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B.TECH
PCCS4304

6th Semester Regular / Back Examination 2016-17

OPERATING SYSTEM

BRANCH(S): CSE, ECE, ETC, IT, ITE

Time: 3 Hours

Max Marks: 70

Q.CODE: Z250

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) What are the features required for an operating system that supports multi-tasking.
b) Explain Belady's anomaly.
c) What are the criteria that any solution to the critical section problem must satisfy?
d) How does a thread differ form a process? What are the advantages of multi-threading.
e) What is a safe state? What is its relevance to deadlock?
f) What is a DMA controller? What is its role?
g) Mention in brief the important pieces of information present in a PCB.
h) Differentiate between internal and external fragmentations.
i) What are system calls? In what way are they useful?
j) What is the role of time quantum in Round Robin scheduling? How is it determined?

Q2 **a)** Explain the Peterson's solution to the critical section problem. What are its limitations? **(5)**
b) What is Thrashing? Why does it occur? How the deployment of working-set model can prevent Thrashing? **(5)**

Q3 **a)** Discuss the different multi-threading models. Which of these is better and why? **(5)**
b) State and explain the Banker's algorithm. **(5)**

Q4 **a)** Explain process scheduling with the help of the queuing-diagram. Describe the role of different schedulers in process scheduling. **(5)**
b) Consider the following virtual page reference string on a demand paged virtual memory system that has main memory size of 3 page frames which are initially empty. **(5)**

1, 2, 3, 2, 4, 1, 3, 2, 4, 1.

Calculate the number of page faults under the following page replacement algorithms.
(i) FIFO
(ii) Optimal
(iii) LRU

Q5 Consider the following snapshot of the system. Here smallest integer is equal to the highest priority. **(10)**

Process	Arrival time	Priority	CPU Burst (in ms)
P1	0	5	19
P2	2	3	13
P3	3	2	17
P4	4	7	07

Calculate the average waiting time (up to two decimal places) when the operating system deploys the following scheduling algorithms.

(i) FCFS.
(ii) SJF (non-preemptive).
(iii) Shortest remaining time first.
(iv) Priority (preemptive).
(v) Round Robin (time quantum=5ms)

Q6 **a)** What is the Readers-Writers problem in concern to process synchronization? How does binary semaphore offer a solution for this problem? **(5)**

b) Describe paging. Explain how page faults are handled by the OS? **(5)**

Q7 **a)** What is a wait-for-graph? How is it helpful in detecting a deadlock? What are it limitations? **(5)**

b) Consider a disc containing 200 cylinders (in the range 0-199). The current head position is at cylinder 53 and the previous request was for cylinder 162. The queue of next cylinder requests are: **(5)**

98, 183, 37, 122, 14, 124, 65, 67

Calculate the number of head movements for FIFO, SSTF and C-SCAN algorithms.

Q8 **Write short notes on any two.** **(5 x 2)**

a) Multilevel Queue scheduling
b) Demand Paging
c) Interrupt driven data transfer