

Operating Systems

1. Syllabus Operating System

0. Introduction Operating System

galvin book chapter 1 and 2

1. Linux System

- History
- Architecture
- Linux kernel
 - Monolithic
 - Micro-kernel
 - Modular

2. Shell

- Types of shells
- BASH shell
- Linux file system
 - Linux directories
 - Absolute vs Relative path
- File system commands
 - Directory related commands
 - Files related commands
 - File permissions/owner
 - Shell wild-card characters
- Regular expressions
- Advanced topics
 - IO redirection
 - Pipe
- VI editor
 - .vimrc
- Shell scripts
 - Variables
 - read and echo
 - if-then-else, elif, case and test command
 - while, until and for loop
 - positional parameters
 - functions
 - arrays
 - string operations
 - Directory stack
- Shell files
 - .bashrc
 - .profile, .bash_profile
 - .bash_logout

- .bash_history
 - Networking commands
 - ifconfig
 - netcat
 - ssh
- 3. System calls
 - User vs kernel mode
 - Preemptible/Non-preemptible kernel
- 4. CPU Scheduling
 - Pre-emptive vs non-preemptive
 - Scheduling algorithms
- 5. Process
 - Introduction & life cycle
 - Linux process commands: ps, top
 - Process creation: fork(), exec(), wait()
 - Orphan & zombie processes
- 6. Inter-process communication
 - Signals - Sending (kill command) & handling
 - Shared memory
 - Message queue
 - Pipe and Fifo
- 7. Threads
 - Introduction
 - Process vs Threads
 - Thread creation
 - Thread synchronization
 - Semaphore
 - Mutex
 - Producer-consumer problem
 - Deadlock
 - User vs kernel threads
- 8. File & IO management
 - File & File system
 - File system architecture
 - File vs Directory internals
 - Hard vs Symbolic links
 - File IO system calls
 - Disk allocation mechanism - ext2/ext3
 - Disk scheduling algorithms
- 9. Memory management
 - MMU introduction
 - Virtual memory / Swap area
 - Segmentation vs Paging
 - TLB and multi-level paging
 - Page fault handling
 - Page replacement algorithms

- Dirty bit and copy-on-write

2. Evaluation

- Theory : 40 marks - CCEE(5-jan-2021) * MCQ based on - linux commands, - shell scripts, - linux system call, - rest conceptual question
- Lab: 40 marks * Linux commands - 10 marks * Subjective question * Bash shell scripts - 20 marks * Test case based * System call programming - 10 marks * C programming : file upload
- Internals: 20 marks - MCQ

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(ls, cp, mv, lpr, sort, grep, cat, tac, more, head, tail, man, whatis,
whereis, locate, find, diff,
file, rm, mkdir, rmdir, cd, pwd, ln and ln -s, gzip and gunzip, zip and
unzip, tar and its variants,
zcat, cal, bc and bc -l, banner date, time, wc, touch, echo, who, finger,
w, whoami, who am
i, alias, unalias, touch, push, pop, jobs, ps, etc
```