02 MAY 2023

KATHMANDU UNIVERSITY
End Semester Examination [C]
April/May, 2023

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 :

SECTION "A"

[20Q. × 0.5 = 10 marks]

Encircle the most appropriate answer.

1. Which of the following is **NOT** a function of an operating system?
   A. File Management
   B. Virtual Memory Management
   C. Virtualization Management
   D. Interface Management

2. In Symmetric multiprocessing (SMP) _____.
   A. Each processor run identical copy of the OS
   B. Each processor is assigned specific task
   C. It uses loosely coupled system
   D. It may make use of commodity platform

3. Which of the following cannot be considered as an advantage of a Distributed System?
   A. Fail-Safe
   B. Resource sharing
   C. Computational speed up
   D. Tightly coupled

4. Banker's algorithm is used to _____.
   A. efficiently distribute resources
   B. implement less busy waiting
   C. prevent deadlock
   D. recover from deadlock

5. Page size is _____ proportional to internal fragmentation.
   A. directly
   B. inversely
   C. constantly
   D. exponentially

6. The size of virtual memory of any system is dependent on _____.
   A. RAM size
   B. Swap memory
   C. Address Bus
   D. Data Bus

7. Translation lookaside buffer help to _____.
   A. Reduce page fault
   B. Increase page fault
   C. Efficient page handling
   D. Reduce EAT

8. Which queue is used to list the processes that are prepared to be executed?
   A. Ready Queue
   B. Waiting Queue
   C. Execution Queue
   D. Job Queue

9. Which of the following is efficient among file allocation methods?
   A. Linked
   B. Contiguous
   C. Stacked
   D. Indexed

10. Which of the following is a component of the process control block?
    A. Accounting information
    B. Different processes states
    C. Operating System information
    D. Secondary memory information

11. Which of the following is also known as double buffering?
A. FCFS buffering
B. Buffer swapping
C. Circular swapping
D. Waited buffering

12. In which OS structure the operating system services such as memory management and process management are provided by the kernel?
A. Macro
B. BDS
C. Linux
D. Monolithic

13. Information about which of the following is not stored in the page table?
A. Page offset
B. Base address of each page
C. Reference bit
D. Page size

14. Page replacement algorithm implements the concept of _____ to mitigate page fault ratio.
A. Random access
B. Demand paging
C. Locality of reference
D. Thrashing

15. What could be the constraints of compaction to remove external fragmentation?
A. Double buffering
B. I/O response
C. Kernel buffering
D. I/O buffering

16. A process is said to be in ____ state if it is waiting for an event that will never occur?
A. Waiting
B. Starvation
C. Ready
D. Deadlock

17. Which of the following is **NOT** a benefit of microkernel system structure?
A. Easier to port to next operating system
B. Easier to communicate between sub process
C. More secure and more reliable
D. More operations moves from kernel mode to user mode

18. No preemption in deadlock characterization means ___.
A. Processes must not be using a resourcing and demanding other resources at same time.
B. Process must have priority of using resources.
C. Process can release the resource only when it complete its task
D. Processes can be forced to release the resource by the operating system.

19. If there is a cycle in a resource allocation graph with several instances per resource type, then it may lead to the following condition.
A. It will lead to a deadlock.
B. It will not lead to a deadlock.
C. Possibility of deadlock.
D. It will lead to allocation problems.

20. Binary semaphore is also known as ___.
A. Counting Semaphore
B. Mutex lock
C. Busy waiting luck
D. Monitor lock

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Level : B.E./B.Sc.
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F.M. : 40

SECTION "B"
[6Q. × 4 = 24 marks]

Attempt *ANY SIX* questions.

1. What are the operations of an operating system as a resource manager and as a control manager? [2+2]
2. Write in brief about kernel, system program and application programs. [1+1.5+1.5]
3. List the methods used to pass parameters to the OS in a system call with brief explanation.
4. What is the purpose of segmentation? How segmentation is used for efficient memory allocation? [1+3]
5. Explain in brief about the concept of shared library using virtual memory with appropriate diagrams.
6. Write in brief about device directory and information that are available in device directory.
7. What are the drawbacks of contiguous allocation of disk space?

SECTION "C"
[2Q × 8 = 16 marks]

Attempt *ANY TWO* questions.

8. Describe in brief about the steps of handling page faults and aspects of demand paging with appropriate diagrams. [5+3]
9. A. Explain the use of monitors for Process Synchronization using any classical problem. [4]
   B. Write is brief about procedures involved in Direct Memory Access using appropriate diagram. [4]
10. Consider the following set of processes with CPU burst time and arrival time given in milliseconds (unit). [2+4+2]

Process	Burst Time	Arrival Time
P1	8	1
P2	5	0
P3	2	2
P4	1	1
P5	5	3

   a. Draw Gantt charts illustrating the execution of these processes using SJF non preemptive and RR(quantum = 2) scheduling.
   b. What is the turnaround time of each process for each of the scheduling algorithms?
   c. Which of the algorithms result in minimal average waiting time?