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Code No: 154BR**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech II Year II Semester Examinations, April/May - 2023****OPERATING SYSTEMS****(Common to CSE, IT, CSBS, CSIT, ITE, CE(SE), CSE(CS), CSE(AI&ML), CSE(DS),
CSE(IOT), CSE(N))****Time: 3 Hours****Max. Marks: 75**

- Note:** i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A**(25 Marks)**

- 1.a) Define the essential properties of parallel operating systems. [2]
- b) How does multiprogramming increase CPU utilization? [3]
- c) Write about wait command. [2]
- d) How does priority scheduling differ from round robin method? [3]
- e) What is a message queues? [2]
- f) Give an example of the situation describing deadlock. [3]
- g) Define segmentation. [2]
- h) What is the purpose of paging the page tables? [3]
- i) What is a file? [2]
- j) List down various file attributes. [3]

PART – B**(50 Marks)**

- 2.a) In a multiprogramming and time-sharing environment, several users share the system simultaneously. This situation can result in various security problems. What are two such problems?
- b) Can we ensure the same degree of security in a time-shared machine as in a dedicated machine? Explain your answer. [5+5]

OR

- 3.a) Under what circumstances would a user be better off using a timesharing system rather than a PC or single-user workstation.
- b) Distinguish between the client-server and peer-to-peer models of distributed systems. [5+5]

- 4.a) Describe the differences among short-term, medium-term, and long-term scheduling.
- b) Can a multithreaded solution using multiple user-level threads achieve better performance on a multiprocessor system than on a single-processor system? [5+5]

OR

- 5.a) Describe the actions taken by a thread library to context switch between user-level threads.
- b) Why is it important for the scheduler to distinguish I/O-bound programs from CPU-bound programs? [5+5]

- 6.a) Demonstrate that monitors and semaphores are equivalent as they can be used to implement the same types of synchronization problems.
- b) What is critical-section problem? Give a classic Peterson's solution to the critical-section problem. [5+5]

OR

7. Discuss the tradeoff between fairness and throughput of operations in the readers-writers problem. Propose a method for solving the readers-writers problem without causing starvation. [10]
8. Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)? Which algorithm makes the most efficient use of memory? [10]

OR

9. Explain the concept of Least Recently Used memory page replacement method and how it is different from First In First Out (FIFO) page replacement method. [10]
- 10.a) What are the advantages of Contiguous allocation? What are the drawbacks of contiguous allocation of disk space?
- b) Explain the following commands: lseek, stat, ioctl. [4+6]

OR

11. Explain in detail about the common schemes for defining the logical structure of a directory. [10]

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Code No: 154BR**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech II Year II Semester Examinations, August/September - 2021****OPERATING SYSTEMS****(Common to CSE, IT, ITE)****Time: 3 Hours****Max. Marks: 75****Answer any Five Questions
All Questions Carry Equal Marks**

- 1.a) Describe the system components of an operating system and explain them briefly.
- b) Discuss the Functionalities of Operating Systems in detail. [8+7]
2. What is a System call? Discuss major System calls of Operating Systems. [15]
3. Explain and give the differences in how much the following scheduling algorithms discriminate in favor of short processes.
 - a) Multilevel feedback queues
 - b) FCFS
 - c) RR. [5+5+5]
4. Consider 3 processes P1, P2 and P3 which require 5, 7 and 4 time units and arrive at time 0, 1 and 3. Draw the Gant chart, process completion sequence and average waiting time for.
 - a) Round robin scheduling with CPU quantum of 2 time units.
 - b) FCFS. [7+8]
5. Consider a system with three processes and four resources. Resource R1 and R3 with one instance, R2 with two instances, process P1 holding an instance of R2 and waiting for R1, process P2 is holding an instance of R1 and R2 and waiting for R3, process P3 is holding an instance of R3:
 - a) Draw a resource allocation graph to the given system.
 - b) Is it possible to apply the Resource allocation graph algorithm to avoid deadlock? Explain. [8+7]
6. What is the need of Page replacement? Consider the following reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1. Find the number of Page Faults with FIFO, Optimal Page replacement and LRU with four free frames which are empty initially. Evaluate which algorithm gives the minimum number of page faults? [15]
- 7.a) Explain the Logical versus Physical Address Space.
- b) List the advantages and disadvantages of Demand Paging. [7+8]
8. Explain the following:
 - a) close
 - b) lseek
 - c) stat [5+5+5]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, August/September - 2022

OPERATING SYSTEMS

(Common to CSE, IT, CSBS, CSIT, ITE, CSE(SE), CSE(CS), CSE(AIML), CSE(DS),
CSE(IOT), CSE(N))

Time: 3 hours

Max. Marks: 75

**Answer any five questions
All questions carry equal marks**

- 1.a) Explain about time-sharing operating systems.
- b) Define real time system. Explain about real time operating system. [7+8]
- 2.a) Briefly explain about system calls.
- b) Explain about the system components of OS. [9+6]
- 3.a) Discuss about Process Control Block with a neat diagram.
- b) Explain about shortest Job First Scheduling algorithm with an example. [7+8]
- 4.a) Describe Round Robin scheduling algorithm with example.
- b) Explain about fork and exit system calls with examples. [8+7]
- 5.a) Discuss about resuming processes within a Monitor.
- b) Explain about deadlock detection. [7+8]
- 6.a) Describe IPC between processes on a single computer system.
- b) Discuss about implementation of Semaphores. [7+8]
- 7.a) Describe basic method of segmentation.
- b) Explain about performance of demand paging. [8+7]
8. Explain the following:
 - a) Virtual file systems
 - b) Indexed allocation. [8+7]

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Code No: 154BR**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech II Year II Semester (Special) Examinations, January/February - 2021****OPERATING SYSTEMS****(Common to CSE, IT)****Time: 2 hours****Max. Marks: 75****Answer any five questions****All questions carry equal marks**

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- 1.a) Mention the objectives and functions of Real-Time Embedded systems.
- b) Distinguish between client-server and peer-to-peer models of distributed systems. [7+8]
2. What is a System call? Explain the various types of system calls provided by an operating system. [15]
- 3.a) Describe the differences among long-term scheduling, short-term and medium term scheduling.
- b) Describe the actions taken by a thread library to context-switch between user level threads. [8+7]
4. Demonstrate Round Robin CPU scheduling algorithms with suitable example. [15]
5. Write about deadlock conditions and bankers algorithm in detail. [15]
- 6.a) How does the signal() operation associated with monitors differ from the corresponding operation defined for semaphores.
- b) Is it possible to have a deadlock involving only a single process? Explain. [8+7]
7. Consider the reference string: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 for a memory with three frames. Trace FIFO, optimal, and LRU page replacement algorithms. [15]
8. Explain File Free Space management approaches. [15]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B.Tech II Year II Semester Examinations, July/August - 2021****OPERATING SYSTEMS****(Common to CSE, IT)****Time: 3 hours****Max. Marks: 75****Answer any Five Questions
All Questions Carry Equal Marks**

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- 1.a) What are the various components of operating system structure and explain with a neat sketch.
- b) Differentiate between Multi Programming, Multi Tasking and Multi processing systems. [8+7]
2. Consider the following five processes with the length of the CPU burst time in milliseconds.

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

Processes are assumed to have arrived at time 0.

For the above set of processes find the average waiting time and average turn around time for each of the following scheduling algorithm using Gantt chart. Consider 1 is highest priority:

- a) SJF b) Non Preemptive Priority [7+8]
3. What is Deadlock? List the condition that leads to deadlock. How deadlock can be prevented. [15]
- 4.a) Distinguish between logical verses physical address space.
- b) Explain about Virtual Memory Management in detail. [7+8]
5. Describe about the different types of File allocation methods. [15]
- 6.a) What are the various objectives and functions of operating systems?
- b) Write short note on Real Time Operating Systems. [8+7]
- 7.a) What is Demand paging? Explain.
- b) Discuss about segmentation with an example. [7+8]
8. What is Mutual exclusion? Explain Peterson's solution for mutual exclusion problem. [15]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, March - 2022

OPERATING SYSTEMS

(Common to CSE, IT, ITE)

Time: 3 Hours

Max. Marks: 75

Answer any five questions

All questions carry equal marks

- 1.a) Discuss the Functionalities of Operating Systems in detail.
- b) What is a System call? Discuss major System calls of Operating Systems. [8+7]
- 2.a) Distinguish between the client-server and peer-to-peer models of distributed systems.
- b) Discuss the various System components. [7+8]
3. List and explain the Scheduling Algorithms. [15]
- 4.a) Explain the terms fork, exit, wait, waitpid, exec.
- b) Consider 3 processes P1, P2 and P3, which require 5, 7 and 4 time units and arrive at times 0, 1 and 3. Draw the Gant chart, process completion sequence and average waiting time for.
 - i) Round-robin scheduling with CPU quantum of 2 time units.
 - ii) FCFS [7+8]
5. Consider the following page reference string: 1, 2, 3, 4, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6 How many page faults would occur for the FIFO replacement algorithm for 3 frames. [15]
6. Discuss how LRU and FIFO page replacement algorithms can be implemented on the following reference string when the numbers of frames are 3. Also, calculate the number of page faults. 3, 2, 1, 0, 2, 2, 1, 7, 6, 7, 0, 1, 2, 0, 3, 0, 4, 1, 5, 4, 5, 6, 7, 6, 7, 2, 4, 2, 7, 3. [15]
7. Compare the main memory organization schemes of contiguous memory allocation, pure segmentation and pure paging with respect to the following issues:
 - a) External fragmentation.
 - b) Internal fragmentation.
 - c) Ability to share code across processes. [15]
8. List and explain the various methods for protection and access control. [15]

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B.Tech II Year II Semester Examinations, November/December - 2020****OPERATING SYSTEMS****(Common to CSE, IT)****Time: 2 hours****Max. Marks: 75****Answer any Five Questions
All Questions Carry Equal Marks**

1. List out the types of operating system and explain batch OS and time sharing OS in brief. [15]
2. Explain about the system calls fork, exit, wait, waitpid and exec. [15]
3. What is Semaphore? Give the implementation of Bounded Buffer Producer Consumer Problem using Semaphore. [15]
4. Explain the swapping in memory management. [15]
- 5.a) Explain about the implementation of Access Matrix.
b) Explain about lseek() and stat() system calls. [7+8]
- 6.a) Explain about the distributed operating system in brief.
b) Explain the various system calls are used in OS. [7+8]
7. Consider the following set of processes, with the length of the CPU burst given in milliseconds:

Process	Burst Time	Priority
P1	27	5
P2	12	1
P3	37	2
P4	19	4
P5	10	3

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5 all at time 0. Draw the Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF and Priority. Also determine the average waiting time and average turnaround time for each of the algorithms. [15]

- 8.a) Explain contiguous and linked file allocation methods.
b) Explain about domain protection mechanism in brief. [8+7]

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