

Department of Computer Science and Engineering
Midterm Examination Fall 2022
CSE 321: Operating Systems
[Set A]

Duration: 1 Hour 10 Minutes

Total Marks: 25

Answer the following questions.
Figures in the right margin indicate marks.

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| 1. | a) State time-sharing system with an example. | [3] |
| CO1 | b) Mention the roles of the system call interface. | [2] |
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| 2. | a) Distinguish between CPU scheduler and job scheduler. | [3] |
| CO2 | b) Find the output of the following code snippet. | [4] |

```
int main(){
    int id;
    static int x = 10;
    int y = 5;
    id = fork();
    if (id < 0){
        printf("fork failed\n");
    }
    else if(id == 0){
        printf("child started\n");
        printf("child finished\n");
    }
    else{
        wait(NULL);
        printf("parent started\n");
        x=x-2;
        y=y+5;
        printf("values of x: %d & y: %d\n",x,y);
        printf("parent finished\n");
    }
    x=x+5;
    y=y-5;
    printf("values of x: %d & y: %d\n",x,y);
    printf("terminating\n");

    return 0;
}
```

3. a) **When** is CPU scheduling required? [2]
C03

b) **Draw** a Gantt chart and illustrate the execution of the process using the **Round Robin** scheduling algorithm (**time quantum = 11 units**). **Calculate** the **average waiting time** and **number of context switching**. [3+2+1]

Processes	Arrival Time	Burst Time
P1	3	37
P2	12	17
P3	58	28
P4	59	21
P5	68	19

c) Consider the following set of processes with the length of the CPU-burst time given in milliseconds. **Draw** the Gantt Charts illustrating the execution of these processes using **preemptive priority** (the lowest number implies a higher priority). **Calculate** the **average turnaround time** for the below data set. [3+2]

Processes	Priority	Arrival Time	Burst Time
P1	12	0	4
P2	8	1	2
P3	6	2	3
P4	2	3	5
P5	4	4	1
P6	1	5	4
P7	3	6	6