

POSSESSION OF MOBILES IN EXAM IS UFM PRACTICE.

Name JA

Enrollment No. 3202

Jaypee Institute of Information Technology, Noida

T1 Examination, 2022

B.Tech 5th Semester

Course Title : Operating system and system programming

Maximum Time : 1 Hour

Course Code : 15B11CI412

Maximum Marks : 20

C311.1	Describe and explain the fundamental components of operating system and system programming
C311.2	Apply and compare various policies of scheduling in processes and threads in OS.
C311.3	Describe and discuss various resource management techniques of operating system and compare their performance.
C311.4	Understand the concept of IPC and describe various process synchronization techniques in OS.
C311.5	Discuss the working of IO management and apply various disk scheduling techniques.
C311.6	Analyze and report appropriate OS design choices when building real world system.

1. Write differences between the following [3 Marks][CO-1].

- a) System call vs user define function
- b) Monolithic vs Microkernel Operating System
- c) Parallel Computing system vs Distributed system.

2. Given the following 5 Process, A multilevel feedback queue scheduling algorithm is used. There are 3 queues with the highest priority queue Q1 use round robin with a time quantum of 8 ms. Q2 uses round robin having time quantum of 12ms. Lowest priority queue Q3 uses SJF for scheduling. [5 Marks][CO-2]

Process	Arrival Time	CPU Burst Time
✓ P1	0	12 ✓
P2	5	45 37-4 33-3 22
✓ P3	24	3 ✓
P4	30	22 24 2
P5	33	32 24 12

- a) Draw Gantt Chart for CPU scheduling 114
- b) What is the the average waiting and turnaround time ?
- c) How many times process P2 will be interrupted and which queue the process will terminated the execution ?

3. Consider a multiprocessor system and a multithreaded program written using the many to many threading model. Let the number of user level thread in the program be more than the number of processors in the system. Discuss the performance implication of the following scenarios. [4 Marks][CO-2]

- a) The number of kernel threads allocated to the program is less than the number of processors.
- b) The number of kernel threads allocated to the program is equal to the number of processors
- c) The number of kernel threads allocated to the program is greater than the number of processors but less than the number of user level threads.

4. Consider the following set of processes, with the arrival times, I/O burst time(I/O is overlapping), and the CPU burst time given in milliseconds. The pre-emptive shortest remaining time first algorithm will be used to schedule the process. [4 Marks] [CO-2].

64 8
22 28 127
24 22 5

Processes	Arrival Time	CPU Burst Time-1	I/O Burst Time	CPU Burst Time -2
P1	0	3 ✓	2 ✓	2
P2	0	2 ✓	4 ✓	1 ✓
P3	2	1 ✓	3 ✓	2
P4	5	2 ✓	2 ✓	1

Find the following

SRTF

- Draw Gantt Chart
 - Waiting time of each process and average waiting time.
 - Turnaround time of each process and average turnaround time.
5. What will be the output of the following program ? Justify your answer with a proper explanation. [4 Marks] [CO-2]

a)

```
#include <stdio.h>
#include <unistd.h>
int main()
{
    if(fork() && fork())
        fork();
    printf("hello");
    return 0;
}
```

b)

```
#include <pthread.h>
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
# define MAX_THREADS 50
pthread_t thread_id [MAX_THREADS];
Void * printHello(void * data)
{
    printf("hello from thread %u - I was created in iterating %d ! \n",
    (int)pthread_self(),(int)data);
    pthread_exit(NULL);
}
int main()
{
    int rc,i,n;
    n=20;
    for(i=0;i<n;i++)
    {
        rc=pthread_create(&thread_id[i],NULL,printHello,(void *)i);
        if(rc)
        {
            printf("\n ERROR %d \n",rc);
            exit(1);
        }
        printf("\n I am thread %u created new thread (%u) in iterating %d.....\n",(int)
        pthread_self(),(int) thread_id[i],i);
        If(i % 5 == 0) sleep(1);
    }
    pthread_exit(NULL);
}
```

