be able to:

1. state the major components and architecture of UNIX;
2. log on and off of UNIX;
3. use the UNIX system documentation;
4. communicate with other users on the system through mail and write;
5. organize and manipulate files and directories and their contents;
6. use the UNIX text editor to create and modify files;
7. use the UNIX shell file name expansion, I/O redirection, pipe, and quoting mechanisms;
8. use UNIX utilities to create simple tools for information processing.

## Course Materials

1. Fundamentals of UNIX Student Guide and course notes.
2. Exploring the Unix System, Second Edition, Stephen G. Kochan and Patrick H. Wood.

## Prerequisites

None

## Course Content

### I UNIX OVERVIEW

- A UNIX system history and philosophy.
- B System architecture: kernel, file system, shell, utilities, and applications.

### II USING UNIX

- A Logging on and off.
- B UNIX system documentation.
- C Status inquiries: who, date, and ps.
- D System communications: wall and news.
- E Sending and receiving electronic mail.
- F Terminal communications: write.

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### **III THE UNIX FILE SYSTEM**

- A The logical and physical file system.
- B Listing files and directories: ls.
- C Path names.
- D Accessing files and directories.
- E File and directory access permissions.
- F File manipulation commands.
- G Directory manipulation commands.
- H File/directory naming conventions.

### **IV TEXT EDITING**

- A Entering and exiting vi.
- B Moving around in vi.
- C Creating new text.
- D Modifying text.
- E Copying text.
- F Setting up the vi environment.

### **V THE UNIX SHELL**

- A Overview of the shell.
- B Command interpretation.
- C File name expansion.
- D Input/output redirection.
- E Pipes.
- F Quoting.
- G Shell variables.
- H Modifying the user environment: .profile.
- I Shell programming.

## VI UNIX UTILITIES

- A Displaying and printing files
  - 1. cat
  - 2. pr
  - 3. pg
  - 4. lp
- B File Manipulation Commands
  - 1. split and csplit
  - 2. tail
  - 3. grep
  - 4. sort
  - 5. tr
  - 6. cut and paste
  - 7. sed
- C File information commands
  - 1. find
  - 2. file
- D File comparison commands
  - 1. diff
  - 2. comm
  - 3. uniq
  - 4. cmp
  - 5. sum

## VII COURSE CONCLUSION

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**Course:**

*CU018 - Concepts of UNIX Internals*

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**Length: 4 Days**

**Description**

This seminar presents an in-depth discussion of the UNIX operating system which includes operating system concepts; current UNIX hardware systems and their differences; UNIX versions and look-alikes; detailed discussions of the physical and logical file system implementation, process control mechanisms, I/O subsystem, and interprocess communications. This seminar is designed for system and application programmers, system analysts, and others responsible for porting UNIX and/or application and system software. At the conclusion of this seminar the attendee will have a through understanding of how UNIX operates, manages users and processes, maintains file system integrity, and controls input and output.

## Course Objectives

Upon completion of this seminar the attendee will be able to:

1. state the architecture and features of the UNIX operating system;
2. list the events which occur during UNIX system startup;
3. state the purpose and functions of the UNIX shell;
4. describe the implementation of the physical and logical file systems;
5. define processes and describe how they are created, managed, and terminated;
6. describe the I/O subsystem to include block and character devices, streams and sockets; and,
7. describe how the following interprocess communications facilities operate:
  1. pipes;
  2. messages;
  3. semaphores;
  4. shared memory; and, signals.

## Course Materials

1. Concepts of UNIX Internals Student Guide and course notes.
2. The Design of the UNIX Operating System, Maurice J. Bach.

## Prerequisites

None

## Course Content

### I UNIX SYSTEM OVERVIEW

- A History Of UNIX
- B Hardware
- C Major UNIX Releases
- D UNIX O.S. Structure



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## **II THE SHELL**

- A Command Interpretation
- B Command Parsing
- C Standard Input/output
- D I/O Redirection
- E Background Processing
- F Shell Variables
- G Pipes
- H Filters
- I Wild Card Matching
- J Shell Programming

## **III THE UNIX PHYSICAL FILE SYSTEM**

- A File System Format
- B Super Block
- C File System Hierarchy
- D File Allocation
- E Creating A Link
- F Mountable File Systems
- G File System Commands

## **IV THE UNIX LOGICAL FILE SYSTEM**

- A File System Features
- B File Concept
- C Types Of Files
- D Hierarchal File System Directories
- E Path Names
- F File And Directory Names
- G System Directories
- H Listing Files And Directories
- I File Attributes
- J File Access Permissions
- K File Manipulation
- L Directory Manipulation
- M Special Files
- N Efficient Use Of File System

## **V PROCESS CONTROL**

- A Process Definition
- B Process Attributes
- C User Block
- D Process File Table
- E File Descriptors
- F System File Table
- G System Inode Table
- H Invoking Processes
- I Fork & Exec
- J Pipes
- K Background Processes
- L Signals

## **VI I/O SUBSYSTEM**

- A Driver Interfaces
- B Block Devices
- C Character Devices
- D Streams

## **VII INTERPROCESS COMMUNICATIONS**

- A Process Tracing
- B System V IPC
- C Network Communications
- D Sockets

## **VIII COURSE CONCLUSION**

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**Course:**

*CU110 - Fundamentals of UNIX*

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**Course Description:**

This course provides a comprehensive introduction to the full range of UNIX user commands and utilities. Students will develop shell programming and vi editing skills.

**Audience:**

End-users and programmers who are new to the UNIX environment.

**Prerequisites:**

None

## **Course Contents**

### **Introduction**

- Course objectives
- Course overview
- Suggested references and readings

### **Getting Started**

- What is UNIX?
- A brief history of UNIX
- Logging in
- Logging out
- Try a few more commands
- Changing your password
- Using on-line manuals

### **The File System - Files**

- What is a file?
- The ls command
- The cat command
- The more and pg commands
- The head and tail commands
- The cp command
- The mv command
- The rm command
- File names

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## **The File System - Directories**

- Hierarchical file system
- Pathnames
- The pwd command - print working directory
- The cd command - change directory
- The mkdir command - make directories
- The rmdir command - remove directories
- The cp command - copy files
- Two useful directory names - . and ..

## **Editing With vi**

- What is vi?
- The vi buffering process
- Command mode and insert mode
- Modes diagram
- Getting started
- Moving the cursor around

## **Inserting text**

- Deleting a character or line
- Undo last command
- Opening a new line
- Save your work or abort the session
- Review of vi commands

### More Editing With vi

- Scrolling the buffer
- Cursor motion commands - w, W, b, B, e, E
- Cursor motion commands - \$, ^, 0, G
- Cursor motion commands - f, t, F, T
- Delete operator - d
- Change operator - c
- Yank operator - y
- Put commands - p, P
- Searching for a pattern - /, n, N, ?
- The join command
- The fi le command - :f
- Edit fi le command - :e
- Cut and paste between fi les
- Read fi le command - :r
- Set options command
- Set options command - .exc fi le

### Personal Utilities

- The date utility
- The bc utility
- The expr utility
- The cal utility
- The news utility
- The id utility
- The uname utility
- The fi nger utility
- The script utility
- The clear utility
- Appendix: The at and crontab utilities

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### **Text Handling Utilities**

- The grep utility
- The tr utility
- The cut utility
- The paste utility
- The sort utility
- The wc utility
- The diff utility
- The lp utility

### **File System Security**

#### **File permissions**

- The chmod utility
- Directory permissions
- The umask command

### **File System Management Utilities**

- The find utility
- The df utility
- The du utility
- Compressing files
- The ln utility
- The ulimit utility
- The tar utility

### **Communication Utilities**

- The write and talk utilities
- The mesg utility
- Mail overview

- The mail utility
- The mailx utility
- elm - electronic mail
- Sending mail with elm
- Reading mail with elm
- Customizing elm
- elmr example

### **Using the Shell**

- What is a shell?
- Which shell?
- The command line
- Standard input, standard output and standard error
- Using default standard in and standard output
- I/O redirection
- Appending output of a file
- Pipes
- The tee utility

### **Filename Generation**

- Filename generation
- The ? special character
- The \* special character
- The [ ] special characters
- The ! special characters

### **Introduction to Shell Programming**

- Shell programming objectives
- Overview



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- 
- Suggested references and reading

### **UNIX Processes**

- What is a process?
- Process structure
- The ps utility
- Options to the ps utility
- Background commands (&)
- Killing background processes
- Redirecting the standard error

### **Shell Programming Concepts**

- What is a shell?
- What is a shell script?
- Why use shell scripts?

### **Flow Control.**

- The exit status of commands
- Command line examples
- The test command
- The if-then-else construct
- The elif construct
- A loop example

### **Variables**

- User created variables
- The shell environment
- The export command
- Sub-shells

- Command substitution
- Quoting mechanisms
- Assigning variables - summary

### **Special Variables**

- Command line arguments
- \$# - Number of arguments
- The shift command
- \$\* - All arguments
- \$\$ - PID of shell

### **More Flow Control**

- The for loop
- The while loop
- The case construct

### **Appendix: Korn shell features**

- Viewing your command history
- Editing and re-executing commands

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**Course:**

*CU200 - UNIX System  
Administration*

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1 (866) 521-1776

P.O. Box 307218  
Columbus, OH 43230

**Course Description:**

Learn and practice essential administration tasks. Generic system administration concepts are covered and related to specific vendors' systems.

**Audience:**

UNIX administrators and anyone involved with the UNIX System V, Release 4 operating system.

**Prerequisites:**

Fundamentals of UNIX, and some system administration experience recommended.

## **Course Contents**

### **Overview of System Administration**

- System Administrator Responsibilities
- A Brief History of UNIX
- Evolving Standards
- Navigating the Documentation

### **User Administration**

- What is a “user” in UNIX?
- The /etc/passwd File
- Groups
- The /etc/group File
- Passwords
- Adding Users
- Deleting Users
- Modifying User Attributes
- The Login Process
- /etc/profile and .profile
- Communicating with Users: /etc/motd
- Communicating with Users: The wall Command

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## **File System Basics**

- The Hierarchy
- Files
- Directories
- Device Files
- Character and Block Devices
- The/dev Directory
- Links
- Symbolic Links
- A File System Tour
- The df Command
- The du Command
- The fi nd Command

## **Advanced File System Concepts**

- The Physical File System
- The Inode File
- File Storage in Disk Blocks
- The Superblock
- The Free List
- Slices and File Systems
- File System Types

## **Disk Management**

- Making a File System
- The mkfs Command
- Sharing Filesystems
- The mount Command
- The fstab File
- The fsck Command
- The lost+found Directory
- The prtvtoc Command

## **Backups**

- Backup Strategies
- Backup Tools
- The tar Command
- The cpio Command
- The dump Command
- Network Backup Strategies

## **UNIX Processes**

- Overview of Processes
- Process Space
- Process Table
- The fork/exec Mechanism
- The ps Command
- Background Processes
- The kill Command
- Scheduling Jobs
- The cron Daemon
- The at Command
- The crontab Command
- Format of cron Files
- Access to Scheduling Facilities

## **System Startup and Shutdown**

- Run States
- The init Daemon
- /etc/inittab
- The inittab Actions
- The init Command
- The rc Scripts
- Single-User Mode
- The shutdown Command



### **UNIX System Security**

- Security Overview
- Physical Security
- Account Security
- SUID and SGID Settings
- File and Directory Permissions
- Software Security

### **Performance Monitoring and Tuning**

- Performance Issues
- Methods of Improving Performance
- Swapping and Paging
- The sar Utility
- Using sar
- The truss Command

### **IP Addressing**

- Basic Network Needs
- Ethernet Addresses
- IP Addresses
- DNS vs /etc/hosts to Resolve IP Addresses
- Network Addresses
- Network Classes
- Broadcast Addresses
- Subnet Masks

### **Configuring TCP/IP**

- The /etc/hosts File
- The ifconfig Command
- The /etc/services File



- 
- 
- The inetd Daemon
  - The /etc/inetd.conf File
  - Simple TCP/IP Troubleshooting: The ping and netstat Commands

### **The LP Print Service**

- Printing Overview
- The lp, lpstat, and cancel Commands
- Adding a Printer
- The lpadmin Command
- The accept and reject Commands
- The enable and disable Commands
- Adding a Networked Printer
- Other Administrative Commands

### **Network Utilities**

- Network Services
- telnet - Terminal Emulator
- ftp - File Transfer
- rcp - Remote Copy
- rlogin - Remote Login
- rsh - Remote Commands

### **Kernel Reconfiguration**

- Overview of Reconfiguration
- Kernel Parameters
- Steps to Reconfigure a Kernel
- Specific Steps for SVR4

### **Overview of NIS**

- What is NIS?
- Why Use NIS?
- NIS Design and Implementation
- NIS Maps
- Configuring NIS

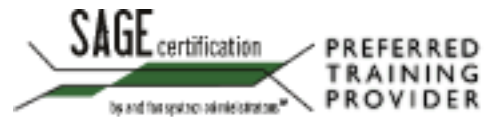




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**Course:**

## *CU214 - Advanced UNIX Tools*



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P.O. Box 307218  
Columbus, OH 43230

### **Course Description:**

In this course, students develop more advanced skills in using UNIX tools. Users increase their productivity in UNIX by learning how to create powerful korn shell scripts for processing text, managing files, and performing other complex tasks.

### **Audience:**

UNIX users, programmers, and system administrators who wish to develop more advanced skills in UNIX.

### **Prerequisites:**

Fundamentals of UNIX

## Course Contents

### ex and vi Options

- ex and vi - Two Editors in One
- ex and vi - Options
- How to Set Options Within vi
- How to Set Options in .exrc

### vi Buffers

- The Unnamed Buffer
- Named Buffers
- Cutting and Pasting Between Files
- The :next Command
- The Delete Buffers

### Shell Interaction - Extending vi

- File Name Shortcuts in vi
- Invoking Shell Commands - ex
- Reading the Output of a Command
- Invoking Filters from vi

### vi Macros

- What are Macros and Why?
- The :map Command
- The vi Quote Mechanism
- Markers
- Executing Commands from a Buffer

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## **Regular Expressions**

- What is a Regular Expression?
- Literal Regular Expressions
- Regular Expressions: ^, \$, \, . [s]
- Regular Expressions: \*, \{m,n\}
- Subexpressions

## **Shell Programming**

- Filename Generation
- Parameters
- Named Parameters
- Positional Parameters
- Special Parameters
- Parameter Substitution
- Here Documents
- Shell Commands
- Command List Separators
- Control Flow - Conditionals
- The case Construct
- Control Flow - Loops
- The trap Command

## **Korn Shell Features**

- Aliases
- Command History
- Functions
- The print and read Commands
- The set Command

### **Introduction to sed**

- About sed
- Why Use sed?
- Invoking sed
- How sed Works

### **Using sed**

- sed Addressing
- sed Addressing - Formats
- sed Functions

### **Introduction to awk**

- Introduction to awk
- How awk Programs Work
- Running awk Programs

### **Awk Patterns**

- Summary of Patterns
- BEGIN and END
- Expressions
- String-Matching Patterns
- Extended REs in awk
- Range Patterns

### **Overview of Perl**

- What is Perl?
- Running Perl programs
- Sample Programs



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Section

*AIX*

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P.O. Box 307218  
Columbus, OH 43230

- CA601 -Fundamentals Of AIX
- CA602 -AIX System Administration
- CA603 -AIX Network Administration
- CA611 -AIX System Administration
- CA612 -Advanced AIX System Administration
- CA613 -AIX Networking Administration



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Course:

*CA601 - Fundamentals of AIX*

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1 (866) 521-1776

P.O. Box 307218  
Columbus, OH 43230

**Length:** 4 Days

**Description**

This course introduces attendees to the AIX Operating System and provides the initial knowledge and hands-on experience to get them started using AIX quickly and efficiently. Subjects covered include an overview of operating system concepts and AIX architecture, how to log on and off, AIX system documentation, communications and status inquiry commands, the structure of the AIX file system, file and directory manipulation commands, how to use the vi (visual) text editor, the use of the shell as a command interpreter and programming language, and the use of over 25 commands for data manipulation.

## Course Objectives

Upon completion of this course the attendee will be able to:

1. state the major components and architecture of AIX;
2. log on and off of AIX;
3. use the AIX system documentation;
4. communicate with other users on the system through mail and write;
5. organize and manipulate files and directories and their contents;
6. use the AIX text editor to create and modify files;
7. use the AIX shell file name expansion, I/O redirection, pipe, and quoting mechanisms;
8. use AIX utilities to create simple tools for information processing.

## Course Materials

1. Fundamentals of AIX Student Guide and course notes.
2. Exploring the Unix System, Second Edition, Stephen G. Kochan and Patrick H. Wood.

## Prerequisites

None

## Course Content

### I AIX OVERVIEW

- A AIX system history and philosophy.
- B System architecture: kernel, file system, shell, utilities, and applications.

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## **II USING AIX**

- A Logging on and off.
- B AIX system documentation.
- C Status inquiries: who, date, and ps.
- D System communications: wall and news.
- E Sending and receiving electronic mail.
- F Terminal communications: write.

## **III THE AIX FILE SYSTEM**

- A The logical and physical file system.
- B Listing files and directories: ls.
- C Path names.
- D Accessing files and directories.
- E File and directory access permissions.
- F File manipulation commands.
- G Directory manipulation commands.
- H File/directory naming conventions.

## **IV TEXT EDITING**

- A Entering and exiting vi.
- B Moving around in vi.
- C Creating new text.
- D Modifying text.
- E Copying text.
- F Setting up the vi environment.

## **V THE AIX SHELL**

- A Overview of the shell.
- B Command interpretation.
- C File name expansion.
- D Input/output redirection.
- E Pipes.
- F Quoting.
- G Shell variables.
- H Modifying the user environment: .profile.
- I Shell programming.

## VI AIX UTILITIES

- A Displaying and printing files
  - 1. cat
  - 2. pr
  - 3. pg
  - 4. lp
- B File Manipulation Commands
  - 1. split and csplit
  - 2. tail
  - 3. grep
  - 4. sort
  - 5. tr
  - 6. cut and paste
  - 7. sed
- C File information commands
  - 1. find
  - 2. file
- D File comparison commands
  - 1. diff
  - 2. comm
  - 3. uniq
  - 4. cmp
  - 5. sum

## VII COURSE CONCLUSION

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**Course:**

## *CA602 - AIX System Administration*

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1 (866) 521-1776

P.O. Box 307218  
Columbus, OH 43230

**Length:** 5 Days

### **Description**

Attendees of this course will learn how to perform most day-to-day system administration tasks. Topics include system startup and shutdown, adding/deleting users, installing terminals, modems, and printers, backing up and restoring system and user data, application package installation, security, and general administrative advice. A diskette containing helpful System Administration utilities and guidelines is also provided to each attendee.

## Course Objectives

Upon completion of this course you will be able to:

1. start up and shut down a AIX system gracefully,
2. monitor system status to determine correct operation,
3. add and delete user accounts and groups,
4. add and configure terminals and printers,
5. create new file systems, check the integrity of file systems, and repair damaged file systems,
6. perform complete and incremental file system backups and restores,
7. identify AIX floppy and tape device special files,
8. use the cpio and tar archive programs for data storage and retrieval,
9. set up and use the cron and at facilities,
10. install the AIX operating system.

## Course Materials

1. AIX System Administration Student Guide and course notes.
2. Essential System Administration, by O'Reilly & Associates.
3. AIX System Administration Software Diskette

## Prerequisites

1. CA601 - Fundamentals of AIX
2. CU002 - Bourne Shell Programming or CU003 - Korn Shell Programming

## Course Content

### I OVERVIEW OF SYSTEM ADMINISTRATION

- A Duties of the system administrator
- B AIX system administration commands and utilities
- C Configuration files and scripts
- D Log files

### II SYSTEM STARTUP AND SHUTDOWN

- A Applying power
- B Run levels
- C Setting the date and time
- D Checking system status
- E System shutdown



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### **III ADDING AND DELETING USERS**

- A The /etc/passwd and /etc/group files
- B Adding a new user
- C Setting up a user's .profile file.
- D Deleting a user

### **IV MAINTAINING FILE SYSTEMS**

- A Monitoring disk space
- B Checking file systems
- C Creating new file systems
- D Mounting/unmounting file systems

### **V ADDING PERIPHERALS TO THE SYSTEM**

- A Terminals
- B Printers
- C Modems

### **VI DISK/TAPE MANAGEMENT**

- A Disk/Tape Devices
- B The tar command
- C The cpio command

### **VII PERFORMING FILE BACKUPS AND RESTORES**

- A Backup strategies
- B Using the cpio and tar commands.
- C Backing up file systems.
- D Restoring files.

### **VIII TASK SCHEDULING**

- A The cron demon.
- B The at command.

**IX OPERATING SYSTEM INSTALLATION**

- A Pre-Installation Tasks
- B Installing the base operating system
- C Installing additional packages

**X COURSE CONCLUSION**

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**Course:**

*CA603 - AIX Network Administration*

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1 (866) 521-1776

P.O. Box 307218  
Columbus, OH 43230

**Length:** 2 Days

### **Description**

This course provides knowledge and hands-on experience necessary to configure and maintain a TCP/IP network environment. Topics include an overview of basic networking concepts, checking for proper installation of hardware and software, names, purpose, and format of each network control file, configuring the network, setting up network and/or remote file systems, and setting up the Network Information Service (formally, Yellow Pages).

### **Course Objectives**

Upon completion of this course the attendee will be able to:

1. describe and state the purpose of the various network protocols;
2. check network hardware and software for proper installation;
3. configure the network software for the specific environment;
4. set up NFS or RFS;
5. set up NIS; and,
6. manage the network.

## Course Materials

1. AIX Network Administration Student Guide and course notes.
2. TCP/IP Network Administration O'Reilly & Associates.

## Prerequisites

1. CA601 - Fundamentals of AIX
2. CA602 - AIX System Administration

## Course Content

### I Network Overview

- A. Network Layers - Physical, Link, Transport, Virtual Terminal, etc.
- B. TCP/IP Description
- C. FTP Description
- D. SMTP Description
- E. Server-Client Relationships

### II Setting up the Network

- A. Checking the physical connection.
  1. UNIX-UNIX Configuration
  2. UNIX-PC Configuration
- B. Installing Network Software

### III CONFIGURING THE NETWORK

- A. Network Control Files
  1. /etc/gateways
  2. /etc/hosts
  3. /etc/hosts.equiv
  4. .rhosts
  5. /etc/services
  6. .netrc
  7. /etc/networks
  8. /etc/protocols
  9. /etc/ftpusers
- B. Configuring and Managing Remote and Network File Systems
- C. Configuring and Managing the Network Information Service.

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Course:

## CA611 - AIX System Administration



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1 (866) 521-1776

P.O. Box 307218  
Columbus, OH 43230

**Duration:** 5 days

**Audience:** New AIX system administrators or administrators migrating from other UNIX systems to AIX.

**Description:** This course combines lectures and hands-on labs to teach the participant how to manage the AIX operating system. It includes information on basic system administration, as well as including topics that are AIX-specific that would be of interest to administrators coming from other platforms. The course may be customized to include topics associated with AIX on the SP platforms.

**Prerequisites:** A familiarity with using the UNIX operating system, including using vi, navigating file systems and using basic commands. This may be accomplished by taking an Introduction to AIX course, or having equivalent experience.

**Topics:**

- Introduction to System Administration
- System Management Tool (smit)
- Managing Devices
- System Startup/Shutdown
- File System Concepts
- The Journaled File System
- Backup and Restore
- Logical Volume Manager
- Managing Users and Groups
- AIX Queuing System
- Basic Problem Determination

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Course:

## *CA612 - Advanced AIX System Administration*



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P.O. Box 307218  
Columbus, OH 43230

**Duration:** 3 days

**Audience:** AIX administrators who desire in-depth knowledge and advanced system management skills for managing AIX.

**Description:** This course provides follow-on training for students who have completed the AIX System Administration class. The topics in this course go beyond the basics to include tasks involving security, the ODM, problem solving and performance.

**Prerequisites:** Basic AIX administration skills. These skills may be obtained by taking a AIX System Administration course.

**Topics:**

- Managing System Security
- ODM
- AIX Performance Management
- Dump and Crash
- Error Logging
- Trace



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Course:

*CA613 - AIX Network Administration*

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P.O. Box 307218  
Columbus, OH 43230

**Duration:** 3 days

**Audience:** System and network administrators who require skills in configuring and managing local and wide area networks that include AIX systems.

**Description:** This course teaches the skills necessary to configure and manage TCP/IP, NFS, NIS and DNS.

**Prerequisites:** Basic AIX system administration skills. These skills may be obtained by attending a AIX System Administration class.

**Topics:**

- Overview of Networking
- Configuring TCP/IP
- Configuring SLIP and SLIPLOGIN
- Managing Xstations
- NFS
- NIS
- DNS
- PPP

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Section

*HP-UX*

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P.O. Box 307218  
Columbus, OH 43230

- CH701 -Fundamentals of HP-UX
- CH702 -HP-UX System Administration
- CH703 -HP-UX Network Administration



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Course:

*CH701 - Fundamentals of HP-UX*

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1 (866) 521-1776

P.O. Box 307218  
Columbus, OH 43230

**Length:** 4 Days

**Description**

This course introduces attendees to the HP-UX Operating System and provides the initial knowledge and hands-on experience to get them started using HP-UX quickly and efficiently. Subjects covered include an overview of operating system concepts and HP-UX architecture, how to log on and off, HP-UX system documentation, communications and status inquiry commands, the structure of the HP-UX file system, file and directory manipulation commands, how to use the vi (visual) text editor, the use of the shell as a command interpreter and programming language, and the use of over 25 commands for data manipulation.

## Course Objectives

Upon completion of this course the attendee will be able to:

1. state the major components and architecture of HP-UX;
2. log on and off of HP-UX;
3. use the HP-UX system documentation;
4. communicate with other users on the system through mail and write;
5. organize and manipulate files and directories and their contents;
6. use the HP-UX text editor to create and modify files;
7. use the HP-UX shell file name expansion, I/O redirection, pipe, and quoting mechanisms;
8. use HP-UX utilities to create simple tools for information processing.

## Course Materials

1. Fundamentals of HP-UX Student Guide and course notes.
2. Exploring the Unix System, Second Edition, Stephen G. Kochan and Patrick H. Wood.

## Prerequisites

None

## Course Content

### I HP-UX OVERVIEW

AHP-UX system history and philosophy.

BSystem architecture: kernel, file system, shell, utilities, and applications.

### II USING HP-UX

- A Logging on and off.
- B HP-UX system documentation.
- C Status inquiries: who, date, and ps.
- D System communications: wall and news.
- E Sending and receiving electronic mail.
- F Terminal communications: write.

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### **III THE HP-UX FILE SYSTEM**

- A The logical and physical file system.
- B Listing files and directories: ls.
- C Path names.
- D Accessing files and directories.
- E File and directory access permissions.
- F File manipulation commands.
- G Directory manipulation commands.
- H File/directory naming conventions.

### **IV TEXT EDITING**

- A Entering and exiting vi.
- B Moving around in vi.
- C Creating new text.
- D Modifying text.
- E Copying text.
- F Setting up the vi environment.

### **V THE HP-UX SHELL**

- A Overview of the shell.
- B Command interpretation.
- C File name expansion.
- D Input/output redirection.
- E Pipes.
- F Quoting.
- G Shell variables.
- H Modifying the user environment: .profile.
- I Shell programming.

## **VI HP-UX UTILITIES**

### **A Displaying and printing files**

1. cat
2. pr
3. pg
4. lp

### **B File Manipulation Commands**

1. split and csplit
2. tail
3. grep
4. sort
5. tr
6. cut and paste
7. sed

### **C File information commands**

1. find
2. file

### **D File comparison commands**

1. diff
2. comm
3. uniq
4. cmp
5. sum

## **VII COURSE CONCLUSION**



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Course:

*CH702 - HP-UX System  
Administration*

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1 (866) 521-1776

P.O. Box 307218  
Columbus, OH 43230

**Length:** 5 Days

**Description**

Attendees of this course will learn how to perform most day-to-day system administration tasks. Topics include system startup and shutdown, adding/deleting users, installing terminals, modems, and printers, backing up and restoring system and user data, application package installation, security, and general administrative advice. A diskette containing helpful System Administration utilities and guidelines is also provided to each attendee.

## Course Objectives

Upon completion of this course you will be able to:

1. start up and shut down a HP-UX system gracefully,
2. monitor system status to determine correct operation,
3. add and delete user accounts and groups,
4. add and configure terminals and printers,
5. create new file systems, check the integrity of file systems, and repair damaged file systems,
6. perform complete and incremental file system backups and restores,
7. identify HP-UX floppy and tape device special files,
8. use the cpio and tar archive programs for data storage and retrieval,
9. set up and use the cron and at facilities,
10. install the HP-UX operating system.

## Course Materials

1. HP-UX System V Release 4 Administration Student Guide and course notes.
2. Essential System Administration, by O'Reilly & Associates.
3. HP-UX System Administration Software Diskette

## Prerequisites

1. CH701 - Fundamentals of HP-UX
2. CU002 - Bourne Shell Programming or CU003 - Korn Shell Programming

## Course Content

### I OVERVIEW OF SYSTEM ADMINISTRATION

- A Duties of the system administrator
- B HP-UX system administration commands and utilities
- C Configuration files and scripts
- D Log files

### II SYSTEM STARTUP AND SHUTDOWN

- A Applying power
- B Run levels
- C Setting the date and time
- D Checking system status
- E System shutdown

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### **III ADDING AND DELETING USERS**

- A The /etc/passwd and /etc/group files
- B Adding a new user
- C Setting up a user's .profile file.
- D Deleting a user

### **IV MAINTAINING FILE SYSTEMS**

- A Monitoring disk space
- B Checking file systems
- C Creating new file systems
- D Mounting/unmounting file systems

### **V ADDING PERIPHERALS TO THE SYSTEM**

- A Terminals
- B Printers
- C Modems

### **VI DISK/TAPE MANAGEMENT**

- A Disk/Tape Devices
- B The tar command
- C The cpio command

### **VII PERFORMING FILE BACKUPS AND RESTORES**

- A Backup strategies
- B Using the cpio and tar commands.
- C Backing up file systems.
- D Restoring files.

### **VIII TASK SCHEDULING**

- A The cron demon.
- B The at command.

### **IX OPERATING SYSTEM INSTALLATION**

- A Pre-Installation Tasks
- B Installing the base operating system
- C Installing additional packages



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**Course:**

## *CH7003 -HP-UX Network Administration*

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P.O. Box 307218  
Columbus, OH 43230

**Length:** 2 Days

### **Description**

This course provides knowledge and hands-on experience necessary to configure and maintain a TCP/IP network environment. Topics include an overview of basic networking concepts, checking for proper installation of hardware and software, names, purpose, and format of each network control file, configuring the network, setting up network and/or remote file systems, and setting up the Network Information Service (formally, Yellow Pages).

### **Course Objectives**

Upon completion of this course the attendee will be able to:

1. describe and state the purpose of the various network protocols;
2. check network hardware and software for proper installation;
3. configure the network software for the specific environment;
4. set up NFS / or RFS;
5. set up NIS; and,
6. manage the network.

### **Course Materials**

1. HP-UX Network Administration Student Guide and course notes.
2. TCP/IP Network Administration O'Reilly & Associates.

### **Prerequisites**

1. CU701 - Fundamentals of Unix System V Release 4
2. CU702 - Unix System System V Release 4 Administration

### **Course Content**

#### **I NETWORK OVERVIEW**

- A Network Layers - Physical, Link, Transport, Virtual Terminal, etc.
- B TCP/IP Description
- C FTP Description
- D SMTP Description
- E Server-Client Relationships

#### **II SETTING UP THE NETWORK**

- A Checking the physical connection.
  1. UNIX-UNIX Configuration
  2. UNIX-PC Configuration
- B Installing Network Software

#### **III CONFIGURING THE NETWORK**

##### **A Network Control Files**

1. /etc/gateways
  2. /etc/hosts
  3. /etc/hosts.equiv
  4. .rhosts
  5. /etc/services
  6. .netrc
  7. /etc/networks
  8. /etc/protocols
  9. /etc/ftpusers
- B Configuring and Managing Remote and Network File Systems
  - C Configuring and Managing the Network Information Service.

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Section

*Linux*

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Columbus, OH 43230

- CL010 -Fundamentals of Linux
- CL020 -Advanced Linux and UNIX Programming
- CL030 -Linux System Administration





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**Course:**

*CL010 - Fundamentals of LINUX*

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Columbus, OH 43230

**Course Description:**

This comprehensive hands-on course provides the knowledge and skills needed to effectively use Linux. In this course you will learn how to use Linux user commands and develop shell scripts.

**Audience:**

End-users and programmers who are new to the Linux environment.

**Prerequisites:**

None

## **Course Contents**

### **Getting Started**

- What is UNIX?
- A Brief History of UNIX
- Linux
- Linux Distributions
- Logging In
- Logging Out
- Try a Few More Commands
- Changing Your Password
- Using On-Line Manuals

### **The File System - Files**

- What is a File?
- The ls Command
- The cat Command
- The more and less Commands
- The head and tail Commands
- The cp Command
- The mv Command
- The rm Command
- File Names

### **The File System - Directories**

- Hierarchical File System
- Pathnames
- The pwd Command - Print Working

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## **Directory**

- The cd Command - Change Directory
- The mkdir Command - Make Directories
- The rmdir Command - Remove

## **Directories**

- The cp Command (again) - Copy Files
- Two Useful Directory Names - . and ..

## **Editing With vi**

- What is vi?
- The vi Buffering Process
- Command Mode and Insert Mode
- Modes Diagram
- Getting Started
- Moving the Cursor Around
- Inserting Text

## **Deleting a Character or Line**

## **Undo Last Command**

- Opening a New Line
- Save Your Work or Abort the Session
- Review of vi Commands

### More Editing with vi

- Scrolling the Buffer
- Cursor Motion Commands - w,W,b,B,e,E
- Cursor Motion Commands - \$,^,0,G
- Cursor Motion Commands - f,t,F,T
- Delete Operator - d
- Change Operator - c
- Yank Operator - y
- Put Commands - p,P
- Searching for a Pattern - /,n,N,?
- The Join Command
- The File Command - :f
- Edit File Command - :e
- Cut and Paste Between Files
- Read File Command - :r
- Set Options Command
- Set Options Command - .exrc fi le

### Personal Utilities

- The date Utility
- The bc Utility
- The expr Utility
- The cal Utility
- The id Utility
- The uname Utility
- The fi nger Utility
- The script Utility
- The clear Utility
- Appendix: The at and crontab
- Utilities

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### **Text Handling Utilities**

- The grep Utility
- The tr Utility
- The cut Utility
- The paste Utility
- The sort Utility
- The wc Utility
- The diff Utility
- The lpr Utility

### **File System Security**

- File Permissions
- The chmod Utility
- Directory Permissions
- The umask Command

### **File System Management Utilities**

- The find Utility
- The df Utility
- The du Utility
- Compressing Files
- The ln Utility
- The ulimit Utility
- The tar Utility

### **Communication Utilities**

- The write and talk Utilities
- The mesg Utility
- Mail Overview
- The mail Utility

- elm - Electronic Mail
- Sending Mail with elm
- Reading Mail with elm
- Customizing elm
- elmrc

### **Using the Shell**

- What is a Shell?
- The Command Line
- Standard Input, Standard Output and Error
- Using Default Standard In and Output
- I/O Redirection
- I/O Redirection - Examples
- I/O Redirection - Warning
- Appending Output of a File
- Pipes
- The tee Utility

### **Filename Generation**

- Filename Generation
- The ? Special Character
- The \* Special Character
- The Special Characters
- The ! Special Character

### **Processes**

- What is a Process?
- Process Structure
- The ps Utility

- 
- 
- Options to the ps Utility
  - Background Commands (&)
  - Killing Background Processes
  - Redirecting the Standard Error

### **Shell Programming Concepts**

- What is a Shell?
- Which Shell?
- What is a Shell Script?
- Why Use Shell Scripts?

### **Flow Control**

- The Exit Status of Commands
- Command Line Examples
- The test Command
- The if-then-else Construct
- The elif Construct
- A Loop Example

### **Variables**

- User Created Variables
- The read Command
- The Shell Environment
- The export Command
- Subshells
- Command Substitution
- Quoting Mechanisms
- Assigning Variables - Summary

### **Special Variables**

- Command-Line Arguments
- \$# - Number of Arguments
- The shift Command
- \$\* - All Arguments
- \$\$ - PID of Shell

### **More Flow Control**

- The for Loop
- The while Loop
- Examples
- The case Construct



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## **Appendix: Bash Shell Features**

- Viewing Your Command History
- Editing and Re-executing Commands
- Aliases



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**Course:**

*CL020 - Advanced Linux and UNIX  
Programming*

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**Course Description:**

In-depth training for software developers on Linux and UNIX system programming facilities. Learn how to develop sophisticated multiprocess applications using system calls and library routines.

**Audience:**

Application developers who will be writing advanced programs on Linux and UNIX.

**Prerequisites:**

Fundamentals of UNIX or Fundamentals of Linux, C Programming, and Advanced C Programming. Strong C programming skills are required for this course.

## **Course Contents**

### **UNIX Standards**

- Brief History of UNIX
- AT&T and Berkeley UNIX Systems
- Major Vendors
- What is a Standard?
- What is POSIX?
- Other Industry Specs and Standards

### **Files and Directories**

- The POSIX.1 Basic File Types
- File Descriptions
- Keeping Track of Open Files
- File Table Entries
- The v-node Structure
- The fcntl Function
- File Attributes
- The access Function
- Link, unlink, remove, and rename Functions
- Functions to Manipulate Directories

### **System I/O**

- Standard I/O vs System I/O
- System I/O Calls
- File and Record Locking

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## **Processes**

- What is a Process?
- Process Creation and Termination
- Process Memory Layout
- Dynamic Memory Allocation
- Accessing Environment Variables
- Real and Effective User IDs

## **Process Management**

- Programs versus Processes
- The fork() System Function
- Parent and Child
- The exec System Function
- Current Image and New Image
- The wait() and waitpid() Function
- Interpreter Files and exec

## **Pipes - Basic IPC**

- Interprocess Communication
- FIFOs
- More on FIFO's

## Signals

- What is a Signal?
- Types of Signals
- Signal Action
- Blocking Signals from Delivery
- The sigaction() Function
- Signal Sets and Operations
- Sending a Signal to Another Process
- Blocking Signals with sigprocmask()
- Scheduling and Waiting for Signals
- Restarting System Calls (SVR4)
- Signals and Reentrancy

## Overview of Client/Server Programming

- Designing Distributed Application
- Clients and Servers
- Ports and Services
- Server Types
- Stateless vs. Stateful Servers
- Concurrency Issues

## The Berkeley Sockets API

- Berkeley Sockets
- Data Structures of the Sockets API
- Socket System Calls
- Generic Client/Server Models
- Sample Socket-based Client

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### **Algorithms and Issues in Client Design**

- Algorithms Instead of Details
- Client Architecture
- Sockets Utility Functions

### **TCP Client Algorithm**

- TCP Client Implementation
- UDP Client Algorithm
- UDP Client Implementation

### **Server Design**

- Iterative Servers
- Concurrent Servers
- Performance Consideration
- An Iterative Server Design
- A Concurrent Server Design

### **System V Interprocess Communication**

- System V IPC
- The Three System V IPC Facilities
- Common Operation - Get (IPCget)
- Common Operation - Control (IPCctl)
- Calls to Operate on the Facilities
- Commonalities between msg, sem, and shm
- IPC via Message Queues
- IPC via Shared Memory Segments
- Coordinating the Use of Shared Memory
- Semaphore Sets-semget() and semctl() Calls
- Semaphore Sets - the semop() calls
- Shared Memory Coordination Using Semaphores
- IPC Facility Handling ipcs and ipcrm

### **Date and Time Functions**

- Time Representations
- Decoding Calendar Time
- Shorthand Functions - asctime(), ctime()
- Formatting Calendar Time Shared
- Process Times
- The Difference Between clock() and times()
- Berkeley High resolution Timers

### **Standard I/O**

- I/O Calls to manipulate streams
- I/O Calls which perform character I/O
- I/O Calls which perform string I/O
- I/O Calls which perform formatted I/O
- I/O Calls which perform binary I/O



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**Course:**

## *CL030 - LINUX System Administration*



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### **Course Description:**

Learn and practice essential Linux system administration tasks. This course is not specific to a particular Linux distribution and presents information about using Linux in a commercial environment.

### **Audience:**

System Administrators who want to gain practical, hands-on Linux administration training.

### **Prerequisites:**

Linux Fundamentals, installation, configuration, and some system administration experience recommended.

## **Course Contents**

### **Overview of System Administration**

- A System Administrator's Responsibilities
- A Brief History of UNIX
- Linux
- Linux Distributions
- Navigating the Documentation

### **User Administration**

- What is a "user" in Linux?
- The /etc/passwd File
- Groups
- The /etc/group File
- Passwords
- The /etc/shadow File
- Adding Users
- Deleting Users
- Modifying User Attributes
- The Login Process
- /etc/profile and .profile
- Communicating With Users: /etc/issue
- Communicating With Users: The Wall Command

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## **File System Basics**

- The Hierarchy
- Files
- Directories
- Special Files
- Character and Block Devices
- The/dev Directory
- Links
- Symbolic Links
- A File System Tour
- The df Command
- The du Command
- The fi nd Command

## **Advanced File System Concepts**

- The Virtual File System
- The Physical File System
- The Inode Table
- File Storage in Disk Blocks
- The Superblock
- Linux File Attributes

## **Disk Management**

- Partitions and File Systems
- Making a File System
- The mkfs Command
- The mount Command
- Sharing File Systems
- The fstab File
- The fsck Command
- The lost+found Directory
- The fdisk Command

## **Backups**

- Backup Strategies
- Backup Tools
- The tar Command
- The cpio Command
- The dump Command
- Network Backup Strategies

## **Linux Processes**

- Overview of Processes
- Process Space
- Process Table
- The fork/exec Mechanism
- The ps Command
- The /proc File System
- Background Processes
- The kill Command
- Scheduling Jobs
- The cron Daemon
- The at Command
- The crontab Command
- Format of cron Files
- Access to Scheduling Facilities

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## **System Startup and Shutdown**

- Overview of the Bootup Sequence
- LILO
- The lilo.conf File
- The init Daemon
- /etc/inittab
- The init Command
- The rc Scripts
- Single-User Mode
- The shutdown Command

## **Linux System Security**

- Security Overview
- Physical Security
- Account Security
- SUID and SGID Settings
- File and Directory Permissions
- Software Security
- Securing a Network Server
- Firewalls

## **Performance Monitoring and Tuning**

- Performance Issues
- Methods of Improving Performance
- Swapping and Paging
- Managing Swap Space
- The top Command
- The vmstat Command
- The strace Command

### **Networking Utilities**

- Basic Network Needs
- IP Addresses
- The /etc/hosts File
- DNS
- The nslookup Command
- Subnets
- Telnet
- FTP
- Ping

### **Configuring TCP/IP**

- Network Interfaces
- The ifconfig Command
- TCP/IP and Ports
- The /etc/services File
- The inetd Daemon
- The /etc/inetd.conf File
- Network Startup
- The netstat Command
- The route Command
- The traceroute Command

### **The Print System**

- Printing Overview
- Adding a Printer
- The lpd Daemon
- The /etc/printcap File
- The lpr, lpq, and lprm Commands
- The lpc Command
- Network Printers
- Interfaces and Filters

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## **Package Management**

- Software Installation and Management
- The rpm Command
- Installing and Upgrading Software With rpm
- Removing Packages
- The rpm Database
- Building Software From Source

## **Server Configuration and Management**

- Standard Network Services
- File and Print Sharing
- Samba
- The Apache Web Server
- Managing FTP
- Internet Mail Service
- Managing a DNS Server

## **Overview of NIS**

- What is NIS?
- Why Use NIS?
- NIS Design and Implementation
- NIS Maps
- Configuring NIS





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Section

*Perl*

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- CP040 - Beginners Perl
- CP140 - Introduction to Perl
- CP050 - Perl Programming
- CP150 - Advanced Perl Programming



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**Course:**

*CP050 - Perl Programming*

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**Course Description:**

Perl has been described as C, awk, sed, and shell programming all wrapped into one language. Learn how to take advantage of Perl's power through examples and extensive hands-on exercises. This course introduces object-oriented programming in Perl.

**Audience:**

Programmers and system administrators.

**Prerequisites:**

Fundamentals of UNIX. C Programming is recommended.

## Course Contents

### Overview of Perl

- What is Perl?
- Running Perl Programs
- Example Programs

### Perl Variables

- Three Types of Variables
- Variable Names and Syntax
- Variable Naming
- Lists
- Scalar and List Contexts
- The Repetition Operator

### Arrays and Hashes

- Arrays
- Example - The @ARGV Array
- Array Functions
- Array Slices
- Hashes
- Hash Functions
- Scalar and List Contexts Revisited

### I/O: Input Operations and File I/O Filehandles

- The open Function
- The Input Operator <>
- Default Input Operator
- The print Function
- File Operation Functions
- Reading Directories

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## **Operators**

- Perl operators
- Operators, Functions and Precedence
- File Test Operators
- Assignment Operator Notations
- The Range Operator
- Quotation Operators
- Pattern Matching Operators

## **Flow Control**

- Simple Statements
- Simple Statement Modifiers
- Compound Statements
- The next, last and redo Statements
- The for Loop
- The foreach Loop

## **Regular Expressions**

- Pattern Matching Overview
- The Substitution Operator
- Regular Expressions
- Special Characters
- Quantifiers (\*, +, ?, {})
- Assertions (^, \$, \b, \B)

### **Subroutines**

- Overview of Subroutines
- Passing Arguments
- Local Variables
- Passing Names
- Returning Values

### **Quoting and Interpolation**

- String Literals
- Interpolation
- Array Substitution
- Backslashes and Single Quotes
- Command Substitution
- Here Documents

### **References**

- References
- Creating References
- Using References
- Passing References as Arguments to Subroutines
- Anonymous Composers
- Hard References as Hash Keys
- The Symbol Table

### **Complex Data Structures**

- Two-dimensional Arrays in Perl
- Anonymous Arrays and Anonymous Hashes
- Arrays of Arrays
- Arrays of References
- A Hash of Arrays
- A Hash of Hashes

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## **Packages and Modules**

- Packages
- BEGIN and END Routines
- require vs. use
- Modules
- The bless Function

## **Object-Oriented Programming in Perl**

- What is Object-Oriented?
- Why Use Object-Oriented Programming?
- Classes, Objects, and Methods in Perl
- Inheritance, the “is-a” Relationship
- Containment, the “has-a” Relationship
- Overloaded Operators
- Destructors

## **Advanced Regular Expressions**

- Substrings
- Substrings in List Context
- RE Special Variables
- Multiline Res
- Substituting with an Expression

## **Binary Data Structures**

- Variable-Length (Delimited) Fields
- Variable vs. Fixed
- Handling Binary Data
- The pack() Function
- The unpack() function
- The read () Function
- C Data Structures

### **Multitasking with Perl**

- What are Single and Multitasking?
- UNIX Multitasking Concepts
- Process Creation with fork
- Program Loading with exec()
- File Descriptor Inheritance
- How UNIX Opens Files
- One-Way Data Flow - Pipes
- Final Result - Page Viewing

### **Sockets Programming in Perl**

- Clients and Servers
- Ports and Services
- Berkeley Sockets
- Data Structures of the Sockets API
- Socket System Calls
- Generic Client/Server Models
- A Little Web Server

### **Appendix 1 - The Perl Distribution**

- Where Can You Get Perl?
- How Do You Build Perl?
- What Gets Created and Installed?
- Differences Between Platforms



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## **Appendix 2 - The Perl Debugger**

- Overview of the Perl debugger
- Debugger Commands
- Non-Debugger Commands
- Listing Lines
- Single Stepping
- Setting and Clearing Breakpoints
- Modifying the Debugger
- The -w and -D Flags



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**Course:**

*CP150 - Advanced Perl  
Programming*

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**Course Description:**

Perl has evolved from its beginnings as an eclectic scripting tool for UNIX administrators into one of the most popular, influential, and widely used computer languages in history. In this course, you will learn how to fully utilize the Perl programming language.

**Audience:**

Application programmers, system administrators, web-site authors, webmasters, and UNIX/NT power users.

**Prerequisites:**

Perl Programming and Perl application development experience. Full comprehension of the extending and embedding material will require some C or C++ programming experience.

### **Course Contents**

- Warnings
- Diagnostic Messages
- Carp, Confess, and Croak
- Strict Checks
- Compiler Pragmas
- Debugging Flags
- Your Perl Configuration
- The Devel::Peek Module
- The Data::Dumper Module

### **Expert List Manipulation**

- The grep Operator
- Lists, Arrays, and List Operators
- Context
- Context and Subroutines
- Initializing Arrays and Hashes
- Reference Syntax
- Auto-vivification
- Defined Values
- Other List Operators
- Usage of map, grep, and foreach

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## **Blocks and Code References**

- Blocks
- Subroutines
- Subroutine Prototypes
- Code Refs and Anonymous Subroutines
- Typeglobbing for the Non-Squeamish
- Local (Dynamic) Variables
- Lexical Variables
- Persistent Private Subroutine Variables
- Closures
- The eval Operator
- The Block Form of eval
- The String Form of eval
- Block Form of eval for Exception Handling

## **Packages**

- Review of Packages
- BEGIN and END Blocks
- Symbol Tables
- Package Variables
- Calling Package Subroutines
- Importing Package Symbols
- Exporting Package Symbols
- Using the Exporter Package
- The use Function
- AUTOLOAD and @ISA
- AutoLoader and SelfLoader

## **Objects and Classes**

- Object-Oriented Stuff
- Making Perl Object-Oriented
- References
- The bless Function
- So, What's a Blessed Thing Good For?
- Calling Class and Object Methods
- Object Methods
- Writing Classes
- Constructors
- Inheritance
- What Perl Doesn't Do

## **Tied Variables**

- Why Use tie?
- Tying a Scalar
- Inside Tied Variables
- untie
- Another Tied Scalar Example
- Tying an Array
- A Tied Array Example
- Tying Hashes
- Tie::Hash and Tie::Array
- Tying Filehandles
- What Are DBM, NDBM, GDBM, SDBM, etc?
- Using the DBM Modules

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## **Installing and Using Perl Modules**

- Laziness, Impatience, and Hubris
- CPAN
- Using Modules
- Installing a Perl Module
- Unpacking the Module Source
- The Configuration Step
- The Build Step
- The Test Step
- The Install Step
- Using CPAN.pm
- Using Module Documentation

## **Introduction to DBI/DBD**

- The Old Way - DBPerls
- A Better Way - DBI/DBD
- Database Programming
- Handles
- Connecting to the Database
- Creating a SQL Query
- Getting the Results
- Updating Database Data
- Transaction Management
- Finishing Up

### **DBI/DBD SQL Programming**

- Error Checking in DBI
- Getting Connected
- Drivers
- Using Parameterized Statements
- Statement Handle Attributes
- Other Handle Attributes
- Column Binding
- The do Method
- BLOBs and LONGs and Such
- Installing DBI Drivers

### **Introduction to Perl/Tk**

- Tcl, Tk, Tcl/Tk, Tkperl, Perl/Tk, etc.
- Perl/Tk
- Creating a Perl/Tk Application
- GUI Programming Overview
- Adding Widgets
- Scrolled Widgets
- Configuring Widgets
- Menus
- More Fun with Menus
- Using FileSelect



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## **Perl/Tk Programming**

- Tk::Error and Tk::ErrorDialog
- Configuring Widgets
- Geometry Management
- Geometry Management with grid()
- The Frame Widget
- Defining Widget Callbacks
- Bindings
- Nonblocking I/O with filevent()
- Tags
- Other Widgets
- Other Tk Commands
- Getting Tk

## **Extending Perl with C/C++**

- Extending the Perl Interpreter
- Overview of Perl5 XSUBs
- Get Started with h2xs
- Set up the Perl Wrapper Class
- Write the XS Code
- The XS File
- Write Some Test Code
- What Do You Want?
- Returning Values on the Stack
- A Walk Through an XSUB
- Arguments to XSUBs
- Other h2xs Options

### **Embedding the Perl Interpreter**

- Why Embed Perl?
- Embedding Perl in a C Program
- Compiling the Program
- perlmain.c
- Perl Data Types
- Macros and Functions
- Manipulating Scalars
- Memory Management
- Script Space
- Evaluating Perl Expressions
- Dynamic Loading
- Multiple Perl Interpreters

### **Module Development and Distribution**

- Distributing Modules
- Get Started with h2xs
- Files Created by h2xs
- The Build Library (blib) Directory
- Unit Testing and test.pl
- Versions
- Using blib
- POD
- POD Translators
- Cutting a Distribution
- Other Niceties
- Makefile.PL

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## **Design and Implementation**

- Think First
- Object-Oriented Design
- Object-Oriented Development
- Library Modules
- Utility Programs
- Filters
- Performance
- Timing with Benchmark



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Course:

## *CP040 - Perl Programming*

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**Length:** 5 Days

**Description:**

This course will provide the attendee with the knowledge needed to program in the Perl programming language using CGI. In this course the attendee will learn about the structure of a Perl program and Perl variables. In addition to this the attendee will learn how to create dynamic home pages and HTML forms using Perl.

**Course Content**

**I Introduction to Perl**

- a What is Perl
- b Where to get Perl
- c Structure of a Perl Program
- d The Perl Command Line
- e The Print Statement

## **II Perl Variables**

- a Scalars
- b Lists
- c Arrays
- d Variable Scoping
- e Variable Interpolation
- f Operations on Variables
- g Accessing the Perl Program's Command Line

## **III Environment Variables**

- a The Operating System Environment
- b The Web Browser Environment

## **IV Creating Web Pages Dynamically**

- a Creating Forms

## **V Error Handling**

- a The die Function
- b The warn Function
- c The eval Function

## **VI Creating, Reading and Writing Files**

- a Opening a File
- b File Testing
- c Handling Errors
- d Dynamic Web Pages Revisited
- e Creating a Web Page Counter
- f Working with Tabular Data
- g Reading and Formatting a Table for Printing
- h Loading a Table into an Associative Array
- i Working with Fixed-Length Records
- j Reading and Formatting Data for Printing
- k Creating Tables in HTML
- l Putting Tabular Data on the Web

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## **VII Using the Perl Debugger**

- a Starting the Debugger
- b Debugger Commands

## **VIII Regular Expressions (Part 1)**

- a Pattern Matching
- b Variables and Pattern Matching
- c Searching Tables and Displaying Results

## **IX Regular Expressions (Part 2)**

- a Variables and Pattern Substitution
- b Variables Substitution and CGI Data Handling

## **X Controlling Program Flow**

- a Loops and ifs

## **XI Functions and Subroutines**

- a Call by Reference
- b Call by Value
- c Return Values

## **XII Packages (Encapsulation)**

### **XIII The Standard Perl Library**

- a The @ INC Array
- b The require Function
- c Using the “ system”Function
- d Pipes

### **XIV Other Library Packages**

#### **XV Common Tasks and Solutions**

- a Processing Strings with Escape Characters
- b Handling Variables
- c Values from Command Line

#### **XVI The Common Gateway Interface (CGI)**

- a Communicating with the Internet Browsers
- b The Post Method
- c The Get Method

#### **XVII Networking With Perl**

- a Introduction to Client/Server Concepts
- b Network Protocols
- c DNS Functions
- d WWW Client/Server Methods

#### **XVIII Processing Form Input**

- a Text Boxes
- b Radio Buttons
- c Free-form Text Windows
- d Drop-down Combo Boxes

#### **XIX Logging Software**



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**Course:**

*CP140 - Introduction to Perl  
Programming*

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**Duration:** 3 days

**Audience:**

Programmers of other Operating Systems coming to UNIX for the first time and anyone needing to learn how to read and write Born shell scripts of a simple to medium level of complexity.

**Description:**

This an introductory hands-on course that teaches the participant the basics of the Perl Programming Language.

**Prerequisites:**

UNIX Computer Fundamentals, a UNIX editor.

**Topics:**

1. An Introduction to Perl
2. The Perl Interpreter
3. Perl Operators
4. Perl Variables
5. Perl Variables & Arrays
6. Perl Variables & Hashes
7. Perl Statements
8. Perl Character Strings
9. Perl File Management
10. Perl Source Listings!

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Section:

## *Solaris Operating Environment*

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- CS500 - Introduction To Solaris 8 Operating Environment
- CS501 - Basic System Administration Certification Preparation
- CS502 - Advanced Solaris 8 OE System Administration
- CS503 - Solaris Network Administration

### **Solaris 8 Operating Environment Certification Preparation Program / Courses**



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**Course:**

## *CS500 - Introduction To Solaris 8 Operating Environment*

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**Length: 5 Days**

### **Description**

This course introduces attendees to the Solaris 8 Operating Environment and provides the initial knowledge and hands-on experience to get them started using UNIX quickly and efficiently. Subjects covered include an overview of operating system concepts and UNIX architecture, how to log on and off, UNIX system documentation, communications and status inquiry commands, the structure of the UNIX file system, file and directory manipulation commands, how to use the vi (visual) text editor, the use of the shell as a command interpreter and programming language, and the use of over 25 commands for data manipulation.

### **Course Objectives**

Upon completion of this course the attendee will be able to:

1. state the major components and architecture of UNIX;
2. log on and off of UNIX;
3. use the UNIX system documentation;
4. communicate with other users on the system through mail and write;

5. organize and manipulate files and directories and their contents;
6. use the UNIX text editor to create and modify files;
7. use the UNIX shell file name expansion, I/O redirection, pipe, and quoting mechanisms;
8. use UNIX utilities to create simple tools for information processing.

### **Suggested Course Materials**

- Introduction to Solaris 8 Operating Environment Student Guide and course notes.
- Exploring the Unix System, Second Edition, Stephen G. Kochan and Patrick H. Wood.

### **Prerequisites: None**

### **Course Content**

#### **I. UNIX Overview**

- UNIX system history and philosophy.
- System architecture: kernel, file system, shell, utilities, and applications.

#### **II. Using UNIX**

- Logging on and off.
- UNIX system documentation.
- Status inquiries: who, date, and ps.
- System communications: wall and news.
- Sending and receiving electronic mail.
- Terminal communications: write.

#### **III. The UNIX File System**

- The logical and physical file system.
- Listing files and directories: ls.
- Path names.

- 
- 
- Accessing files and directories.
  - File and directory access permissions.
  - File manipulation commands.
  - Directory manipulation commands.
  - File/directory naming conventions.

#### **IV. Text Editing**

- Entering and exiting vi.
- Moving around in vi.
- Creating new text.
- Modifying text.
- Copying text.
- Setting up the vi environment.

#### **V. The UNIX Shell**

- Overview of the shell.
- Command interpretation.
- File name expansion.
- Input/output redirection.
- Pipes.
- Quoting.
- Shell variables.
- Modifying the user environment: .profile.
- Shell programming.

#### **VI. UNIX Utilities**

- Displaying and printing files  
cat, pr, pg, lp
- File Manipulation Commands  
split and csplit, tail, grep, sort, tr, cut and paste, sed

- File information commands  
fi nd,fi le
- File comparison commands  
diff, comm, uniq, cmp, sum



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Course:

*CS501 - Basic Solaris System  
Administration Certification  
Preparatoin*



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**Length: 5 Days**

**Description**

This course introduces students to the Solaris 8 Operating Environment by providing instructor-led, interactive lectures, hands-on exercises, and review questions. Students will become proficient in basic Solaris 8 OE administration by installing and configuring an operational Solaris 8 OE system which they will use throughout the course, starting up and shutting down the system, maintaining file systems, adding and removing user accounts, and installing printers. Students will demonstrate completion of the course requirements by passing an end of course exam. This course is designed to provide assistance in preparing to take the Solaris 8 OE Basic System Administrator Certification Exam 310-011.

**Course Objectives**

Upon completion of this course the student will be able to:

1. State the basic duties of a Solaris System Administrator
2. State the hardware and software requirements for a Solaris 8 OE Intel based operating system installation.
3. Install the Solaris 8 OE on an Intel based platform.
4. Startup and shutdown a Solaris System.

5. State the steps that occur when a Solaris system is booted.
6. Modify the start up sequence.
7. State the steps that occur when a Solaris system is shutdown.
8. Modify the shutdown sequence
9. State the types of Solaris file systems.
10. Create new file systems on different types of media.
11. Mount and unmount file systems.
12. Perform file system maintenance.
13. Use the cron facilities to create jobs to be run at a later date and time.
14. Perform backup and restore of data.
15. Add, manage, and delete user accounts.
16. Add, manage, and delete printers.

### Prerequisites

Before attending this course, attendees must be able to:

1. Log on and off of a Solaris system
2. Define basic Solaris terms such as operating system, kernel, shell, files, directories, devices, etc.
3. Use common Solaris commands such as ls, who, date, mail, etc.
4. Use Solaris man pages to determine command syntax and execution.
5. Use the vi text editor
6. Use basic shell features such as I/O redirection, pipes, filename expansion characters, quoting, etc.
7. Read shell, awk, and sed scripts
8. Use the Common Desktop Environment

These skills can be acquired by taking the CS500, Solaris Fundamentals Course.

### Suggested Student Materials:

- CS501 - Solaris 8 OE Basic System Administration Student Guide.
- CS501 - Solaris 8 OE Basic System Administration Student Training Files CD.
- Sun Solaris 8 OE Installation CD Set (Classroom Use)
- Sun Certified System Administrator for Solaris 8.0 Study Guide
- Textbook, Osborne-McGraw Hill, 2001, ISBN 0-07-212369-9.

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## **Course Content**

### **I. System Administration Overview**

- A. The Duties of the System Administrator
- B. Choosing a System Administrator
- C. The root Login
- D. Setting up a System Logbook
- E. System Documentation
- F. Other Recommended Books
- G. Site Planning

### **II. Solaris Installation**

- A. Installation Types
- B. Hard Drive Considerations
- C. Hardware Requirements
- D. Hardware Compatibility
- E. Video Card
- F. Network Card
- G. Incompatible Hardware
- H. Plug-n-Play Devices
- I. Network Install
- J. Stand-Alone System Install
- K. Disk Partitioning
- L. User ID's, Host Names, and IP Addresses
- M. Network Information
- N. Pre-installation Summary
- O. Solaris Installation Preparation
- P. Intel Processor Based System CMOS Settings
- Q. Hard Drive Selection
- R. Boot Device
- S. Solaris Installation

### III. Startup and Shutdown

- A. Booting Solaris
  - 1. 1.Turning the System On
  - 2. 2.The boot Sequence
- B. Shutting The System Down
- C. Alternative Shutdown Commands
  - 1.The reboot Command
  - 2.The halt Command
  - 3.The poweroff Command
- D. Events Which Occur During Startup
- E. Run-Levels
- F. The init Process
  - 1. 1.The /etc/inittab File
  - 2. 2.How init Works
  - G.The /etc/rc.d/rc Initialization Script
- H. Run-Level Transition
- I. Controlling init
- J. Starting/Stopping/Restarting Processes
- K. Sending a signal to a process
- L. Working with Boot Managers
- M. Customizing A Run Level
- N. Shutdown Events
- O. Abnormal Shutdown

### IV. The Solaris File System

- A. Types of Files - directory, ordinary, special, and symbolic link.
- B. File/Directory Permissions
- C. Directory Commands - mkdir, cd, pwd, rmdir
- D. File Manipulation - cp, mv, ln and rm
- E. Filesystem Hierarchy
- F. Printing file contents

### V. Filesystem Management

- A. Types of Filesystems
- B. Mountable Filesystems
- C. The /bin/mount Command
- D. Mounting a Filesystem
- E. The /etc/fstab File

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- F. Unmounting a Filesystem
  - G. Mounting a CD-ROM Filesystem
  - H. Creating a Floppy Disk Filesystem
  - I. Mounting a Floppy Disk Filesystem
  - J. Unmounting a Floppy Disk Filesystem
  - K. Periodic Cleanup of Filesystems

## **VI. Filesystem Maintenance**

- A. Causes of Filesystem Corruption
- B. fsck - Filesystem Check Command
- C. Orphaned files and directories
- D. fsck Phases
- E. Using fsck
- F. Setting Disk Quotas
- G. Managing Log Files

## **VII. The cron and at Facilities**

- A. The cron Command
- B. The crontab Files
- C. Who Can Use Cron?
- D. The crontab Command
- E. Notes About cron
- F. The at Command

## **VIII. File Backup & Restore**

- A. I/O Subsystem
- B. Device Drivers
- C. Device Types
- D. Solaris Tape Devices
- E. Solaris Floppy Devices
- F. Formatting Floppy Disks
- G. How Data Is Stored on Media
- H. Backups
- I. Backup Strategies

- J. Backup Commands
- K. The ufsdump Command
- L. The ufsrestore command
- M. The tar command
- N. The dd command
- O. The cpio command
- P. The mt command
- Q. The fssnap command
- R. Compression programs
  - 1. compress
  - 2. pack

## **IX. User Account Management**

- A. Overview of User Accounts
  - 1. The /etc/passwd File
  - 2. The /etc/shadow File
  - 3. The /etc/group File
- B. Adding A User Account
- C. Adding a Group
- D. Add User Default Files
- E. Setting the Initial Password
- F. Deleting a User Account

## **X. Printer Administration**

- A. Overview of the Print Facility
  - 1. The Application
  - 2. The Print Client
  - 3. The Print Spooler
  - 4. The Print Filter
  - 5. The Printer
- B. Printer Commands and Management
- C. The /etc/printcap File
- D. Setting Up a Network Printer
- E. Using printtool to Configure a Printer
- F. Adding A Printer
- G. Editing the Remote Unix (lpd) Queue Entry
- H. Configuring the Input Filter

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- I. Completing the Setup and Testing the Printer
  - J. Setting Up a Local Printer
  - K. Configuring the Local Printer
  - L. Printing Documents
  - M. Configuring a Remote Printer
  - N. Troubleshooting the Printer
  - O. Deleting a Printer





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Course:

## *CS502 - Advanced Solaris 8 OE System Administration*



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**Length: 5 Days**

### **Description**

This course teaches students how to effectively administer and maintain Solaris systems. A good system administrator must not only be technically qualified, but must also be able to manage system resources to keep users working efficiently. In addition to teaching students how to perform basic system administration tasks, this module shows students how to effectively balance user requirements with the technical aspects of the Solaris system. Students will demonstrate completion of the course requirements by passing an end of course exam. This course is designed to provide assistance in preparing to take the Solaris 8 OE Advanced System Administrator Certification Exam 310-012.

### **Course Objectives**

Upon completion of this course the student will be able to:

1. Manage Solaris Processes
2. Configure and use the system logging facility, syslogd().
3. Add a new hard drive to the system.

4. Format and partition a new harddrive
5. Create new file systems on a hard drive.
6. Manage pseudo and swap devices
7. Describe the Network File System
8. Configure NFS servers and clients
9. Automount file systems
10. Install software packages from various package formats.
11. Use the Solaris Management Console for application management.
12. Maintain the security of Solaris systems.
13. Identify, diagnose, and correct problems with Solaris systems.
14. Recover from common system problems.
15. Install Solaris 8 OE Using Custom JumpStart.

### **Prerequisites**

Before attending this course, attendees must have completed CS501, Solaris 8 OE Basic System Administration.

### **Suggested Student Materials:**

- SE002 - Solaris 8 OE Advanced System Administration Student Guide.
- SE001 - Solaris 8 OE Advanced System Administration Student Training
- Files CD.
- Sun Solaris 8 OE Installation CD Set (Classroom Use)
- Sun Certified System Administrator for Solaris 8.0 Study Guide Textbook, Osborne-McGraw Hill, 2001, ISBN 0-07-212369-9 (provided in the SE001, Solaris 8 Basic System Administration Course.)

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## Course Content

### I.Process Management

- A. Processes Structure
- B. Process Creation
  - 1. Inherited Properties
  - 2. Differences between Parent and Child
  - 3. Process Execution
  - 4. Differences between fork and exec
- C. Daemon Processes
- D. Orphans and Zombies
- E. Checking System Status
- F. Managing Processes
- G. Terminating Processes

### II.System Logging syslogd()

- A. The syslogd() daemon
- B. The /etc/syslog.conf file
- C. Configuring the syslogd facility
- D. Monitoring logging information
- E. Remote logging

### III.Hard Drive Management

- A. Installing a hard drive
- B. Partitioning a hard drive
- C. Labeling a hard drive
- D. Saving and retrieving partition tables
- E. The Volume Table of Contents
  - 1. Viewing
  - 2. Updating
- F. Creating filesystems on new hard drive partitions
- G. Checking new filesystems
- H. Mounting new filesystems
- I. Adding filesystem information to the system - the /etc/vfstab file.
- J. Concatenated Virtual File Systems
- K. Striped Virtual File Systems
- L. Installing and Using Solstice DiskSuite applications.
- M. Managing the Pseudo Filesystem

N. Managing Swap Space

#### **IV. Network File Systems**

- A. NFS - Network File System
- B. NFS Terminology
- C. NFS Commands and Files
  - 1. The share, shareall, unshare, unshareall Commands
  - 2. The /etc/dfs/dfstab File
  - 3. The /bin/mount command
- D. Configuring NFS
  - 1. Setting Up the NFS Server
  - 2. Setting Up A NFS Client
  - 3. Mounting/Unmounting NFS filesystems
- E. Removing a NFS Resource
- F. Server System Procedures
- G. Client System Procedures

#### **V. Automounting Filesystems**

- A. The automount Command
- B. Creating automount map files
- C. Starting/Stopping the automountd daemon
- D. Testing automounted filesystems

#### **VI. Software Management**

- A. Installing Software Packages
- B. Distribution Methods
- C. Distribution Format
- D. Managing .tar Files
- E. General Steps for Installing a Package
- F. Determining Package Information using pkginfo
- G. Adding packages with pkgadd
- H. Testing and Verifying an Installed Application
- I. Removing packages with pkgrm
- J. Installing System Updates
- K. Determine system patch requirements
- L. Patch package formats
- M. Downloading patches
- N. Preparing to install a patch

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- O. Installing a patch - patchadd
  - P. Verifying installed patches
  - Q. Removing a patch - patchrm

## **VII.Solaris Management Console**

- A. Functions of the Solaris Management Console
- B. Using the Solaris Management Console
- C. Adding applications to the Solaris Management Console

## **VIII.Access Control**

- A. User and roles associations
- B. Authorizations
- C. User assigned authorizations
- D. Privileged operations
- E. Profile and authorization control files
- F. Configuring user authorizations and roles

## **IX.System Security**

- A. User Security
- B. File System Security
- C. File/Directory Access - chown, chgrp, chmod
- D. SUID/SGID Programs
- E. Access Control Lists
- F. Developing and Implementing a Security Policy
- G. Security Monitoring & Auditing
- H. What to do if the system is compromised

## **X.Troubleshooting**

- A. Troubleshooting Methodologies
- B. Identifying the Problem
- C. Identification and Troubleshooting Commands
- D. Connectivity Issues
- E. Server Application Failures
- F. Examining Processes
- G. Examining Configuration Files
- H. Examining System Resources

- I. Inspecting System Logs
- J. Mounting and Unmounting Filesystems
- K. Recognizing Common Errors
- L. Resolving Common Problems
- M. Identifying Boot Problems
- N. Booting from Disks
- O. Backup and Restore Problems
- P. Troubleshooting Resources

### **XI. Fault Recovery**

- A. Recovery from a System that will not boot
- B. Recovery from a Forgotten or Unknown root Password

### **XII. Jumpstart Installation**

- A. Overview of Custom JumpStart
- B. Setting up a Custom JumpStart Server
- C. Setting up a boot client
- D. Installing the Solaris 8 OE using Custom JumpStart
- E. Boot clients installed with Custom JumpStart

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Course:

## *CS503 - Solaris Network Administration*



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**Length: 5 Days**

### **Description**

This comprehensive course provides instruction on Solaris network administration and security. Students will be introduced to networking terminology and will learn how to administer Solaris TCP/IP networks through lectures and hands-on exercises. Topics include how to use the TCP/IP network commands, how to install and configure network hardware, configuring network services, remotely managing Solaris machines, installation and configuration of the network file system (NFS), NIS, DHCP, DNS, NTP, sendmail, Secure Shell, IPv6, and network security.

### **Course Objectives**

Upon completion of this course the student will be able to:

1. Describe and state the purpose of various network protocols.
2. Check network hardware and software for proper operation.
3. Set up and manage NFS, NIS, DHCP, DNS, Sendmail, NTP, and Secure Shell.
4. Describe and configure IPv6.
5. Examine and improve the network security of Solaris systems using network security tools and programs.

## Course Content

### I. Network Hardware and Software

- A. Network Hardware
  - 1. Routers
  - 2. CSU/DSU
  - 3. Modems/Portmaster
  - 4. Hubs
  - 5. Switches
  - 6. Network Interface Cards
- B. Types of Networks
- C. The Internet
- D. Top Level Domains
- E. Domain and Host Names
- F. Gateways
- G. Network Protocols
- H. The TCP/IP Protocol Stack
  
- I. Network Protocol Overview
  - 1. Internet Protocol (IP)
  - 2. Transmission Control Protocol (TCP)
  - 3. File Transfer Protocol (FTP)
  - 4. Telnet
  - 5. Network News Transfer Protocol (NNTP)
  - 6. Hyper Text Transport Protocol (HTTP)
  - 7. Simple Mail Transport Protocol (SMTP)
  - 8. Simple Network Management Protocol (SNMP)
  - 9. Internet Protocol
- J. IP Addressing
- K. IP Address Format
- L. Network and Host Addresses
- M. Reserved Host Addresses
- N. Reserved Network Addresses
- O. Class A Address
- P. Class B Address
- Q. Class C Address
- R. Subnets
- S. Netmasks
- T. Calculating Subnet Sizes
- U. Setting up A Network



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## II. Network Configuration and Administration

- A. Configuring a New Network Card
- B. Managing Network Interfaces
- C. Testing Network Connectivity
- D. Diagnosing Network Problems
- E. Managing Routes
- F. Dialing Out with PPP
- G. Configuring ISDN Access
- H. Network Daemons
- I. Sockets
- J. Required Services
- K. Optional Services
- L. inetd - Internet Daemon
  - 1. The /etc/inetd.conf File
  - 2. Connection Requests
- M. Optional Service Daemons
- N. Network Control Files
  - 1. /etc/hostname
  - 2. /etc/networks
  - 3. The /etc/hosts File
  - 4. The /etc/hosts.equiv File
  - 5. The /etc/hosts.lpd File
  - 6. The /etc/networks File
  - 7. The /etc/protocols File
  - 8. The /etc/services File
- O. Checking the Network Configuration
- P. Network Startup
- Q. Network Shutdown
- R. Obtaining Networking Information
  - 1. The ifconfig Command
  - 2. The hostname Command
  - 3. The domainname Command
  - 4. The dnsdomainname Command
  - 5. The netstat Command
  - 6. The traceroute Command

### **III. Network Information Service**

- A. Overview of NIS
- B. How the Network Information Service Works
- C. The NIS Client-Server Model
- D. NIS Information Management
- E. NIS Services
- F. NIS Tables
- G. Setting Up a NIS Server
- H. Setting Up a NIS Client
- I. Verifying NIS Operation

### **IV. DHCP**

- A. Introduction to DHCP
- B. The DHCP Protocol
- C. Allocation of network addresses
- D. Dynamic Allocation
- E. Description of the communication steps
- F. Variations on the timeline diagram
- G. Message Types Summary
- H. Installing and Configuring the DHCP Server and/or Client Software
- I. Installing the DHCP Software
  - The /etc/dhcpd.conf file
  - The /etc/dhcpd.leases File
- J. Controlling the dhcpd Server
- K. DHCP Client Configuration
- L. Testing the Client/Server Connection and completing the Installation
- M. Restoring the System to Use Static IP Addresses

### **V. Domain Name Service**

- A. The DNS Database
- B. DNS Overview
- C. Installing DNS
- D. DNS Terminology
- E. DNS Daemons and Programs
- F. DNS Configuration Files
- G. DNS Control and Log Files
- H. The named Daemon
- I. Controlling the named Daemon
- J. DNS Configuration Files

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1. /etc/resolv.conf
  2. /etc/host.conf
  3. The /etc/named.conf File
  4. The /var/named/named.ca File
  5. /var/named/named.[zone] files
  6. The named. files Contents
- K. Reverse DNS
  - L. Slave DNS Servers
  - M. The host Command
  - N. The nslookup command
  - O. Setting up a DNS Client
  - P. Configuring a DNS Server
  - Q. DNS Trouble Shooting

## **VI. SendMail**

- A. What is Sendmail?
- B. Installing sendmail
- C. sendmail Programs
- D. Configuring sendmail
- A. The /etc/sendmail.cw File
- B. The /etc/aliases File
- C. The /etc/mail/virtusertable
- E. Sendmail Directories and Log Files
- F. Configuring sendmail
- G. Starting and Stopping sendmail
- H. Testing sendmail
- I. Forwarding Email
- J. Controlling spam
- K. Updating the access database
- L. Special Notes
- M. Setting Up A Mail Server
- N. Installing imap and pop
- O. The Post-Office-Protocol Daemon
- P. imap - Internet Message Access Protocol
- Q. Using a Mail Client to Retrieve Email
- R. Setting Up Microsoft Windows Email Clients
- S. Unix/Solaris Email Clients
- T. sendmail Security

## VII. Network Time Protocol (NTP)

- A. Overview of NTP
- B. Setting up an NTP Environment
- C. Configuring a NTP Server
- D. Configuring a NTP Client
- E. Starting the xntp and ntpd daemons
- F. Querying NTP Servers
- G. Checking NTP Operation

## VIII. Secure Shell

- A. What is SSH?
- B. Obtaining and Installing SSH.
- C. SSH Keys
- D. Configuring the sshd Daemon
- E. Logging in Remotely
- F. Transferring Files
- G. Port Forwarding
- H. Forwarding X Connections

## IX. Solaris Network Security

- A. Why is a System Hacked?
- B. How are Systems Hacked?
- C. How Is Hacking Prevented
- D. Controlling Access - Users
- E. Controlling Access - Remote Hosts
- F. Network Services
- G. Network Daemons
- H. Scanners
  - 1. System Scanners
  - 2. Network Scanners
- I. What are TCP/IP Wrappers?
  - 1. Downloading TCP/IP Wrappers
  - 2. Installing TCP/IP Wrappers
  - 3. tcp\_wrappers-7.6-9
  - 4. Configuring TCP/IP Wrappers
  - 5. /etc/inetd.conf
  - 6. /etc/hosts.allow
  - 7. /etc/hosts.deny

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- J. Testing TCP/IP Wrappers
  - K. Password Security
  - L. ftp Security

- M. Network Security Tools

- 1. portsentry
  - 2. satan
  - 3. other tools

- X. IPv6**

- A. Overview of IPv6
  - B. Differences between IPv4 and IPv6
  - C. Neighbor Discovery Protocol
  - D. IPv6 Autoconfiguration
  - E. IPv6 Addressing
  - F. IPv6 Dual Stack Environment
  - G. IPv6 Tunneling
  - H. Configuring and Testing IPv6

- XI. Network Trouble Analysis**

- A. Common Network Problems
  - B. Hardware
  - C. Software
  - D. Isolating & Troubleshooting Network Problems
  - E. Network Trouble Analysis Lab



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Section

## *Internet and Web Development*

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- CW001 - Beginners Internet
- CW002 - Intermediate Internet
- CW003 - Advanced Internet
- CW011 - Beginning HTML
- CW012 - Intermediate HTML
- CW013 - Advanced HTML





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Course:

*CW011 - Beginning HTML*

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**Course Description:**

Beginning HTML teaches you the skills, techniques, and strategies you need to successfully create and promote your presence on the Web

**Audience:**

Web developers, WebMasters and JavaScript programmers.

**Prerequisites:**

Comfortable using the Internet

**Course Contents**

**Introduction: HTML and the Web**

- What is Hypertext Markup Language (HTML)?
- Why are Web documents published in HTML?

## **The Basic Structure of HTML Documents**

### **Laying Out Text in HTML**

- Heading text
- Paragraph text
- Comments
- Unordered (bulleted) and Ordered (numbered) lists
- Other useful tags
- Adding special characters to your pages
- Pre-exercise Instructions: How to edit HTML code?

### **Enhancing Your Tags: HTML Attributes**

#### **Images and Backgrounds**

- Image Attributes
- Background patterns
- Characteristics of the GIF graphic file format
- Characteristics of the JPEG graphic file format
- The relationship between graphic size and download time

#### **Links to Other Pages, E-mail, and More**

- When an http:// URL does not specify an HTML file
- Adding links to video, sound, downloadable files, and more
- Some Comments
- Inserting a link to another location on the same page
- Adding a link to this location from another document

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### **Adding Color to Your Pages**

- For what parts of my page can I change the color?
- How colors are specified
- Converting a base 10 color number to base 16 (hexadecimal)
- Controlling background, text, and link colors
- Changing the color of a piece of text \* A warning about colors

### **HTML Tables**

- The table tags and their attributes
- Quick Table attribute guide
- A Note on Browser Compatibility



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Course:

*CW012 - Intermediate HTML*

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**Course Description:**

Intermediate HTML explores the leading-edge HTML techniques needed to enhance your Web pages with frames, targets, columns, image maps, and meta tags.

**Audience:**

Web developers, WebMasters and JavaScript programmers.

**Prerequisites:**

Beginning HTML

**Course Contents**

**Introduction**

- Introduction to Our Case Study

### **An Introduction to Frames**

- Frames: Creating the main document
- The <FRAMESET> Tag
- The COLS and ROWS attributes of <FRAMESET>
- The <FRAME> tag
- Additional attributes of the <FRAME> tag
- Additional attributes of the <FRAMESET> tag
- Using nested framesets for complex layouts
- The <NOFRAMES> tag

### **Adding Links Between Frames**

- The <BASE TARGET> tag
- Additional options for linked windows
- Magic target names
- Changing the color of frame borders

### **Client-Side Image Maps**

- Building a client-side image map
- Embedding the map code
- Adding the USEMAP attribute to the <IMG> tag
- Using LiveImage to generate image map code

### **Review of HTML Tables**

- The table tags and their attributes
- Quick Table attribute guide

### **Using Tables to Create a More Complex Design**

- A step-by-step analysis of the changed code

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---

### **Fluid Tables vs. Fixed-Width Tables**

- Fluid Tables
- A fixed-width table

### **Nested Tables**

- How to place a table within a table
- Complex Page Design with Nested Tables

### **The <META> Tag**

- KEYWORDS and DESCRIPTION <META> tags
- AUTHOR and GENERATOR <META> tags
- The <META> Refresh tag

### **The Future: XHTML**

- HTML: Too Flexible?
- The Solution: XHTML
- How can I code to be XHTML Compliant?
- XHTML Resources





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**Course:**

*CW013 - Advanced HTML*

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**Course Description:**

Learn how to create HTML forms, as well as scripts that process form results. In addition, discover how to use JavaScript to ensure that users complete all the appropriate fields.

**Audience:**

Web developers, WebMasters and JavaScript programmers.

**Prerequisites:**

Intermediate HTML

**Course Contents**

**HTML Forms and Scripting**

- Your Files for Today

### **Building HTML Forms**

- A Simple Example
- <FORM> and <INPUT> Tags

### **Fine-Tuning Your Form**

- Using Tables for Form Layout
- Attributes of Text Fields: SIZE and MAXLENGTH
- The METHOD of Your Form: GET or POST

### **More Types of Form Fields**

- SELECT Menus
- Radio Buttons
- Checkboxes
- Text Areas

### **Server-Side Scripting**

- Various Scripting Technologies
- Why ASP?
- ASP Form Handling: The Basics

### **Using If Conditionals to Process Checkboxes**

### **Sending Email From Your ASPs**

- Sending E-mail with CDONTS

### **An Introduction to JavaScript**

- What is JavaScript?

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### **In-line Form Validation Using JavaScript**

- Event Handlers
- Using JavaScript to Determine Form Submission
- Using JavaScript If-Else Statements to Toggle Form Submission
- Retrieving Values of Text Fields Via JavaScript



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Course:

*CW001 - Beginners Internet*

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**Length:** 4 Hours

**Course Content**

**I Introduction to the Internet**

- A What is the Internet?
- B What can I do with it?
- C How is the Internet Connected?
- D Internet Buzz Words

**II E-Mail**

- A What are E-Mail Clients?
- B Format of an E-Mail Address
- C Sending E-Mail
- D Receiving E-Mail
- E Reading E-Mail
- F Where is my mail?
- G Using the Address Book
- H Adding a Card

### **III Searching**

- A What are Search Engines?
- B How do Search Engines Work?
- C Selecting a Search Engine
- D Using Net Search

### **IV Using Internet Explorer**

- A Buttons
- B Back - Forward - Home - Reload

### **V Review - Q & A Session**

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Course:

*CW002 - Intermediate Internet*

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**Length:** 4 Hours

**Course Content**

**I Introduction - Overview**

**II FTP**

- A What is FTP?
- B How can FTP be used?
- C Basic FTP Commands
- D Downloading Netscape using FTP

**III Installing Applications**

- A Using Windows Explorer
- B Monitoring Hard Drive Space
- C Creating Directories
- D Removing Directories
- E Removing Files
- F Launching the Internet Explorer Setup Program

#### **IV Configuring Internet Explorer**

- A Internet Options
- B Outlook Express Options

#### **V Favorites**

- A Adding a Favorite
- B Deleting a Favorite
- C Creating a Folder
- D Using a Folder
- E Deleting a Folder

#### **VI RealPlayer**

- 4. ADownloading RealPlayer
- 5. BInstalling RealPlayer

#### **VII Review - Q & A Session**



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Course:

*CV003 - Advanced Internet*

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**I Introduction - Overview**

**II Internet Servers**

- A What are they?
- B What do they do?
- C Where are they?
- D Why do we need them?

**III Programming Languages**

- A What are Programming Languages?
- B What is HTML, Perl, C, C++ and Java?

**IV Diagnostic Utilities**

- A What is ping?
- B How can I use ping?
- C What is traceroute?
- D How can I use traceroute?
- E What is winipcfg?
- F How can I use winipcfg?

## **V Creating a Simple Home Page**

- A HTML Syntax
- B Simple HTML Page
- C Adding a Link
- D Adding an Image
- E Changing the Background Image
- F Using Links and Images

## **VI Review - Q & A Session**



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## *Index*

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### **Symbols**

238, 242  
\$\$ - PID of Shell 53  
.cshrc (csh) 47  
.exrc 118  
.exrc File 73  
.login (csh) 47  
.logout (csh) 47  
.netrc 132, 150  
.profi 1108  
.profi le207  
.rhosts 132, 150  
/dev Directory 109  
/dev Directory (Linux) 171  
/etc/ftpusers 132, 150  
/etc/gateways 132, 150  
/etc/group 108  
/etc/group (AIX) 129  
/etc/group (HPUX) 147  
/etc/group (Linux) 170  
/etc/hosts 112, 132, 150  
/etc/hosts.equiv 132, 150  
/etc/inetd.conf 113  
/etc/inittab 110  
/etc/inittab (Linux) 173  
/etc/motd 108  
/etc/networks 132, 150  
/etc/passwd 108  
/etc/passwd (AIX) 129  
/etc/passwd (HPUX) 147  
/etc/passwd (Linux) 170  
/etc/profi le 108  
/etc/protocols 132, 150  
/etc/services 112, 132, 150  
/etc/services (Linux) 174  
/etc/shadow (Linux) 170

## A

Accessing files 207  
add and delete user (AIX) 128  
add and delete user (HPUX) 146  
add users 210  
Adding a link (HTML) 234  
Adding a Networked Printer 114  
Adding a new user (AIX) 129  
Adding a Printer 114  
Adding a Printer (Linux) 174  
Adding links to video, sound,  
downloadable files  
(HTML) 234  
Adding Users (Linux) 170  
Administrator Awareness  
(Security) 86  
Advanced AIX System  
Administration 135  
Advanced HTML 241  
Advanced Internet 249  
Advanced Linux and UNIX  
Programming 163  
Advanced Perl Programming 187  
Advanced Solaris 8 OE System  
Administration 25, 203, 217  
Advanced UNIX Programming 57  
Advanced UNIX Tools 117  
Advanced VI Commands 72  
AIX 123  
AIX Network Administration 131, 137  
AIX Performance Management 136  
AIX Queuing System (AIX) 134  
AIX Shell 125  
AIX shell file name expansion 124  
AIX System Administration 127, 133  
AIX system administration commands  
and utilities 128  
AIX system documentation 124  
AIX system history and  
philosophy 124  
AIX text editor 124  
AIX utilities 124  
Aliases 119  
Aliases (UNIX) 161  
and, signals 96

Anonymous Arrays and Anonymous  
Hashes (Perl) 182  
applications 206  
architecture and features of UNIX 96  
architecture of UNIX 58, 205  
Arithmetic (AWK) 76, 81  
Arithmetic Evaluation (csh) 47  
array functions (Perl) 180  
array slices (Perl) 180  
Array Substitution (Perl) 182  
Arrays (AWK) 77, 81  
arrays (Perl) 180  
ASP (HTML) 242  
ASP Form Handling (HTML) 242  
Associative Array (Perl) 198  
at 102  
at (AIX) 129  
at (HPUX) 147  
audit programs which will assist in  
maintaining system  
security 84  
Audits (Security) 89  
Auto Indenting (vi) 73  
Auto Searching (vi) 73  
Auto Wrap (vi) 73  
Auto-vivification (Perl) 188  
awk 64, 66, 120, 210  
AWK for file processing and report  
generation 75  
Awk Patterns 120  
AWK Programming 79  
awk Programming 75  
awk Syntax 76

## B

Background Commands (&)  
(UNIX) 159  
Background Processes 98  
Background Processing 97  
Background Processing (csh) 47  
background, text, and link colors  
(HTML) 235  
Backup and Restore (AIX) 134  
Backup Strategies 110  
Backup strategies (AIX) 129

- Backup strategies (HPUX) 147
- Backup Tools 110
- backups (AIX) 128
- Basic System Administration
  - Certification Preparation 203
- bc 102
- bc (UNIX) 156
- BEGIN and END (AWK) 80
- Beginners Internet 245
- Beginning HTML 233
- bless Function (Perl) 190
- BLOBs / LONGs (Perl) 192
- Block Devices 98
- Block Devices (Linux) 171
- Blocks (Perl) 189
- Boot Camp 29
- Boot Camp. It is an intense 4 to 5 week training program 29
- Boot Device 211
- Bootup Sequence (Linux) 173
- Bourne Shell Programming 35
- Broadcast Addresses 112
- bugs contained in UNIX 84
- Build Library (blib) Directory (Perl) 194
- built-in shell 36
- C**
- C Shell Programming 45
- cal 102
- cal (UNIX) 156
- cancel 114
- Carping, Confessing, and Croaking (Perl) 188
- case 36
- case (UNIX) 160
- case statement 106
- case Statements 53
- cat 65, 100, 207
- cat (UNIX) 126, 154
- cd 101
- cd - Change Directory (UNIX) 155
- CDE, Common Desktop Environment 210
- certification 23
- Certification Exams, 310-01125
- Certification Exams, 310-01225
- Certification Preparation 25
- Certification Preparation Program 203
- Certification Preparatoion 209
- Certification Preparatory Courses 30
- CGI (Perl) 200
- change directory 101
- Changing Text (vi) 68
- Changing the color (HTML) 235
- Changing your password 100
- Character Devices 98
- Character Devices (Linux) 171
- Checkboxes (HTML) 242
- chmod 103
- chmod (UNIX) 157
- class philosophy 19
- clear 102
- clear (UNIX) 156
- client-side image map (HTML) 238
- Closures (Perl) 189
- color (HTML) 235
- color of frame borders (HTML) 238
- COLS 238
- columns (HTML) 237
- Command Interpretation 97
- Command interpretation 207
- Command Line Editing (csh) 47
- Command Line Execution (ksh) 50
- Command Line Execution (UNIX) 34
- command line interpreter 36
- Command Parsing 97
- Command Substitution 52
- Common Desktop Environment, CDE 210
- Common Gateway Interface (CGI) (PERL) 200
- communications 206
- Compiling and Installing SUID/SGID Programs (Security) 85
- components and architecture (AIX) 124
- components and architecture of UNIX 92
- Compound Assignment Operators

- (AWK) 76
- Compressing files 103
- Compressing Files (UNIX) 157
- Concepts of UNIX Internals 95
- Conditional Debugging 54
- Configuration files (AIX) 128
- Configuration files and scripts (HPUX) 146
- Control Flow - Loops 119
- Converting a base 10 color number to base 16, hexadecimal (HTML) 235
- copy files 101
- Copying Objects (vi) 69
- Costs / Prices 19
- cp 100, 101
- cp (Linux) 154
- CPAN (Perl) 191
- cpio 65, 110
- cpio (AIX) 128, 129
- cpio (HPUX) 147
- cpio (Linux) 172
- create a new (vi) 67
- Creating A Link 97
- Creating, Reading and Writing Files (Perl) 198
- cron (AIX) 129
- cron (HPUX) 147
- crontab 102
- cSAGE 23
- cSAGE Certification Preparatory Course 209
- cSAGE exams 23
- csh - Shell Overview 47
- csplit 207
- cut 103
- cut (UNIX) 126, 157
- D**
- date 102, 206, 210
- date (UNIX) 125, 156
- date and time, setting (AIX) 128
- date and time, setting (HPUX) 146
- DBI Drivers (Perl) 192
- DBI/DBD (Perl) 191
- DBI/DBD SQL Programming (Perl) 192
- DBM Modules (Perl) 190
- Debugging Flags (Perl) 188
- Define basic Solaris terms 210
- Defining Macros (vi) 73
- delete users 210
- Deleting Text (vi) 68
- Deleting Users (Linux) 170
- device special files (AIX) 128
- device special files (HPUX) 146
- Device Special Files (Security) 85
- devices 210
- df 103, 109
- df (UNIX) 157, 171
- Diagnostic Messages (Perl) 188
- die Function (Perl) 198
- diff 65, 103, 208
- diff (UNIX) 126, 157
- Directories 109
- directories (AIX) 124
- Directory permissions 103
- disk space, monitoring (AIX) 129
- disk space, monitoring (HPUX) 147
- Disk/Tape Devices (AIX) 129
- Disk/Tape Devices (HPUX) 147
- DNS (AIX) 138
- DNS vs /etc/hosts 112
- documentation 205
- documentation (AIX) 124
- downloadable files (HTML) 234
- Driver Interfaces 98
- du 103, 109
- du (UNIX) 157, 171
- dump 110
- dump (Linux) 172
- Dump and Crash (AIX) 136
- duties of a Solaris System Administrator 209
- Duties of the system administrator (HPUX) 146
- Dynamic Web Pages (Perl) 198

**E**

EOMail, Sending and receiving  
    (AIX) 125  
echo 54  
Editing Concepts (vi) 68  
editing environment (vi) 67  
Editing With vi (Linux) 155  
electronic mail 206  
elif 53  
E-Mail, Address Book (Internet) 245  
E-Mail Address (Internet) 245  
E-Mail Clients (Internet) 245  
E-mail with CDONTS, sending  
    (HTML) 242  
E-Mail, Reading (Internet) 245  
E-Mail, Receiving (Internet) 245  
E-Mail, Sending (Internet) 245  
Embedding the map code (HTML) 238  
Environment Variables (Perl) 198  
Error Checking in DBI (Perl) 192  
Error Handling (Perl) 198  
Error Logging (AIX) 136  
Ethernet Addresses 112  
eval Function (Perl) 198  
eval Operator (Perl) 189  
Evaluating Perl Expressions (Perl) 194  
Evolving Standards 108  
ex 118  
exams 23  
Executives 21  
Explorer (Internet) 247  
export 52  
expr 102  
expr (UNIX) 156  
Expressions (AWK) 80

**F**

Favorite, Adding (Internet) 248  
Favorite, Deleting (Internet) 248  
file 65  
file (UNIX) 126  
File Access Permissions 97  
File Archiving 65  
File Attributes 97  
File Comparison 65

File Concept 97  
File Formatting 65  
File Manipulation 97  
File name expansion 207  
file name expansion 206  
File Name Generation 47  
File names (UNIX) 100  
file operation functions (Perl) 180  
File permissions 103  
File Permissions (UNIX) 157  
File Storage in Disk Blocks  
    (Linux) 171  
File System 59  
file system 206  
File System Concepts (AIX) 134  
File System Format 97  
File System Management (UNIX) 157  
File System Security 85, 103  
File System Security (UNIX) 157  
File Systems Sharing (Linux) 171  
file systems, checking (HPUX) 147  
file systems, checking, creating  
    (AIX) 129  
file systems, creating (HPUX) 147  
File Testing (Perl) 198  
Filename Generation 104  
Files 109  
files (AIX) 124  
filesystems (HPUX) 146  
filesystems, create, check, repair  
    (AIX) 128  
file 65, 103, 109, 208  
file (UNIX) 126, 157, 171  
file 102  
file (UNIX) 156  
file width table (HTML) 239  
Flow Control 105  
Flow Control (AWK) 80  
Flow Control (UNIX) 160  
Fluid Tables (HTML) 239  
for 36  
for Loop 53  
for loop 106  
for Loop (Perl) 181  
for Loop (UNIX) 160

for Loops (AWK) 77  
foreach 46  
foreach (csh) 48  
foreach (Perl) 188  
foreach Loop (Perl) 181  
Fork & Exec 98  
fork and exec 47  
frames (HTML) 237  
fsck 109  
fsck - (Linux) 171  
fstab 109  
fstab (Linux) 171  
FTP 150  
ftp 114  
FTP (Internet) 247  
ftp (Linux) 175  
Function Libraries 54  
Fundamentals of AIX 123  
Fundamentals of HP-UX 141  
Fundamentals of UNIX 91, 99

## G

GET Form (HTML) 242  
getline (AWK) 81  
GID 85  
GIF graphic (HTML) 234  
Global Search and Replace (vi) 72  
goal of education 23  
graphic size (HTML) 234  
grep 65, 103, 207  
grep (Perl) 188  
grep (UNIX) 126, 157  
grep Operator (Perl) 188  
Groups 85, 108  
groups (AIX) 128  
GUI Programming (Perl) 192

## H

Hard Drive 211  
Hardware Compatibility 211  
Hardware Requirements 211  
hashes (Perl) 180  
head 65, 100  
head (UNIX) 154  
Here Documents 119

Here Documents (Perl) 182  
hexadecimal (HTML) 235  
Hierarchical File System Directories 97  
Hierarchical File System 154  
Hierarchical file system (UNIX) 101  
History and Alias Mechanisms  
    (csh) 47  
History of UNIX 34, 108  
history of UNIX 100  
HP-UX Network Administration 149  
HP-UX operating system 146  
HP-UX System Administration 145  
HP-UX system administration  
    commands and utilities 146  
HP-UX system documentation 142  
HTML 233  
HTML forms 241  
Hypertext Markup Language  
    (HTML) 233

## I

I/O Redirection 97  
I/O redirection 46, 206, 210  
I/O redirection (AIX) 124  
I/O Redirection (csh) 47  
I/O Redirection (UNIX) 158  
I/O redirection, pipes, quoting, and  
    filename expansion 36  
I/O subsystem (UNIX) 58  
id 102  
id (UNIX) 156  
if 36, 46, 48  
if, if-elseStatements (AWK) 77  
ifconfig 112  
if-then-else 53  
image maps (HTML) 237  
Incremental Operators (AWK) 76  
inetd 113  
init Command (Linux) 173  
init Daemon 110  
init Daemon (Linux) 173  
Initialization Sequence (UNIX) 59  
Initializing Arrays and Hashes  
    (Perl) 188  
inittab 110



- Inode 109
- Inode Table (Linux) 171
- Input and Output Functions (Security) 85
- input operator (Perl) 180
- Input/output redirection 207
- Insert/Append Mode (vi) 72
- Inserting a link (HTML) 234
- Installation (HPUX) 147
- Installing additional packages (AIX) 130
- Installing and Upgrading Software
  - With rpm (Linux) 175
- Installing the base operating system (AIX) 130
- Intel, Solaris on 209
- Intermediate HTML 237
- Intermediate Internet 247
- Internet Buzz Words 245
- Internet Servers 249
- Internet, How is it Connected 245
- Internet, what is 245
- Internet, What can I do with it 245
- Introduction to Perl Programming 201
- Introduction to Shell
  - Programming 104
- Introduction To Solaris 8 25, 205
- Introduction To Solaris 8 Operating Environment 203
- invoke subshells 36
- Invoking Processes 98
- IP Addressing 112
- IT teams 21
- J**
- JavaScript 241
- JavaScript If-Else Statements to Toggle Form Submission (HTML) 243
- JavaScript to Determine Form Submission (HTML) 243
- Job Control (csh) 47
- Journalled File System (AIX) 134
- JPEG graphic (HTML) 234
- K**
- Kernel 59
- kernel 206
- Kernel Reconfiguration 114
- Killing background processes 105
- Known Bugs, Trapdoors, and Viruses 86
- Korn Shell Features 119
- Korn Shell Programming 39, 49
- Korn Shell Variables and Arrays (ksh) 50
- L**
- Laziness, Impatience, and Hubris (Perl) 191
- Leadership 21
- Lectures 20
- less (UNIX) 154
- lilo.conf File (Linux) 173
- Line Numbering (vi) 73
- Line Substitution (vi) 72
- link (HTML) 234
- Links 109, 171
- Linux 154
- Linux Distributions 154, 170
- Linux File Attributes 171
- Linux Fundamentals 153
- Linux Processes 172
- LINUX System Administration 169
- Linux System Security 173
- Linux User 170
- List Operators (Perl) 188
- Lists, Arrays, and List Operators (Perl) 188
- ln 103
- ln (UNIX) 157
- Loaned Out Logins (Security) 89
- Log files (HPUX) 146
- log off 205
- log on 205
- log on and off (AIX) 124
- log on and off of UNIX 92
- Logging In and Out (Linux) 154
- logical and physical file system 58
- logical filesystem 206

- Logical Volume Manager (AIX) 134
- Loops and ifs (Perl) 199
- Loops, for (AWK) 77
- Loops, while (AWK) 77
- lp 65, 103, 114, 207
- lp (UNIX) 126
- lpadmin 114
- lpr (UNIX) 157
- lpstat 114
- ls 100, 206, 210
- ls (UNIX) 154
- M**
- Macros (vi) 118
- Macros and Functions (Perl) 194
- Magic target names (HTML) 238
- mail 205, 210
- make directories 101
- Making a File System (Linux) 171
- manage the network (HPUX) 149
- manage users 210
- Managers 21
- Managers will benefit 29
- Managers, UNIX for Managers 29
- Managing Devices (AIX) 134
- manipulate files 206
- Manipulating Data (ksh) 50
- Manipulating Data (sh) 34
- Manipulating Scalars (Perl) 194
- manuals, Using 100
- map (Perl) 188
- Mathematical Functions (AWK) 77
- Memory Management (Perl) 194
- mesg 103
- meta tags (HTML) 237
- Methods used to gain Unauthorized Access (Security) 89
- migrating to UNIX 29
- minimum recommended file and directory access permissions 84
- mkdir 101
- mkdir - Make Directories (UNIX) 155
- mkfs 109
- mkfs (Linux) 171
- Modifying User Attributes (Linux) 170
- Module Development and Distribution (Perl) 194
- monitor system status (AIX) 128
- monitor system status (HPUX) 146
- more 65, 100
- more (UNIX) 154
- Moving Text (vi) 69
- Multi-Dimensional Arrays (AWK) 81
- Multitasking with Perl 184
- mv 100
- mv (UNIX) 154
- N**
- naming conventions 207
- Navigating the Documentation 108
- Nested Tables (HTML) 239
- Netscape (Internet) 247
- netstat 113
- netstat (UNIX) 174
- Network Addresses 112
- Network Backup Strategies 110
- Network Backup Strategies (Linux) 172
- Network Classes 112
- Network Commands 34
- Network File Systems (AIX) 132
- Network File Systems (HPUX) 150
- Network Information Service (AIX) 132
- Network Information Service (HPUX) 150
- Network Layers 132
- Network Layers - Physical, Link, Transport, Virtual Terminal (HPUX) 150
- network proper installation (AIX) 131
- network protocols (AIX) 131
- Network Security 88
- Network Security Checklist 85
- Network Software Installation (HPUX) 150
- Network Utilities 114
- Networking (AIX) 138
- Networking Utilities (Linux) 174

- Networking With Perl 200
- news 102, 206
- next, last and redo Statements  
(PERL) 181
- NFS - Network File Systems  
(AIX) 132
- NFS - Network File Systems  
(HPUX) 150
- NFS (AIX) 131, 138
- NFS (HPUX) 149
- NIS - Network Information Service  
(AIX) 132
- NIS - Network Information Service  
(HPUX) 150
- NIS (AIX) 131, 138
- NIS (HPUX) 149
- NIS (Linux) 175
- O**
- Object-Oriented Programming  
(Perl) 183
- Object-Oriented, Making Perl 190
- Objects and Classes (Perl) 190
- ODM (AIX) 136
- Off-Site Training 20
- on-line manuals 100
- open function (Perl) 180
- Opening a File (Perl) 198
- operating system, installation  
(HPUX) 147
- operating system, pre-install  
(AIX) 130
- Operators, Functions and Precedence  
(Perl) 181
- Outlook Express (Internet) 248
- Output into Files (AWK) 81
- Output into Pipes (AWK) 81
- Output Redirection (AWK) 77
- Overview of NIS 114
- P**
- pack() Function (Perl) 183
- Packages (Perl) 183
- Paging 112
- Partitions and File Systems  
(Linux) 171
- pass signals 36
- Passing Arguments 54
- Passing Arguments (Perl) 182
- Passing AWK Output to the shell 77
- Passing Names (Perl) 182
- Passing Shell Arguments to AWK 77
- Password Compromise (Security) 89
- Passwords 85, 108
- Passwords (Linux) 170
- paste 103, 207
- paste (UNIX) 126, 157
- PATH Environment Variable 52
- Pathnames (UNIX) 154
- Pattern Matching (Perl) 181
- Pattern Specifications (AWK) 76
- Performance Monitoring and  
Tuning 112
- Performance Monitoring and Tuning  
(Linux) 173
- Perl Character Strings 202
- Perl Configuration 188
- Perl Debugger 185, 199
- Perl Doesn't Do 190
- Perl Embedded in a C Program 194
- Perl File Management 202
- Perl Interpreter 202
- Perl Interpreter, Embedding (Perl) 194
- Perl Library 200
- Perl Modules 191
- Perl Operators 202
- Perl Programming 179, 197
- Perl Source Listings! 202
- Perl Statements 202
- Perl Variables 202
- Perl Variables & Arrays 202
- Perl Variables & Hashes 202
- Perl with C/C++ 193
- Perl, Example Programs 180
- Perl/Tk Programming 193
- pg 65, 100, 207
- pg (UNIX) 126
- philosophy 19
- Physical Access (Security) 86
- physical file system (AIX) 125

- Physical File System (Linux) 171
  - physical files system 206
  - Physical Security 112
  - ping 113
  - ping (Internet) 249
  - pipe 206
  - pipe (AIX) 124
  - Pipelines 47
  - Pipes 98, 207
  - pipes 46, 96, 210
  - Pipes (AWK) 77
  - Pipes (UNIX) 158
  - Planning and Setting Goals 22
  - Plug-n-Play Devices 211
  - POD Translators (Perl) 194
  - POSIX Standardization 59
  - POSIX.1 Basic File Types 164
  - POST From (HTML) 242
  - pr 207
  - pr (UNIX) 126
  - Pre-Installation (AIX) 130
  - print 119
  - print function (Perl) 180
  - Print Statement (Perl) 197
  - print working directory 101
  - Printers (AIX) 129
  - printers (AIX) 128
  - Printers (HPUX) 147
  - printers (HPUX) 146
  - Printing 114
  - Printing (Linux) 174
  - Printing Character Strings (AWK) 77
  - Printing Variables (AWK) 77
  - Problem Determination (AIX) 134
  - Process Attributes 98
  - Process Creation (csh) 47
  - Process Definition 98
  - Process File Table 98
  - Processing Form Input (Perl) 200
  - Professional / Technical Writing 22
  - Programming in sh 34
  - Programming Macros (vi) 73
  - ps 105, 206
  - ps (UNIX) 125, 158
  - pwd 101
  - pwd - Print Working Directory (UNIX) 154
- R**
- Radio Buttons (HTML) 242
  - rc Scripts (Linux) 173
  - rcp 114
  - read 52, 119
  - read () Function (Perl) 183
  - reading directories (Perl) 180
  - Reading Files (Perl) 198
  - Reading Lines From Files 53
  - RealPlayer (Internet) 248
  - Recommendations for Securing Your System 86
  - Records and Fields (AWK) 76
  - References (Perl) 182
  - Regular Expressions 119
  - regular expressions 64
  - Regular Expressions (ksh) 50
  - Regular Expressions (Perl) 181, 199
  - Regular Expressions (sh) 34
  - Relational Operators (AWK) 76
  - remove directories 101
  - Removing Packages (Linux) 175
  - repair damaged files systems (HPUX) 146
  - restores (AIX) 128
  - Restoring files (AIX) 129
  - Restoring files (HPUX) 147
  - Returning Values (Perl) 182
  - Returning Values from Functions 54
  - RFS (AIX) 131
  - RFS (HPUX) 149
  - risk analysis 84
  - rlogin 114
  - rm 100
  - rm (UNIX) 154
  - rmdir 101
  - rmdir - Remove Directories (UNIX) 155
  - route (UNIX) 174
  - ROWS 238
  - rpm (Linux) 175
  - rsh 114

- Run levels (AIX) 128
- Run levels (HPUX) 146
- Run Levels (UNIX) 59
- Running Scripts 52
- S**
- SAGE Certification Preferred Training Provider 23
- SAGE Certification recommended course tracks 23
- Samba (Linux) 175
- sar Utility, accounting 112
- Saving Files and Exiting (vi) 72
- Scalar and List Contexts (Perl) 180
- script 102
- script (UNIX) 156
- Script Tracing 54
- scripts that process form results (HTML) 241
- Scrolling and Searching (vi) 72
- Search Engines (Internet) 246
- Secure Programs 85
- Security 83
- Security Administration 86
- Security Checklist 85
- Security Compromises 86
- security features of UNIX 88
- Security Overview 112
- Security Problem Checklist 86
- security vulnerabilities inherent to UNIX 84
- Security, Account 112
- sed 64, 120, 210
- sed - stream line editor 65
- sed (UNIX) 126
- sed Addressing 120
- sed Functions 120
- sed pattern space and addresses 65
- SELECT Menus (HTML) 242
- self-audit (Security) 88
- semaphores 96
- Sending Email From Your ASPs (HTML) 242
- Server Configuration and Management (Linux) 175
- Server-Client Relationships (AIX) 132
- Server-Client Relationships (HPUX) 150
- Server-Side Scripting (HTML) 242
- set 119
- Setting and Printing Variables (csh) 47
- Setting up the Network (AIX) 132
- Setting VI Options 73
- SGID 112
- shared memory 96
- Sharing Filesystems 109
- Shell 59
- Shell Arithmetic 54
- shell debugging 36
- Shell Environment 52
- shell flow control 36
- Shell Functions 54
- Shell Interaction - Extending vi 118
- Shell Overview (csh) 47
- Shell Program, creating (csh) 47
- Shell Program, executing (csh) 47
- Shell Programming 35, 39, 45, 49, 119
- Shell Programming / Scripting 51
- shell programs which process interrupts 36
- Shell Programs, debugging (csh) 47
- Shell script 66
- Shell Script Problems (ksh) 50
- Shell Script Structures 34
- Shell Script Structures (ksh) 50
- Shell Scripting 51
- Shell Variables 52
- Shell variables 207
- shut down a AIX 128
- shut down a HP-UX 146
- Shutdown 110
- shutdown 209
- shutdown (AIX) 128
- shutdown (HPUX) 146
- shutdown (Linux) 173
- Single-User Mode 110
- smit - System Management Tool (AIX) 134
- SMTP 150
- Sockets 98

- Sockets Programming in Perl 184
  - Software Installation and Management (Linux) 175
  - Solaris 8 Operating Environment Certification Preparation 25
  - Solaris Certification Preparatory Course 30, 209
  - Solaris Installation 211
  - Solaris Network Administration 25, 203
  - Solaris on Intel 209
  - Solving Shell Script Problems 34
  - sort 103, 207
  - sort (UNIX) 126, 157
  - sound (HTML) 234
  - Speaking / Lectures 20
  - Special Files 97
  - Special Symbols Tables (AWK) 76
  - split 207
  - split (UNIX) 126
  - Spoofing Methods 86
  - SQL Query (Perl) 191
  - Standard Input, Standard Output and Error, Shell (UNIX) 158
  - Standard Input/output 97
  - Standards (UNIX) 108
  - start up and shut down a AIX 128
  - start up and shut down a HP-UX 146
  - Startup 110, 209
  - Startup/Shutdown (AIX) 134
  - state the actions to take if compromise is suspected (Security) 88
  - Statement Modifiers (Perl) 181
  - Streams 98
  - Strict Checks (Perl) 188
  - String (AWK) 81
  - String Handling Functions (AWK) 77
  - String-Matching Patterns (AWK) 80
  - Structure of a Perl Program 197
  - Subnet Masks 112
  - Subroutine Prototypes (Perl) 189
  - Subroutines (Perl) 189
  - Sub-shells 52
  - Substitution Operator (Perl) 181
  - Substitution, Replacement, Deletion (vi) 72
  - Substrings (Perl) 183
  - Successful Meeting 22
  - SUID 112
  - sum 65
  - sum (UNIX) 126
  - Super Block 97
  - Superblock 109
  - Superblock (Linux) 171
  - Swapping 112
  - switch 46
  - Symbolic Links 109, 171
  - System Administration (AIX) 134
  - System Administration Certification Preparation 25
  - System Administrator Responsibilities 108
  - System Administrator's Responsibilities (Linux) 170
  - system administrator, Duties (AIX) 128
  - system and user environments 64
  - System Architecture 59
  - System architecture kernel, file system, shell, utilities (AIX) 124
  - System Directories 97
  - System File Table 98
  - System Inode Table 98
  - System Management Tool (smit) (AIX) 134
  - System Problems 86
  - System Security 83
  - System Security (AIX) 136
  - System Startup and Shutdown (Linux) 173
  - system status (HPUX) 146
- T**
- Tab Stops (vi) 73
  - Table attribute guide (HTML) 238
  - table tags (HTML) 235
  - table within a table (HTML) 239
  - Tables for Form Layout (HTML) 242
  - Tables in HTML, Creating (Perl) 198

- Tabular Data (Perl) 198
- tail 65, 100, 207
- tail (UNIX) 126, 154
- talk 103
- tar 65, 103, 110
- tar (AIX) 128, 129
- tar (HPUX) 147
- tar (Linux) 172
- tar (UNIX) 157
- targets (HTML) 237
- Tcl, Tk, Tcl/Tk, Tkperl, Perl/Tk, etc. (Perl) 192
- TCP/IP 150
- TCP/IP (AIX) 132, 138
- TCP/IP and Ports (Linux) 174
- TCP/IP Network Security 85
- TCP/IP, Configuring 112
- Team Leads 21
- tee 65
- tee (UNIX) 158
- telnet 114
- Terminal Security 88
- Text Areas (HTML) 242
- Text Editing 207
- Text Fields Attributes (HTML) 242
- Text Handling (UNIX) 157
- Timing with Benchmark (Perl) 195
- tr 103, 207
- tr (UNIX) 126, 157
- traceroute (Internet) 249
- traceroute (UNIX) 174
- trap signals 36
- Tricking Authorized Users/System Administrators (Security) 89
- trojan horses 84
- Trusted Computing Base 85
- Trusted Computing Base for Auditing 86
- Two-dimensional Arrays (Perl) 182
- Types of Editors 68
- Types Of Files 97
- U**
- UID 85
- ulimit 103
- ulimit (UNIX) 157
- umask 103
- umask (UNIX) 157
- uname 102
- uname (UNIX) 156
- unauthorized access 84
- unauthorized access (Security) 88
- Unauthorized Access by Hackers (Security) 88
- Unauthorized Access by Trusted Users (Security) 88
- unauthorized users 84
- Undo Last Command, vi (Linux) 155
- Unformatted Print (AWK) 77
- UNIX “ sh”Shell 34
- UNIX “ tool”philosophy 64
- UNIX Boot Camp 29
- UNIX Bourne Shell Programming 35
- UNIX C Shell Programming 45
- UNIX Features 59
- UNIX Filesystem 34
- UNIX For Programmers 33
- UNIX Kernel 34
- UNIX Korn Shell Programming 39
- UNIX Processes 52, 105, 110
- UNIX security control 84
- UNIX Security Features 85
- Unix Security for Users 87
- UNIX Security Levels 85
- UNIX Security Problems 85
- UNIX shell 92, 96
- UNIX shell constructs 64
- UNIX software development tools for program 58
- UNIX System Administration 107
- UNIX System Administration Certification 23
- UNIX System Documentation 59
- UNIX system documentation 92
- UNIX System Security 83, 112
- UNIX system startup 96
- UNIX text editor 92
- UNIX Tools 63
- UNIX Tools & Commands 34
- UNIX utilities 92

- UNIX-PC Configuration (AIX) 132
  - UNIX-PC Configuration (HPUX) 150
  - UNIX-UNIX Configuration (AIX) 132
  - UNIX-UNIX Configuration (HPUX) 150
  - unpack() function (Perl) 183
  - USEMAP (HTML) 238
  - user 108
    - user (AIX) 129
    - user (HPUX) 146
  - User Accounts 85
    - user accounts (AIX) 128
  - User Block 98
  - User Defined Functions (AWK) 81
  - User Environment (csh) 47
    - user interface and command line interpreter (csh) 46
  - User Security Checklist 85
  - user, add, manage, delete 210
  - user-defined shell variables 36
  - Users and Groups (AIX) 134
  - Users, adding and deleting 108
  - Using Arrays with Loops 53
  - Using Macros (vi) 73
  - Using the Shell 104
  - utilities 206
  - UUCP Security 85
- V**
- Variable Interpolation (Perl) 198
  - Variable Scoping (Perl) 198
  - Variable Substitution 52
  - Variable-Length (Delimited) Fields (Perl) 183
  - Variables 105
    - variables 207
    - variables (Perl) 180
    - Variables (UNIX) 160
    - Variables, Arrays (Perl) 198
    - Variables, Built-in (AWK) 80
    - variables, built-in (csh) 46
    - Variables, Lexical (Perl) 189
    - Variables, Lists (Perl) 198
    - Variables, Local (Perl) 189
    - Variables, Persistent Private Subroutine (Perl) 189
    - Variables, Positional (AWK) 76
    - Variables, Predefined (AWK) 76
    - Variables, Scalars (Perl) 198
    - Variables, Tied (Perl) 190
    - Variables, User Defined (AWK) 76
  - variables, user-defined (csh) 46
  - various run levels (UNIX) 58
  - vi 101, 118, 207
    - vi (UNIX) 125
    - vi buffering process 101
    - vi Buffering Process (UNIX) 155
    - vi Buffers 118
  - VI Editor 34
    - vi editor 67
  - VI Screen Editor (Advanced) 71
  - VI Screen Editor (Basic) 67
  - video (HTML) 234
  - Virtual File System (Linux) 171
- W**
- wall 108, 206
    - wall (UNIX) 125
  - warn Function (Perl) 198
  - Warnings (Perl) 188
  - wc 65, 103
    - wc (UNIX) 157
  - Web documents published (HTML) 233
  - Web Pages Created Dynamically (Perl) 198
  - What is Perl 197
  - What is UNIX 100
  - What To Do If Your System Is Compromised 86
  - What to Look For (Security) 89
  - Where to get Perl 197
  - while 36, 46
    - while (csh) 48
    - while Loop 53
    - while loop 106
    - while Loop (UNIX) 160
    - while Loops (AWK) 77
  - who 206, 210
    - who (UNIX) 125



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**Index**

---

Widgets (Perl) 192  
Wild Card Matching 97  
Winning Spirit 22  
world class 21  
write 103  
Writing Files (Perl) 198  
Writing Files to Disk (vi) 72

**X**

XHTML Compliant (HTML) 239

**Y**

Yank and Put (vi) 69