

CS – 6: Operating Systems

Introduction: 6 L

Operating Systems functions, Types of operating systems, Multiprogramming systems, Batch systems, Time-sharing systems, Operating system operations, Special purpose operating systems, Distributed systems, Different computing environments.

[1] Page 03 to 12, Page 18 to 23, Page 31 to 36,

Operating System Organization: 5 L

Processor and user modes, user operating system interface, Kernels, System calls and its types, System programs, Operating system structures, Virtual machines.

[1] Page 49 to 55, Page 58 to 67, Page 70 to 74, Page 76 to 78

Process Management: 12 L

Process states, Process Scheduling, Process hierarchy, Threads, Threading issues, Multi-threading models, Non-pre-emptive and pre-emptive scheduling algorithms, Concurrent processes, Critical section, Semaphores, methods for inter-process communication, Deadlocks.

[1] Page 101 to 113, Page 115 to 122, Page 153 to 161, Page 166 , Page 183 to 190,

Page 192 to 198, Page 225 to 228, Page 234 to 235, Page 283 to 290.

Memory Management: 12 L

Physical and virtual address space, Memory allocation strategies, Paging, Segmentation, Virtual memory and Demand paging, Page replacement algorithms.

[1] Page 315 to 317, Page 319 to 320, Page 322 to 336,

Page 342 to 344, Page 357 to 367, Page 369 to 380

File and I/O Management: 8 L

Directory structure, File operations, Files system mounting, File allocation methods, Device management, Disk scheduling algorithms.

[1] Page 421 to 445, Page 461 to 466, Page 470 to 477, Page 479 to 481,

Page 505 to 507, Page 511 to 515

Protection and Security:

5 L

Policy mechanism, Program, network and system threats, Authentication.

[1] Page 591 to 595, Page 621 to 626, Page 630 to 634, Page 649 to 653

Recommended Reading Material

Text Books

1. A Silberschatz, P.B. Galvin, G. Gagne, *Operating Systems Concepts*, 8th edition, John Wiley Publications ,2008.

Reference Books

1. G. Nutt, *Operating Systems: A Modern Perspective*, 2nd edition Pearson Education ,1997.
2. A.S. Tanenbaum, *Modern Operating Systems*, 3rd edition, Pearson Education ,2007.
3. W. Stallings, *Operating Systems, Internals & Design Principles*, 5th edition, Prentice Hall of India, 2008.

LIST OF PRACTICALS OF CS – 6: OPERATING SYSTEMS

BASIC UNIX COMMANDS

1. File Manipulation functions
 - creat,
 - open,
 - read,
 - write,
 - close,
 - mv,
 - cp,
 - rm.
2. Directory Manipulation functions such as mkdir, rmdir, cd, pwd.
3. ls with options such as -l, -s, etc
4. wc
5. diff
6. cmp
7. chmod

UNDERGRADUATE PROGRAMME IN COMPUTER SCIENCE

8. who
9. who am i
10. passwd
11. du
12. date
13. cal
14. grep
15. cat
16. sort and tail

C/ C++ programs

1. WRITE A PROGRAM (using *fork()* and/or *exec()* commands) where parent and child execute:
 - a) same program, same code.
 - b) same program, different code.
 - c) before terminating, the parent waits for the child to finish its task.
2. WRITE A PROGRAM to report behaviour of Linux kernel including kernel version, CPU type and model. (CPU information)
3. WRITE A PROGRAM to report behaviour of Linux kernel including information on configured memory, amount of free and used memory. (memory information)
4. WRITE A PROGRAM to print file details including owner access permissions, file access time, where file name is given as argument.
5. WRITE A PROGRAM to copy files using system calls.
6. Write program to implement FCFS scheduling algorithm.
7. Write program to implement Round Robin scheduling algorithm.
8. Write program to implement SJF scheduling algorithm.
9. Write program to calculate sum of n numbers using *thread* library.
10. Write program to calculate factorial of number n using *thread* library.
11. Write program to calculate sum of n even numbers using *thread* library.