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Question Paper Code:53805

B.E./B.Tech. DEGREE EXAMINATION, NOV 2018

Third Semester

Computer Science and Engineering

15UIT305 OPERATING SYSTEMS

(Common to Information Technology)

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. If a process fails, most operating system write the error information to
a ____ CO1- R
(a) Log file (b) Another running process
(c) New file (d) None of the mentioned
2. Which one of the following cannot be scheduled by the kernel? CO2- R
(a) Kernel level thread (b) User level thread
(c) Process (d) None of the mentioned
3. Which of the following condition is required for deadlock to be possible? CO3 R
(a) mutual exclusion
(b) a process may hold allocated resources while awaiting assignment of other resources
(c) no resource can be forcibly removed from a process holding it
(d) all of the mentioned
4. _____ is the concept in which a process is copied into main memory CO4- R
from the secondary memory according to the requirement.
(a) Paging (b) Demand paging (c) Segmentation (d) Swapping

5. The data structure used for file directory is called CO5- R
- (a) Mount table (b) Hash table (c) File table (d) Process table

PART – B (5 x 3= 15Marks)

6. When are real-time systems used? CO1- R
7. What are the various scheduling criteria for CPU scheduling? CO2- R
8. How can we handle deadlock? CO3- R
9. What are the different accessing methods of a file? CO4- R
10. How can the index blocks be implemented in the indexed allocation scheme? CO5- R

PART – C (5 x 16= 80Marks)

11. (a) (i) Describe the difference between symmetric and asymmetric multi-processing. What are three advantages and one disadvantages of multiprocessor system? CO1- App (16)
(ii) Discuss in detail the various system calls

Or

- (b) What are the system components of an operating system and explain them? CO1- App (16)

12. (a) Bring out a detailed discussion on the various CPU scheduling algorithms. CO2- App (16)

Or

- (b) Consider the following set of processes with the length of the CPU burst time given in milliseconds CO2- Ana (16)

Process Burst Time Priority

P1 2 2

P2 1 1

P3 8 4

P4 42

P5 5 3

The processes are assumed to have arrived in the order P1, P2, P3, P4,P5 all at time 0.

- (a) Draw four Gantt charts illustrating the execution of these processes using FCFS,SJF, a non-preemptive priority (a smaller priority number implies a higher priority)and RR (quantum=1)scheduling.

- (b) What is the turnaround time of each process for each of the scheduling algorithms in part a?
- (c) What is the waiting time of each process for each of the scheduling algorithms in part a?
- (d) Which of the schedules in part a results in the minimal average waiting time?

13. (a) Discuss situation under which the most frequently used page replacement algorithm generates fewer page faults than the least recently used page replacement algorithm. Also discuss under which circumstances the opposite holds. CO3- Ana (16)

Or

- (b) When do page faults occur ? Consider the following page-reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. How many page faults would occur for the following replacement algorithms, assuming one, two, three, four, five, six, or seven frames? Remember that all frames are initially empty, so your first unique pages will all cost one fault each. CO3- Ana (16)
- (i) LRU replacement
 - (ii) FIFO replacement
 - (iii) Optimal replacement.

14. (a) (i) What are directories? List different types of directory structures with examples. Mention their advantages and disadvantages. CO4- U (8)
- (ii) What is a file? Explain in detail different allocation methods. CO4- U (8)

Or

- (b) Consider a demand -paging system with the following time measured utilizations: CO4- Ana (16)
- | | |
|-------------------|-------|
| CPU utilization | 20% |
| Paging disk | 97.7% |
| Other I/O devices | 5% |
- For each of the following, say whether it will (or is likely to) improve CPU utilization. Explain your answers.
- a. Install a faster CPU.
 - b. Install a bigger paging disk.
 - c. Increase the degree of multiprogramming.
 - d. Decrease the degree of multiprogramming.
 - e. Install more main memory.
 - f. Install a faster hard disk or multiple controllers with multiple harddisks
 - g. Add prepaging to the page fetch algorithms.
 - h. Increase the page size.

15. (a) Consider a disk queue with requests for I/O to blocks on cylinders 98, 193, 37, 122, 74, 724, 65, 67. If the disk head starts at 53, then find out the total head movement with respect to FCFS, SSTF, SCAN, C-SCAN and LOOK scheduling. CO5- U (16)

Or

- (b) Explain about kernel I/O sub system and transforming I/O to hardware operations. CO5-U (16)