

**MidTerm 1**

**25<sup>th</sup> February 2019, 9:00 am – 10:00 am**

<b>Course Code: CS205</b>	<b>Course Name: Operating Systems</b>
<b>Instructor Name / Names: Dr. Hasina Khatoon, Nausheen Shoaib, and Tania Iram</b>	
<b>Student Roll No:</b>	<b>Section No:</b>

**Instructions:**

- Read each question completely before answering it. There are **3 questions on 2 pages**.
- In case of any ambiguity, you may make assumption. But your assumption should not contradict any statement in the question paper.
- All the answers must be solved, such that, the entire question is in one sequence.

**Time:** 60 minutes.

**Max Marks:** 60

**Q1:** Answer the following Questions:

[Marks=30]

- i. What is the purpose of virtualization in operating systems?
- ii. What are system calls? Give at least two different examples of system call.
- iii. What are the advantages and disadvantages of using the microkernel approach of design of operating systems?
- iv. What are CPU bound and I/O bound processes?
- v. When does a process move from Running to Waiting state and from Running to Ready state?
- vi. What operations are performed during context switching of a process?
- vii. Differentiate between long term and short term schedulers?
- viii. Differentiate between preemptive and non-preemptive scheduling algorithms?
- ix. Which CPU scheduling algorithm(s) may cause starvation of processes?
- x. Differentiate between Ready queue and Disk queue.

**Q2:** Given the following piece of code:

(6)

```
main(int argc, char ** argv)
{
    int child = fork();
    int c = 5;

    if(child == 0)
    {
        c += 5;
    }
    else
    {
        child = fork();
        c += 10;
        if(child)
            c += 5;
    }
}
```

How many different copies of the variable c are there? What are their values?

**Q3 (a)** Given the following processes with their next CPU burst and arrival time. Give Gantt chart using the following scheduling algorithms: (8)

<b>Process</b>	<b>Next CPU burst</b>	<b>Arrival Time</b>
P0	10	0
P1	15	2
P2	5	4
P3	4	6
P4	12	8

- i. Shortest-Job-First (Use preemptive scheme).
- ii. Round-Robin (Time Quantum = 5msec)

**Q3 (b)** Calculate the average waiting time and the average turnaround time for each of the scheduling algorithms mentioned in (a) above. (8)

**Q3(c)** Using preemptive priority-based scheduling, give the Gantt chart and calculate the average waiting time for the following priorities where 1 is the highest priority: (8)

**P0 = 5; P1 = 3; P2 = 6; P3 = 4; P4 = 1**