

PCS6J008 ADVANCED OPERATING SYSTEM

Module 1:

Introduction to UNIX/Linux Kernel : System Structure, User Perspective, Assumptions about Hardware, Architecture of UNIX Operating System (TextBook-3: Chapter Topics: 1.2, 1.3,1.5, 2.1), Concepts of Linux Programming, Getting Started with SystemProgramming (TextBook-1: Chapter 1-Relevant Topics), Introduction to the tools on Linux (Chapter 3 Text Book 5),NASM (Chapter 3,4,7,8Book 6)

Module 2:

File and Directory I/O : inodes, structure of regular file, open, read, write, lseek, close, pipes, dup (TextBook-3: Chapter Topics: 4.1, 4.2, 5.1-5.6), open, creat, close, lseek, read, write, file sharing, atomic operations, dup and dup2, fcntl, ioctl, /dev/fd, stat, fstat, lstat, file types,Set-User-ID and Set-Group-ID, file access permissions, ownership of new files and directories, access function, umaskfunction, chmod and fchmod, sticky bit, chown, fchown, and lchown, file size, file truncation, file systems, link, unlink, remove, and rename functions, symbolic links, symlink and readlink functions, file times, utime, mkdirand rmdir, readingdirectories, chdir, fchdir, and getcwd, device special files (TextBook-4: Chapter Topics: 3.3-3.16, 4.2-4.23), Scatter/Gather I/O, The Event Poll Interface, Mapping Files into Memory, Advice for Normal File I/O, Synchronized, Synchronous, and Asynchronous Operations, I/O Schedulers and I/O Performance, Files and their Metadata , Directories, Links,Copying and Moving files, Device Nodes, Out-of-Band Communication, Monitoring File Events (TextBook-1: Chapters: 4 and 7)

Module 3:

Process Environment, Process Control and Process Relationships: Process states and transitions, the context of a process, saving the context of a process, sleep, process creation, signals, process termination, awaiting process termination, invoking other programs, the user id of a process (TextBook-3: Chapter Topics: 6.1, 6.3, 6.4, 6.6, 7.1-7.6), Process termination, environment list, memory layout of aC program, shared libraries, memory allocation, environment variables, setjmp and longjmp, getrlimit and setrlimit, process identifiers, fork, vfork, exit, wait and waitpid, waitid, wait3 andwait4, race conditions, exec, changing user IDs and group IDs, interpreter files, system function, process accounting, user identification, process times, Terminal logins, network logins, process groups, sessions, controlling terminal, tcgetpgrp, tcsetpgrp, and tcgetsid functions, job control, shell execution of programs, orphanedprocess groups (TextBook-4: Chapter Topics: 7.3-7.11, 8.2-8.16, 9.2-9.10) , The Process ID, Running a New Process, Terminating a Process, Waiting for Terminated Child Processes, Users and Groups, Sessions and Process Groups, Daemons, Process Scheduling, Yielding the Processor, Process Priorities, Processor Affinity (TextBook-1: Chapter 5 and 6 [Relevant Topics])

Module 4:

Memory Management: The Process Address Space, Allocating Dynamic Memory, Managing Data Segment,Anonymous Memory Mappings, Advanced Memory Allocation, Debugging MemoryAllocations, Stack-Based Allocations, Choosing a Memory Allocation Mechanism, Manipulating Memory, Locking Memory, Opportunistic Allocation(TextBook-1: Chapter 8),

Module 5:

Signal Handling: Signal concepts, signal function, unreliable signals, interrupted system calls, reentrant functions, SIGCLD semantics, reliable-signal technology, kill and raise, alarm and pause, signal sets, igprocmask, sigpending, sigaction, sigsetjmp and siglongjmp, sigsuspend, abort, system function revisited, sleep, job-control signals (TextBook-4: Topics: 10.2-10.20), Signal Concepts, Basic Signal Management, Sending a Signal, Reentrancy, Signal Sets, Blocking Signals, Advanced Signal Management, Sending a Signal with a Payload (TextBook-1: Chapter 9).

Recommended Text:

1. Linux System Programming, O'Reilly, by Robert Love. (Chapter 1 and 4-9 [Relevant Topics])
2. Windows Internals, Microsoft Press, by Mark E. Russinovich and David A. Soloman. Chapter References: (Chapter 1, 2, and 5 [Relevant Topics])
3. The Design of the UNIX Operating System, PHI, by Maurice J. Bach. Chapter References: (1.2, 1.3, 1.5, 2.1, 4.1, 4.2, 5.1-5.6, 6.1
4. , 6.3, 6.4, 6.6, 7.1-7.6)
5. Advanced Programming in the UNIX Environment, Addison-Wesley, by Richard Stevens. Chapter References: (3.3-3.16, 4.2-4.23, 7.3-7.11, 8.2-8.16, 9.2-9.10, 10.2-10.20)
6. Guide to Assembly Language Programming in Linux, Sivarama P. Dandamudi, Springer
7. Professional Assembly Language, Richard Blum, Wrox, Wiley India