System Level Design - Semester Exam - Apr 1

Name: **CSC3320**

When answering the questions below, make sure to show all of your work. Pay attention to the point values on each question. State your assumptions, and explain your answers thoroughly.
Time: Hours | Max Marks: 100

1. Which metric measures the time from submission to completion of a process? [1]

a) Turnaround time

b) Response time

c) CPU burst

d) Context switch

2. Which of the following is a performance monitoring tool? [1]

a) top

b) gcc

c) nano

d) df

3. Which of the following is non-preemptive scheduling algorithm? [1]

a) First Come First Serve

b) Round Robin

c) SJF

d) Priority Scheduling

4. Which system call is used to terminate a process forcefully? [1]

a) kill()

b) exit()

c) abort()

d) terminate()

5. How is Priority Scheduling different from SJF? [1]

a) Uses priority instead of burst time

b) Uses time quantum

c) No difference

d) Priority scheduling is only for I/O-bound

6. What does a return value of -1 from `fork()` indicate? [1]

a) Fork failed

b) Child process

c) Parent process

d) Normal execution

7. Which tool helps in analyzing memory usage in Linux? [1]

a) valgrind

b) gdb

c) awk

d) sed

8. Which is a preemptive CPU scheduling algorithm? [1]

a) Round Robin

b) FCFS

c) Non-preemptive SJF

d) Priority Scheduling without preemption

9. Which algorithm suffers from starvation without aging? [1]

a) Priority Scheduling

b) Round Robin

c) FCFS

d) SJF

10. Which command is used to list all running processes in Linux? [1]

a) ps

b) ls

c) top

d) jobs

11. Which signal cannot be caught or ignored? [1]

a) SIGKILL

b) SIGTERM

c) SIGINT

d) SIGSTOP

12. What is the default action of most signals like SIGTERM? [1]

a) Terminate the process

b) Ignore

c) Pause the process

d) Restart the process

13. Which system call can suspend process until signal is received? [1]

a) pause()

b) sleep()

c) wait()

d) alarm()

14. Which Linux command displays a dynamic real-time view of running processes? [1]

a) top

b) pwd

c) du

d) grep

15. What is the role of the `ptrace` system call? [1]

a) Monitor and control execution of a process

b) Copy data to another file

c) Redirect input

d) Encrypt files

16. Which tool helps inspect performance counters on Linux systems? [1]

a) perf

b) strace

c) du

d) env

17. What is the main advantage of Round Robin scheduling? [1]

a) Fairness among processes

b) Shortest average waiting time

c) Minimizes context switches

d) None

18. Turnaround time is equal to: [1]

a) Completion time - Arrival time

b) Waiting time + Burst time

c) Response time - I/O time

d) Context switch + Burst time

19. How does the operating system determine which process to run next? [1]

a) Using the scheduler

b) Paging table

c) Interrupt vector

d) File table

20. Which tool is often used for profiling applications in Linux? [1]

a) perf

b) cd

c) scp

d) less

21. Which system call is used to create a new process? [5]

22. Explain how to compile and execute a C program using `gcc`. [5]

23. Explain the term linking. [5]

24. Name the system call used to create a new process in Unix-like systems. [5]

25. What are the essential fields stored in a Process Control Block (PCB)? [5]

26. Define buffering in file I/O context. [5]

27. Compare file descriptor and file pointer. [5]

28. What is paging? [5]

29. Describe a real-life example of inter-process communication. [7]

30. What is the difference between a thread and a process? [7]

31. What happens when fork() is called twice in a process? [7]

32. Compare and contrast shared memory and message queues. [7]

33. Implement a program that creates a chain of processes using fork(). [6]

34. Explain how kill() and raise() internally communicate with the kernel. [6]