OR iii.   What is meant by thrashing? Explain various causes of thrashing. **6**

Q.6   Write short notes on any two:
   i.   Disk Scheduling   **5**
   ii.   Free Space Management   **5**
   iii.   File Allocation Methods   **5**

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Enrollment No....................................

Faculty of Engineering
End Sem (Even) Examination May-2022
CS3CO09 / IT3CO21 Operating Systems
Programme: B.Tech.   Branch/Specialisation: CSE / IT

Duration: 3 Hrs.   **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i.   Which of the following is used to generate machine level language **1**
           code from high level language instructions?
           (a) A Compiler   (b) System software
           (c) Application software   (d) An operating environment
     ii.   Multiprogramming systems: **1**
           (a) Are easier to develop than Batched systems
           (b) Execute each job faster
           (c) Execute more jobs in the same time
           (d) Are used only on large main frame computers
     iii. The interval from the time of submission of a process to the time of **1**
           completion is termed as:
           (a) Waiting time   (b) Turnaround time
           (c) Response time   (d) Throughput
     iv.   Which of the following is NOT true for deadlock prevention and **1**
           deadlock avoidance schemes?
           (a) In deadlock prevention, the request for resources is always granted
               if the resulting state is safe
           (b) In deadlock avoidance, the request for resources is always granted
               if the resulting state is safe
           (c) Deadlock avoidance is less restrictive than deadlock prevention
           (d) Deadlock avoidance requires prior knowledge of resource
               requirements

                                                              P.T.O.

v. If relocation is static and is done at assembly or load time, compaction_____. **1**
(a) Cannot be done   (b) Must be done
(c) Must not be done   (d) Can be done

vi. External fragmentation will not occur when we use: **1**
(a) First fit
(b) Best Fit
(c) Worst Fit
(d) No matter which algorithm is use it can always occur

vii. Which of the following page replacement algorithms suffers from Belady's anomaly? **1**
(a) FIFO   (b) LRU   (c) Optimal   (d) Both (a) and (b)

viii. Virtual Memory is: **1**
(a) Large secondary memory
(b) Large main memory
(c) Illusion of large main memory
(d) None of these

ix. The time taken to move the disk arm to the desired cylinder is called the: **1**
(a) Positioning time   (b) Random access time
(c) Seek Time   (d) Rotational Latency

x. In indexed allocation of file: **1**
(a) Each file must occupy a set of contiguous blocks on the disk
(b) Each file is a linked list of disk blocks
(c) All the pointers to scattered blocks are placed together in one location
(d) None of these

Q.2 i. Differentiate between: **4**
(a) Multitasking and Multi-programmed OS
(b) Parallel and Distributed OS

ii. Write various functions of Operating System in detail. **6**

OR iii. What are language processors? Write two language processors with their activities. **6**

Q.3 i. What is thread? What resources are used when thread is created? How do they differ from those used when process is created? **4**

ii. Consider a system with three processes and three resource types and at time to the following snapshot of the system has been taken: **6**

Process	Allocated			Maximum			Available		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
P1	2	2	3	3	6	8	7	7	10
P2	2	0	3	4	3	3			
P3	1	2	4	3	4	4			

(a) Is the current allocation a safe state? Deduce safe sequence using Banker's Algorithm
(b) Would the requests (1, 0, 0) be granted for process P2?

OR iii. Explain critical section problem in detail. Describe the three conditions that must be satisfied by a solution to it. **6**

Q.4 i. Explain segmentation process with example. **4**

ii. Consider six memory partitions of size 200KB, 400KB, 600KB, 500KB, 300KB and 250KB where KB refers to kilobyte. These partitions need to be allotted to four processes of sizes 357KB, 210KB, 468KB and 491KB in that order. If the best fit algorithm is used, which partitions are NOT allotted to any processes? Show your solution in each step. **6**

OR iii. Consider a computer system with 40-bit virtual addressing and page size of sixteen kilobytes. If the computer system has a one-level page table per process and each page table entry requires 48 bits, then calculate the size of the per-process page table in megabytes. **6**

Q.5 i. Explain demand paging and demand segmentation. **4**

ii. Consider the following page reference string **6**
1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6
How many page faults occur for the following replacement algorithm, assuming three frames? Also show steps to prove your answer.
(a) FIFO replacement   (b) LRU replacement
(c) Optimal replacement

Marking Scheme
CS3CO09 / IT3CO21 Operating Systems

Q.1   i.   Which of the following is used to generate machine level language code   **1**
from high level language instructions?
(a) A Compiler

ii.   Multiprogramming systems: **1**
(c) Execute more jobs in the same time

iii.   The interval from the time of submission of a process to the time of   **1**
completion is termed as:
(b) Turnaround time

iv.   Which of the following is NOT true for deadlock prevention and   **1**
deadlock avoidance schemes?
(a) In deadlock prevention, the request for resources is always granted
if the resulting state is safe

v.   If relocation is static and is done at assembly or load time,   **1**
compaction_____.
(a) Cannot be done

vi.   External fragmentation will not occur when we use: **1**
(d) No matter which algorithm is use it can always occur

vii.   Which of the following page replacement algorithms suffers from   **1**
Belady's anomaly?
(a) FIFO

viii.   Virtual Memory is: **1**
(c) Illusion of large main memory

ix.   The time taken to move the disk arm to the desired cylinder is called   **1**
the:
(c) Seek Time

x.   In indexed allocation of file: **1**
(c) All the pointers to scattered blocks are placed together in one
location

Q.2   i.   Differentiate between: **4**
(a) Multitasking and Multi-programmed OS
    1 mark for each difference (1 mark * 2)   2 marks
(b) Parallel and Distributed OS
    1 mark for each difference (1 mark * 2)   2 marks

ii.   Any six functions of Operating System   **6**
1 mark for each function   (1 mark * 6)

OR   iii.   Language processors   3 marks   **6**
Two language processors with their activities
1.5 marks for each (1.5 marks * 2)   3 marks

Q.3   i.   Thread   2 marks   **4**
Resources are used when thread is created   1 mark
They differ from those used when process is created   1 mark

ii.   (a) Is the current allocation a safe state   1 mark   **6**
    Deduce safe sequence using Banker's Algorithm   2 marks
(b) Would the requests (1, 0, 0) be granted for process P2
    For complete calculation   3 marks

OR   iii.   Critical section problem   3 marks   **6**
Three conditions   3 marks

Q.4   i.   Segmentation process   3 marks   **4**
Example   1 mark

ii.   Show your solution in each step   **6**
3 marks for each correct step   (3 marks * 2)

OR   iii.   For correct answer   1 mark   **6**
For deduction   5 marks

Q.5   i.   Demand paging   2 marks   **4**
Demand segmentation   2 marks

ii.   (a) FIFO replacement   2 marks   **6**
(b) LRU replacement   2 marks
(c) Optimal replacement   2 marks

OR   iii.   Thrashing   3 marks   **6**
Causes of thrashing   3 marks

Q.6   Write short notes on any two:
i.   Disk Scheduling   **5**
As per the explanation
ii.   Free Space Management   **5**
As per the explanation
iii.   File Allocation Methods   **5**
As per the explanation

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