C-DAC's Certified Professional in Linux System Programming

Areas of Concentration

1. Introduction to Linux Architecture & Programming

   a. Introduction to UNIX, Linux and GNU
   b. Difference between free software and open source
   c. Linux Distributions
   d. Linux Architecture
   e. Introduction to Linux System Programming

2. Shell scripting

   a. Introduction to shell
   b. Types of shell
   c. Pipes and Redirection operators
   d. Environmental variables
   e. Interactive vs Non-Interactive shell
   f. Advantages of shell scripting

3. GNU

   a. Components of GNU Toolchain
   b. GNU make
   c. GNU binutils
   d. GNU Compiler Collection(GCC)
   e. GNU Debugger(GDB)
   f. GPROV
   g. GCOV
   h. Static and shared libraries

4. Environment variables

   a. Environmental variables
   b. Configuration profile files
   c. Logging
   d. Time and Date

5. Files

   a. Linux File structure
   b. System calls vs Library Functions
   c. Standard I/O Library
   d. Low-Level File Access(open,read,write,close,dup,dup2,stat,lstat,seek)
   e. Directories access(opendir,readdir,telldir,seekdir,closedir)

6. VFS

a. Filesystem abstraction Layer
b. VFS objects and their data structures
c. super block object & operations
d. Inode object & operations
e. Dentry object & operations
f. File object & operations
g. Data structures associated with Filesystems & with a process

7. /PROC

8. Process Management

   a. Introduction to processes
   b. Process state transition
   c. creating a new process
   d. fork() & vfork()
   e. exec family
   f. Termination of a process
   g. Process scheduling
   h. waiting for a process
   i. Zombie process

9. Process Scheduling

10. POSIX threads

    a. Thread Overview
    b. Process Vs. Thread
    c. Posix Threads
    d. Thread Management
    e. Posix Thread API
    f. Synchronization of threads
    g. Advantages & disadvantages of Threads

11. Primitive IPC mechanisms

    a. Pipes
    b. Named Pipes

12. SYS V IPC mechanisms

    a. Semaphores
    b. Shared Memory
    c. Message Queues

13. Signal Handling

a. Introduction to signals
b. signal types
c. Generating a signal
d. Responding to a signal
e. common use of signals
f. signal API
g. sigaction API

14. Memory Management

a. pages
b. zones
c. Getting pages
d. Slab Layer
e. Slab allocator interface
f. High Memory Mappings

15. Network Programming

a. Introduction to Sockets
b. Domains and Address Families
c. Socket Types and protocols
d. creating and Naming the sockets
e. Requesting connections
f. Accepting connections
g. closing the socket
h. client-sever Architecture
i. Host and network byte ordering
j. use of select system call
k. Datagrams
l. Raw sockets