MANIPAL UNIVERSITY JAIPUR

Faculty of Engineering
School of Computing & Information Technology
Department of Computer Science and Engineering
IV Semester B.Tech.
Mid-Term-I Examination: 2020-21
CS2201: Operating Systems
(CLOSED BOOK)

Duration: 1 Hours **Max. Marks: - 20**

Instructions:

- Answer all the questions.
- Missing data, if any, may be assumed suitably.
- Calculator is allowed.

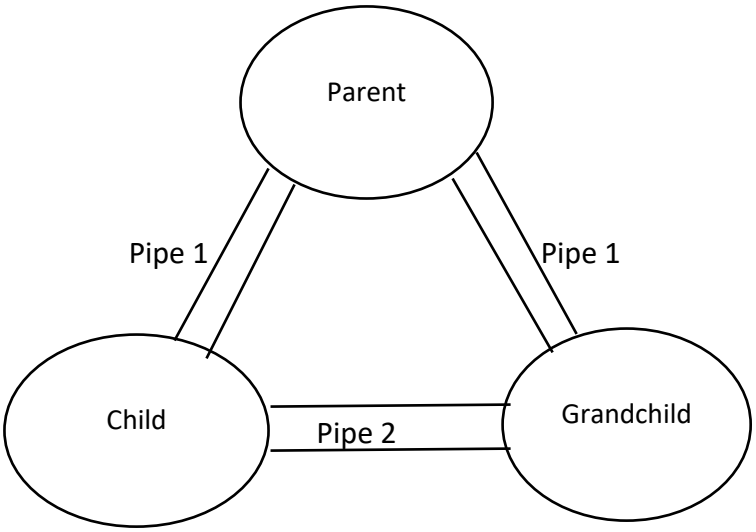
1. Why dual mode CPU operation is necessary for secure functioning of operating system? Explain. **[3]**

2. For each of the process state transitions given below, specify whether it is possible or not? If possible, give any two examples for that process state transition. **[4]**

(a) Running to Ready
(b) Blocking to Running
(c) Running to Blocking
(d) Blocking to Ready

3. Write a program in 'C' using two pipes and three processes (parent-child relationship shown below) where the functionalities of each process are as under. **[5]**

Grandchild reads filename entered from keyboard and writes it on pipe 2 to the child process. Child process reads filename from pipe 2, retrieves the contents of the file and writes them on pipe 1 to the parent process. Parent process reads file contents from pipe 1, counts the number of characters (file size in bytes) and displays the count on the monitor.



4. What will be the output of the 'C' program given below? Also draw the process tree (starting from bash shell process) that will be created during the execution. **[3]**

```
main () {
        if (fork () && fork ())
        if (fork () || fork ())
        fork ();
        printf ("hello\n");        }
```

5. Consider a modified non-preemptive priority-based scheduling as follows. Higher priority processes are scheduled before the lower one. However, among the processes with equal priority, the system selects the process with lowest burst time similar to SJF scheduling. However, among the processes with equal priority and same burst time, the system selects the process by applying FCFS algorithm. **[5]**

[Note: priority number '1' indicates the highest priority and multiple processes may have same priority].

Consider the eight processes P1 to P8 as given below and compute the 'Waiting Time' and 'Turn Around Time' values for each process using the described scheduling algorithm.

Process#	Burst Time	Arrival Time	Priority
P1	4	0	1
P2	2	1	3
P3	4	2	3
P4	6	3	2
P5	8	4	2
P6	7	5	4
P7	8	6	4
P8	3	7	1