

AIX Essentials and Shell Programming

Course Summary

Length: 5 Days

Prerequisite: Basic computer skills

Recommendation Statement:

Student should be able to use a computer monitor, keyboard, mouse. Student needs to be able to input commands and control characters from a keyboard.

Course Description:

For those new to AIX, this is the first course you will take. The course starts at the beginner level and works into intermediate and advanced AIX commands and utilities. The student is introduced to the AIX Korn shell, the command line and command syntax. Although you will be exposed to the various windowing platforms available in AIX, this course teaches UNIX at “the command line level” to develop a thorough understanding of the AIX operating environment.

The student learns how to navigate the AIX file systems and how to work with files, directories and permissions. The student will learn how to use the AIX editors “ex” and “vi. “

Once the student is comfortable with basic AIX commands, they’ll move onto advanced power tools as well as how to customize the POSIX Korn shell. The student will learn how to combine shell variables, shell built-ins and UNIX power tools to build complex POSIX (Korn) shell scripts.

The classroom labs are run in a real-world AIX environment, are structured to allow you to learn by doing, and are developed to simulate “real world” situations. The hands-on labs progressively build your AIX knowledge and command skills in a clear and concise manner.

Working in a controlled UNIX classroom environment with an expert instructor, you will learn AIX concepts and commands. You will receive professional tips and techniques that will help you build your AIX confidence and skills.

Upon completion of this course, you should be able to:

- Log in and log out of AIX
- Use the Common Desktop Environment tools (CDE) and GNome window system
- Compose command-line strings to perform functions
- Navigate the directory tree
- Manipulate text files
- Create files and directories
- Backup and restore user files and directories
- Change permissions of files and directories
- Use the vi text editor
- Identify and modify initialization files
- Employ shell features to streamline command execution
- Use basic network commands
- Use commands to search directories and files
- List active user processes and selectively kill user processes
- Customize the shell environment
- Use UNIX network utilities
- Use UNIX power tools to process data and files
- Interpret and write complex shell scripts
- Read, write, and debug scripts
- Use local and environmental variables and shell metacharacters in scripts
- Use regular expression characters with the grep, sed, and awk utilities
- Write sed scripts to perform non-interactive editing tasks
- Write awk scripts to manipulate individual fields within a record and to write reports based upon an input file
- Use the exit status of a command to determine if the command succeeded or failed
- Access and process command-line arguments passed into a script
- Develop messages to display when a script is used incorrectly
- Use flow control constructs, such as branching and looping
- Perform string manipulation and integer arithmetic on shell variables

AIX Essentials and Shell Programming

Detailed Course Outline - 5 Days

Introduction to the UNIX Operating System

- Describe the AIX Operating Environment and OS releases
- UNIX standardization - an overview of standards in the UNIX community
- Describe Unix shells (which shells are available, compare the common Unix shells, how to choose a shell)
- Describe the Unix kernel

Establishing Communication

- Logging in and starting a Unix session
- Window environments available to the UNIX user
- Understanding the UNIX command syntax
- Using the UNIX "help" facility: manual pages
- Using emulation programs to access the system (ie. Putty / X-Windows / Telnet / CDE - Common Desktop Environment / Gnome / Java Desktop)
- Setting your terminal environment (stty)
- Executing commands from the command line; UNIX Command syntax
- Using the UNIX "help" facility: manual pages

Introduction to the Filing System

- Examining UNIX files and directories
- Describe the UNIX file system and directory structure
- Navigating the UNIX directory hierarchy
- Understand the difference between full and relative paths
- Understanding the current and parent directories
- Understanding the differences between a Windows/DOS based filesystem and a UNIX JFS
- Differences between Windows (DOS) files and Unix files
- Describe mount points - mounting and unmounting filesystems
- Describe hard and symbolic links
- Describe home directories
- Disk space and checking the status of disks, filesystems, and directories (ie. du and df commands)

File Management

- Creating directories
- Copying files and directories
- Moving and renaming files and directories
- Removing files and directories
- Using shell metacharacters
- Locating files by name, owner, type and other parameters using the 'find' command

UNIX Permissions

- Understanding permissions
- File permissions
- Directory permissions
- Change permissions with symbolic mode
- Change permissions with absolute (octal) mode
- Determine and set the umask value

Redirection Filters and Pipes

- Exploring standard input, standard output, and standard error
- Using filters
- Using pipes

Using the vi Editor

- Understand the UNIX editors
- Understand the VI modes
- Creating/viewing/manipulating/saving/deleting files using the vi editor
- Using a .exrc file

Introduction to shell scripts

- Creating simple shell scripts
- Choosing a Shells
- UNIX Shells and Variables
- Understanding the UNIX shells
- Displaying the default variables
- Creating/Removing user variables
- stty to set terminal types (backspace, etc.)

Introduction to the POSIX shell

- Shells: Bourne, Korn, C, bash
- Startup Scripts (.profile, .kshrc)
- Using ENV for automatic environment tailoring
- Use Bourne and Korn shell variables
- Assign values to shell variables
- Display the value of shell variables
- Make variables available to subprocesses using the export statement
- Display the value of environment variables
- Unset shell and environment variables
- Customize the user environment using the .profile file
- Perform arithmetic operations
- Create and use aliases
- Display aliases and the values assigned to them
- Display the built-in aliases
- Customize the Bourne and Korn shell environments
- Use the tilde expansion and command substitution features of the Korn shell

Using Aliases and Functions

- Introducing the alias concept
- Using functions
- Making your aliases and functions permanent
- Removing aliases and functions

Command Editing and Command History

- Enabling command editing in the Korn shell
- Using history to recall commands
- The command history file

System Status and Command Information

- Displaying system information and user status
- Determining command locations

Multitasking Capabilities

- Introduction to multitasking in the UNIX environment
- Managing jobs and background processes
- Using the process table to manage processes
- Introducing delayed and detached jobs

- Display system processes
- Use processes and process identifiers (PIDs)
- Identify parent and child processes
- Terminate processes using the kill command
- Use the pgrep and pkill commands

Advanced File Management

- Creating links
- Processing files with "awk", "tr", and "sed"
- Use awk/nawk commands from the command line
- Write awk programs to generate data reports from text files
- Write awk programs to generate numeric and text reports from text files

Command line data processing

- Using awk to display file contents and process data
- Formatting files with the tr command
- Using UNIX filters to filter, sort and restructure data
- Use awk to scan text files or standard input to display specific data, change data format, and add text to existing data

Archiving User Data

- Managing file space
- Archiving files and directories
- Compressing files
- Use the tar utility to store files
- Backup files with the tar and compress commands
- Use compression tools to save storage space (compress, gzip, etc)

Printing

- lp, lpstat, cancel

Remote Connections

- Connect remotely using telnet and ssh
- Remotely access a system using rlogin or ssh
- Transfer files with ftp and sftp (using the command line)

Advanced Shell Topics - Day 3

Shell Scripts

- Writing and Running Shell Scripts
- Command Substitution
- Shell Variables and Variable Substitution
- Shell Environment Variables
- Comments
- Getting User Input - Read
- The for Loop and if Statement
- Exit Status or Return Code
- The test Command
- The case Statement
- Simple Conditionals
- The set Command
- Arithmetic with shell variables

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Regular Expressions and the grep Command

- Use and describe regular expressions
- Describe the grep command
- Use the grep command to find patterns in a file
- Use the regular expression characters with the grep command
- Metacharacters
- The grep command

Command line database processing

- Using awk to display file contents and process data
- Formatting files with the tr command
- Using UNIX filters to filter, sort and restructure data
- Use awk to scan text files or standard input to display specific data, change data format, and add text to existing data

Stream Editing with 'sed'

- Use sed to perform noninteractive editing tasks
- Substituting text
- Deleting and printing lines
- Reading and writing files
- Multiple 'sed' editor functions
- Use regular expression characters with the sed command

Writing and Debugging Scripts

- Creating a shell script
- Put comments in a script
- Change permissions on a script
- Execute a script
- Debug a script

String Manipulation

- String Comparison
- String Relations
- Concatenation
- Substring Manipulations
- Wildcards and Pattern Matching

Conditionals

- Use the exit status of a command as conditional control
- Use the "if" statement to test a condition
- Pass values using command-line arguments (positional parameters) into a script
- Create USAGE messages
- Place parameters on the command line
- Use conditional if, then, elif, else, and fi constructs
- Use exit, let, and test statements ([[]], " ")
- Apply the &&, ||, and ! Boolean logic operators
- Use the case statement

Interactive Scripts

- Use the print and echo commands to display text
- Use the read command to interactively assign data to a shell variable
- Read user input into one or more variables, using one read statement
- Use special characters, with print and echo, to make the displayed text more user friendly
- Create a "here" document
- Use file descriptors to read from and write to multiple files

Loops

- Write scripts that use for, while, and until loops
- Write a script using the select statement
- Describe when to use loops within a script
- Generate argument lists using command, variable, and file-name substitution

Advanced Variables, Parameters, and Argument Lists

- Declare strings, integers, and array variables
- Manipulate string variables
- Change the values of the positional parameters using the set statement within a script
- Pass values using command-line arguments (positional parameters) into a script
- Declare korn shell string and array variables
- Setting and retrieving arrays
- Set default values for parameters
- Use the Korn shell built-in let, print, set, and typeset statements
- Reading user input
- Positional parameters
- Creating positional parameters
- Conditional substitution
- Working with arithmetic operators and data

Functions

- Create user-defined functions in a shell script
- Create, invoke, and display functions from the command line
- Pass arguments into a function
- Call functions from special (function) files that are saved in one or more function directories
- Describe where functions are available for use

Controlling Script Behavior

- Manage the use of temporary files
- Write scripts using the setuid bit
- Use the crontab command

Scheduling Execution

- sleep
- date
- cron and crontab

Traps

- Describe how the trap statement works
- Include trap statements in a script
- Use the trap statement to catch signals and handle errors

