

C-DAC's Certified Professional in Linux System Programming

Areas of Concentration

1. Introduction to Linux

- Introduction to UNIX, Linux and GNU
- Difference between free software and open source
- Linux Distributions

2. Linux Architecture

3. Shell programming

- Introduction to shell
- Types of shell
- Pipes and Redirection operators
- Environmental variables
- Interactive vs Non-Interactive shell
- Advantages of shell scripting

4. GNU Tool chain

- Components of GNU Tool chain
- GNU make
- GNU binutils
- GNU Compiler Collection (GCC)
- GNU Debugger (GDB)
- GPROV
- GCOV

5. Linux System Programming and System Calls

6. Working with Files

- Linux File structure
- System calls vs Library Functions
- Standard I/O Library
- Low-Level File Access (open, read, write, close, lseek, dup, dup2, stat, lstat, fstat)
- Directory access (opendir, readdir, telldir, seekdir, closedir)
- File and Directory Maintenance (chmod, chown, unlink, link, symlink, mkdir, rmdir & chdir)
- fcntl, mmap and munmap

7. Linux Environment

- Environmental variables
- Logging
- Time and Date

8. Process Management

- Introduction to processes
- Process State Transition

- Creating a new process
 - fork() & vfork()
 - exec family
- Termination of a process
- Process scheduling
- Waiting for a process
- Zombie process

9. Threads

- Thread Overview
- POSIX Threads
- Thread Management
- POSIX Thread API
- Synchronization of threads
- Advantages & disadvantages of Threads

10. Inter Process Communication (IPC)

- Pipes
- Named Pipes
- Semaphores
- Shared Memory
- Message Queues

11. Signals

- Introduction to signals
- Signal types
- Generating a signal
- Responding to a signal
- Common use of signals

12. Socket Programming

- Introduction to Sockets
- Domains and Address Families
- Client-Server Architecture
- Socket types and protocols
- Creating and Naming the sockets
- Requesting connections
- Accepting connections
- Closing the socket
- Host and network byte ordering
- Use of select system call
- Datagram Communication

13. Memory Management

- Pages
- Zones
- Getting pages
- Slab Layer
- Slab allocator interface
- High Memory Mappings

14. **Virtual File System**

- Filesystem abstraction Layer
- VFS objects and their data structures
- Super block object & operations
- Inode object & operations
- Dentry object & operations
- File object & operations
- Data structures associated with Filesystems & with a process

15. **Proc File Systems**