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Question Paper Code: 53085

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Third Semester

Information Technology

15UIT305 - OPERATING SYSTEMS

(Regulation 2015)

(Common to Computer Science and Engineering branch)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

- Which of the following is not an advantage of multiprogramming?
 - Increased Throughput
 - Shorter response time
 - Decreased OS overhead
 - Ability to assign priority to jobs
- A major problem with priority scheduling is
 - Definite blocking
 - Starvation
 - Low priority
 - none of these
- _____ Condition hold for non-sharable resources.
 - Mutual exclusion
 - Circular wait
 - Priority
 - No preemption
- _____ page replacement algorithm suffers from Belady's anomaly.
 - FIFO
 - Optimal
 - LIFO
 - LRU
- Which directory implementation is used in most Operating System?
 - Single level directory structure
 - Two level directory structure
 - Tree directory structure
 - Acyclic directory structure

PART - B (5 x 3 = 15 Marks)

6. Draw the process state transition diagram.
7. Distinguish preemption and non-preemption in scheduling.
8. Write the sequence for resource utilization.
9. Given memory partitions of 100k, 500k, 200k, 400k(in order) how would each of the first fit , best fit and worst fit algorithms place processes of size 117k, 313k, 202k (in order)? Which algorithm makes the most efficient use of memory?
10. Consider a logical address space of 8 pages of 1024 words each, mapped onto a physical memory of 32 frames. How many bits are there in logical address?

PART - C (5 x 16 = 80 Marks)

11. (a) Consider in computers caches are very useful. What problems do they solve? What problems do they cause? If a cache can be made as large as the device for which it is caching, why not make it that large and eliminate the device. (16)

Or

- (b) Differentiate Distributed systems and Real time systems in detail. (16)
12. (a) Draw Gantt chart using preemptive SJF scheduling and Round robin scheduling (time quantum=4) and also find the waiting time and turnaround time of each process for each of the above scheduling algorithms. (16)

Process	Burst Time	Priority
P1	4	0.0
P2	6	3.0
P3	3	3.0
P4	4	5.0

Or

- (b) Dynamically loadable kernel modules give flexibility when drivers are added to a system. Do they also have disadvantages? Under what circumstances a kernel would be compiled in a single binary file? When would it be better to keep it split into modules? Explain your answers. (16)
13. (a) Discuss about the characteristics of deadlocks and methods for handling deadlocks. (16)

Or

(b) Show how to implement the wait() and signal() semaphore operations in multiprocessor environments using the test and set() instruction. The solution should exhibit minimal busy waiting. Develop Pseudo code for implementing the operations. (16)

14. (a) Consider the following page reference string: 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7
How many page faults would occur for the following replacement algorithms?
Assuming TWO and FOUR frames: (i) FIFO replacement (ii) Optimal replacement. (16)

Or

(b) Consider a system where a program can be separated into two parts: code and data. The CPU knows whether it wants an instruction or data. Therefore, two base-limit register pairs are provided: one for instructions and one for data. The instruction base-limit register pair is automatically set to read only, so program can be shared among different users. Discuss the advantages and disadvantages of this scheme. (16)

15. (a) Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143 and the previous request was at cylinder 125. The queue of pending requests in FIFO order, is 86, 1470, 913, 1774, 948, 1509, starting from the current head position , what is the total distance(in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms.
- (i) FCFS
 - (ii) LOOK
 - (iii) SCAN
- (16)

Or

(b) Fragmentation on a storage device could be eliminated by re-compaction of the information. Typical disk devices do not have relocation or base registers, so how can the files be relocated. Give three reasons why re-compacting and relocation of files are often avoided. (16)

