KATHMANDU UNIVERSITY
End Semester Examination [C]
June, 2018

Marks Scored:

Level : B.E./B. Sc.
Year : III
Course : COMP 307
Semester: I

Exam Roll No. :
Time: 30 mins.
F. M. : 10

Registration No.:
Date : JUN 19 2018

SECTION "A"
[20 Q. × 0.5 = 10 marks]

Select the best alternative.

1. Mutual exclusion problem occurs
   a. between two disjoint processes that do not interact
   b. among processes that share resources
   c. among processes that do not use the same resource
   d. none of the above

2. Consider the following set of processes, the length of the CPU burst time given in milliseconds :

Process	Burst time
P1	6
P2	8
P3	7
P4	3

   Assuming the above process being scheduled with the SJF scheduling algorithm :
   a. The waiting time for process P3 is 3ms b. The waiting time for process P3 is 0ms.
   c. The waiting time for process P3 is 16ms d. The waiting time for process P3 is 9ms.

3. 'Aging' is :
   a. keeping track of cache contents
   b. keeping track of what pages are currently residing in memory
   c. keeping track of how many times a given page is referenced
   d. increasing the priority of jobs to ensure termination in a finite time

4. The major disadvantage with linked allocation is that :
   a. internal fragmentation b. external fragmentation
   c. there is no sequential access d. there is only sequential access

5. In distributed system each processor has its own
   a. local memory b. clock
   c. both (a) and (b) d. local memory and processing unit

6. The following C program :

```
main()
{
fork();fork();printf("yes");
}
```

   prints yes:
   a. only once b. twice c. four times d. eight times

7. Which one of the following connects high-speed high-bandwidth device to memory subsystem and CPU.
   a. Expansion bus b. PCI bus c. SCSI bus d. local bus

8. File system mounting helps operating system to
   a. Enhance the file access speed b. Include the directory in operating system
   c. Increase number of partition of disk d. Access contents of particular directory

9. Which of the following approaches do not require knowledge of the system state?
   a. Deadlock detection b. Deadlock prevention
   c. Deadlock avoidance d. None of the above

10. Which scheduling policy is most suitable for a time-shared operating system
   a. Shortest-job First b. Elevator
   c. Round-Robin d. First-Come-First-Serve

11. A critical section is a program segment
   a. which should run in a certain specified amount of time
   b. which avoids deadlocks
   c. where shared resources are accessed
   d. which must be enclosed by a pair of semaphore operations, P and V.

12. To avoid race condition, the maximum number of processes that may be simultaneously inside the critical section is
   a. zero b. one c. two d. more than two

13. Which of the following disk seek algorithms has the most variability in response time?
   a. FCFS b. C-LOOK c. SSTF d. SCAN

14. The main advantage of DMA is that it
   a. Reduces traffic on the data bus
   b. Allows CPU to execute faster
   c. Removes the requirement that transfers be aligned properly
   d. Increases system performance by increasing concurrency

15. Which of the following is true of memory mapped I/O file?
   a. It's is impossible to increase size of memory mapped files.
   b. They eliminate the need to transfer data to and from the disk.
   c. Memory mapped file can be used for process synchronization.
   d. Program need not make read and write system calls for them.

16. Relocatable programs
   a. cannot be used with fixed partitions
   b. can be loaded almost anywhere in memory
   c. do not need a linker
   d. can be loaded only at one specific location

17. Which of the following keeps track of directories and files?
    a. kernel b. file system c. shell d. user interface

18. In the blocked state ?
    a. the processes waiting for I/O are found
    b. the process which is running is found
    c. the processes waiting for the processor are found
    d. the processes executing I/O are found

19. The mechanism that bring a page into memory only when it is needed is called_____
    a. Segmentation b. Fragmentation
    c. Demand Paging d. Page and Replacement

20. Which of the following implement preemptive scheduling
    a. Switching from running to ready state
    b. Switching from running to waiting state
    c. Switching from ready to running state
    d. Switching from waiting to ready state

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SECTION "B"
[6Q × 4 = 24 marks]

Attempt *ANY SIX* questions.

1. Briefly describe about operating system services.

2. Explain different component of process control block. How is it interlinked with context switching?

3. Race conditions are possible in many computer systems. Consider a banking system that maintains an account balance with two functions: deposit (amount) and withdraw (amount). These two functions are passed the amount that is to be deposited or withdrawn from the bank account balance. Assume that a husband and wife share a bank account. Concurrently, the husband calls the withdraw() function and the wife calls deposit(). Describe how a race condition is possible and what might be done to prevent the race condition from occurring.

4. What is the cause of thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem? [2+1+1]

5. What are benefits of using appropriate page replacement algorithms? Simulate LRU place replacement algorithm having frame size of 4 for the string of following pages [1+3]

   2 3 5 6 8 7 4 1 2 3 7 2

6. Explain in brief about different ways of deadlock prevention. List out and explain procedures for deadlock recovery. [2.5+1.5]

7. Write short notes on: [2+2]
   a. Memory Mapped I/O
   b. Multitasking and Multiprogramming

SECTION "C"

[2Q × 8 =16 marks]

Attempt *ANY TWO* questions.

8. Consider the following set of processes, with the arrival times and the CPU burst times given in milliseconds. [8]

Process	Arrival-Time	Burst-Time
P1	0	10
P2	1	8
P3	2	5
P4	4	7

Which scheduling algorithm will be more efficient based on average turnaround time for these processes among preemptive shortest remaining processing time first (SROT) algorithm and RR with quantum of 5 milliseconds.

9. Explain briefly about the disk structure and operations. What is the importance of using disk scheduling algorithm by operating system? Simulate SSTF for the cylinders in following sequence: [3+2+3]

6 54 24 18 9 15 48 38 78 3

10. Explain different techniques of memory allocations. How does it directly relate to different kinds of fragmentations? Explain different stages involved in demand paging. [2+3+3]