

Course Description: This is the first in a series of courses focusing on the Unix Operating System, including Linux, Solaris, AIX, HP-UX, etc. A comprehensive study is given, including its evolution, structure, programming environment, and user interface. Topics include user interfaces, the shell (Korn, Bourne, C, etc), file system commands, data manipulation commands, editors (vi and ed), software tools, networking tools, and system administration tools. The course is supplemented with many hands-on exercises that reinforce the lectures.

Who Should Attend: This course is intended for programmers and end users that are new to the Unix operating system.

Prerequisites: Students are required to have some familiarity with an operating system such as DOS or Windows.

Benefits of Attendance: Upon completion of this course, students will be able to:

- Understand the underlying philosophy of Unix
- Login and log out of a Unix system
- Navigate through the Unix file system
- Use the productivity features of the Unix shell
- Create and modify files using Unix editors
- Copy, rename, and display files
- Fluently use the Unix command set to solve standard computer related problems
- Write simple shell scripts
- Use job control features of the shell
- Effectively use the Unix software tools
- Perform backups and restores
- Understand the responsibilities and the tools of the system administrator
- Use awk and sed to solve system administration tasks
- Use internetworking tools such as telnet and ftp

Course Outline:

Getting Started

Introduction
Features
History
Command Names
Philosophy
Characteristics
Logging In and Logging Out
Terminating a Session
Parts of the Unix Operating System
Functions of the Shell
Shell as a Command Line Interpreter
Command Characteristics
Command Line Formats
How to Get Help - man
stty - Display Terminal Options

Getting to Know the Shell

The Shell as a User Interface
The Standard Output File
Redirection of the Standard Output File
Appending to the Standard Output File
Redirection of the Standard Input File
Standard Input Examples
Pipes
The Standard Error File
Standard Error Examples
Special I/O Symbols Interpreted by the Shell
Shell Variables
Quoting Mechanisms
Command Substitution
The Shell Prompt Variables - PS1, PS2
File Name Generation Characters
Aliases
Functions
The History Mechanism
Command Line Shortcuts

The File System

File System Picture
User View of the File System
File Types
File System Concepts
The /etc/passwd File
Directory Commands
File Access Permissions
Groups
The chmod Command
Using chmod

The vi Editor

The ed Editor
Sample ed Session
Searching and Substituting with ed
The vi Editor
The vi Editor - Editing an Existing File
The vi Editor - Adding Text
Cursor Movement Commands
Deleting Text
Changing Text
Copying and Moving Text
Searching for Text
Last Line Mode
vi Customization
Odds and Ends

File Commands

Relative vs. Complete Pathnames
The Shell's Search Algorithm
ls Command
cat Command
cat Examples
The rm Command
mv Command
cp Command
ln Command
ln Examples
cmp and diff Commands
Exit Codes
Examples of Exit Codes
file Command
pg Command

Commonly Used Commands

grep - Print Lines Matching a Pattern
grep Examples
grep - Special Pattern Matching Characters
grep - Other Considerations
wc - The Word Count Command
sort - Sort Lines of a File
head(tail) - Display Beginning/End of a File
tail - Display Last Few Lines
tr - Translate Characters
tr Options
cut
od - Octal Dump
paste
paste Examples
split

uniq
lp Command

Shell Programming

Shells
Scripting Rationale
Creating a bash Script
bash Startup Files
A Script's Environment
Exporting Variables
Exit Status
Programming the Shell
Parameter Passing
Operators
if
Arithmetic
Looping Constructs
Input and Output
Interrupts

Job Control

Processes
Parent and Child Processes
System Startup
Shell Initialization
Foreground vs. Background
ps Command
The kill Command
Suspending Jobs
jobs Command
fg and bg Commands

Software Tools

C Language and UNIX
Creating Programs in C
Creating a Library
Using the Library
Static vs. Shared Libraries
make
Revision Control
Concurrent Versioning System (CVS)
Other Languages

System Administration

Duties of the System Administrator
Bringing up the System
Multi-User Mode
Shutting Down the System
Adding Users
The /dev Directory
The awk Language

awk Scripts
awk Odds and Ends
The sed Command
Special sed Characters
The find Command
Backing up Files
cpio
tar
File System Commands
The at Command
The crontab Command

Networking Applications

TCP/IP
Client/Server Model
Ports
DNS
NFS
ping
ftp
telnet
ssh