

## System Level Design - Second MID - April 2025

Name:

CSE

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. Remember that an explanation is expected with every answer except the multiple choice and true/false questions when the answer is true. Use blank paper if you do not have enough room..

Time: 09:00 to 12:00 | Total Marks: 75

1. 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
2. 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
3. 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
4. What command would you use to list all running processes in Unix? [1]
  - a) ps
  - b) ls
  - c) chmod
  - d) kill
5. What does a return value of -1 from `fork()` indicate? [1]
  - a) Fork failed
  - b) Child process
  - c) Parent process
  - d) Normal execution
6. Which command is used to send a signal to a process? [1]
  - a) kill
  - b) exec
  - c) fork
  - d) touch
7. Which tool is commonly used to trace system calls in Linux? [1]

- a) strace
- b) gdb
- c) top
- d) make

8. What is the purpose of the `lsof` command? [1]

- a) List open files
- b) Start background job
- c) Kill a process
- d) Display CPU stats

9. What is returned by the `fork()` system call in the child process? [1]

- a) 0
- b) -1
- c) PID of parent
- d) 1

10. Which Linux command helps identify memory leaks? [1]

- a) valgrind
- b) cat
- c) mv
- d) wc

11. Which metric is minimized by SJF? [1]

- a) Average waiting time
- b) Turnaround time
- c) Context switch
- d) Throughput

12. What is the primary goal of system-level debugging tools? [1]

- a) Identify and resolve low-level bugs
- b) Improve UI design
- c) Compile code
- d) Format storage

13. Which command is used to examine the contents of a binary file? [1]

- a) hexdump
- b) echo
- c) cat
- d) tail

14. In Round Robin scheduling, the performance heavily depends on what? [1]

- a) Time quantum
- b) Number of processes
- c) I/O devices
- d) Priority levels

15. Which system call replaces the current process image with a new process image? [1]

- a) exec()

b) fork()

c) wait()

d) exit()

16. How can a child process replace its memory with a new program?

[5]

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17. What is a shared memory segment?

[5]

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18. How can you ignore a signal in C?

[5]

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19. What is the default permission of a file created in Linux?

[5]

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20. Which system call is used to create a pipe?

[5]

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21. Explain how to use pthreads and mutexes in C.

[7]

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22. Write a program that loads a shared library dynamically.

[7]

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23. What security mechanisms does the kernel enforce?

[7]

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24. Explain file system journaling.

[7]

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25. Elaborate on the security implications of running system-level programs in privileged (kernel) mode and what measures are taken to avoid security breaks.

[7]

