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15EC553

Fifth Semester B.E. Degree Examination, Feb./Mar. 2022
Operating Systems

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the fundamental goals of an O.S. (06 Marks)
- b. Explain resource allocation strategies of an O.S. (05 Marks)
- c. Using I/O bound programmes should be given higher priorities in a multiprogramming environment? Illustrate with timing diagram. (05 Marks)

OR

- 2 a. What are the common tasks performed by an operating system? (05 Marks)
- b. Explain turn around time in batch processing system. (05 Marks)
- c. What are the features that a computer must possess to support for multiprogramming? (06 Marks)

Module-2

- 3 a. What are fundamental process states? With a figure explain the fundamental state transitions for a process. (05 Marks)
- b. What are the advantages of threads over process? (05 Marks)
- c. For the following given process for scheduling:

Process	P ₁	P ₂	P ₃	P ₄	P ₅
Admission time	0	2	3	4	8
Service time	3	3	5	2	3

Calculate mean turn around time and mean weighted turn around using FCFS scheduling.

(06 Marks)

OR

- 4 a. Explain the different fields of the PCB data structure used in process management. (05 Marks)
- b. With a figure explain long, medium and short term scheduling in a time sharing system. (05 Marks)
- c. For the following given process for scheduling:

Process	P ₁	P ₂	P ₃	P ₄	P ₅
Admission time	0	2	3	5	8
Service time	3	3	2	5	3

Calculate the mean turn around time and mean weighted turn around using round-robin scheduling with time slicing of 1 unit time.

(06 Marks)

Module-3

- 5 a. Give a comparison of continuous and non continuous memory allocation. (05 Marks)
- b. Explain what are the functions performed by paging hardware. (05 Marks)
- c. The page reference string for a process is as follows:
Page reference string : 5, 4, 3, 2, 1, 4, 3, 5, 4, 3, 2, 1, 5.
For given page frame size of 3. Calculate the total number of page faults using FIFO page replacement policy. (06 Marks)

OR

- 6 a. Explain the steps in address translation by the memory management unit. (05 Marks)
 b. Explain the functions of the virtual memory manager. (05 Marks)
 c. The page reference string for a process is as follows:
 Page reference string : 1, 2, 3, 4, 2, 5, 3, 4, 2, 6, 7, 8, 7, 9, 7, 8, 2, 5, 4, 9
 For a given page frame size of 4. Calculate the total number of page faults using LRU page replacement policy. (06 Marks)

Module-4

- 7 a. What are the facilities provided by the file system and the input-output control system. (05 Marks)
 b. Explain with neat diagram, the directory structure composed of master and user directories. (05 Marks)
 c. With a diagram, explain the linked allocation of disk space. (06 Marks)

OR

- 8 a. Explain the different fields in the file control block (FCB). (05 Marks)
 b. With a neat figure explain the directory tree of the file system. (05 Marks)
 c. Explain with a figure the implementation of file access for a file system actions at open. (06 Marks)

Module-5

- 9 a. What are the issues in implementing message passing and give the uses of message passing. (05 Marks)
 b. List some of the exceptional conditions in message passing. (05 Marks)
 c. Give the different approaches for deadlock prevention. (06 Marks)

OR

- 10 a. Explain mailbox. Give the advantages of mail box. (06 Marks)
 b. With a simple example, explain the resource allocation state of a system using,
 (i) Graph model
 (ii) Matrix model. (06 Marks)
 c. The allocation state of a system containing 10 units of a resources class R_1 and three processes $P_1 - P_3$ is as follows :

	R_1
P_1	4
P_2	4
P_3	2

Allocated
Resources

	R_1
P_1	6
P_2	2
P_3	0

Requested
Resources

Total resources R_1

Free resources

Check for deadlock exist or not in the system when the simulation ends.

(04 Marks)

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