**Assignment 1 / Even Sem 2021-22/OS/D6AD**

1. What is system calls of operating system? explain any five system calls.
2. Differentiate between i. chmod and umask ii. adduser and useradd iii. chown and chmod iv awk and grep
3. What are objectives of operating system?
4. Define Os ?What are functions of OS?
5. Give a system with n processes, how many possible ways processes be scheduled?
6. On a system with n CPUs, what is maximum no of processes that can be in ready, run and blocked states?
7. On a system with n CPUs, what is minimum no of processes that can be in ready, run and blocked states?
8. For each of the following transitions between process states, indicate whether transition is possible. If it is possible, give an example of one thing that would cause it.

a. Run->ready

b. Run-> blocked

c. Run->swapped-blocked

d. Blocked->run

e. Run->terminated

1. To what degree do following algorithm favor short processes? SJF,FCFS,SRTF,RR, Multilevel feedback algorithm
2. Explain race condition ? how to solve this problem?
3. Explain software approach for CS?
4. Explain producer consumer problem. Provide proper solution.
5. Explain context switching in detail with its disadvantages.
6. Explain multithreading and Differentiate between user level and kernel level thread.
7. Explain hardware solution for mutual exclusion.
8. For the processes listed in table below draw a gantt chart illustrating their execution of these processes using FCFS, SJF,SRTN, RR(quantum=2)

|  |  |  |  |
| --- | --- | --- | --- |
| **Process** | **Arrival Time** | **Burst time** | **Priority** |
| A | 0.001 | 3 | 3 |
| B | 1.001 | 8 | 4 |
| C | 4.001 | 4 | 6 |
| D | 6.001 | 2 | 5 |

1. **Objective Questions**

1. Consider three CPU-intensive processes, which require 10, 20 and 30 time units and

arrive at times 0, 2 and 6, respectively. How many context switches are needed if the operating system implements a shortest remaining time first scheduling algorithm? Do not count the context switches at time zero and at the (CO1,CO2, CO5)

(A) 1

(B) 2

(C) 3

(D) 4

2.Consider three processes, all arriving at time zero, with total execution time of 10, 20 and 30 units, respectively. Each process spends the first 20% of execution time doing I/O, the next 70% of time doing computation, and the last 10% of time doing I/O again. The operating system uses a shortest remaining compute time first scheduling algorithm and schedules a new process either when the running process gets blocked on I/O or when the running process finishes its compute burst. Assume that all I/O operations can be overlapped as much as possible. For what percentage of time does the CPU remain idle? (CO1,CO2, CO5)

(A) 0%

(B) 10.6%

(C) 30.0%

(D) 89.4%

3 Consider the methods used by processes P1 and P2 for accessing their critical sections whenever needed, as given below. The initial values of shared Boolean variables S1 and S2 are randomly assigned. (CO1,CO2, CO4, CO5)

|  |  |
| --- | --- |
| Method used by PI  while (S1 = = S2) ;  Critica1 Section  S1 = S2; | Method used by P2  while (S1 != S2) ;  Critica1 Section  S2 = not (S1); |

4. Which one of the following statements describes the properties achieved?

(A) Mutual exclusion but not progress

(B) Progress but not mutual exclusion

(C) Neither mutual exclusion nor progress

(D) Both mutual exclusion and progress