10CS53

Fifth Semester B.E. Degree Examination, June/July 2015
Operating Systems

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting*
atleast TWO questions from each part.

PART – A

1   a. What are the activities for which the operating system is responsible for, in connection with :
        i) Process management ii) File management.   **(10 Marks)**
    b. Explain any two types of system calls.   **(05 Marks)**
    c. What are virtual machines? Explain the benefit of creating virtual machines. **(05 Marks)**

2   a. With a diagram, explain different states of a process.   **(04 Marks)**
    b. Differentiate between direct and indirect interprocess communication. **(04 Marks)**
    c. Explain any three multithreading models in brief.   **(03 Marks)**
    d. Consider the following set of processes :

Process	Arrival time	Burst time
P_1	0	5
P_2	1	1
P_3	2	4

   Compute average turn around d time and average waiting time using FCFS, preemptive SJF and RR (quantum – 4). **(09 Marks)**

3   a. Explain Peterson's solution to critical section problem.   **(06 Marks)**
    b. Describe the mutual – exclusion implementation with TestAndSet().   **(06 Marks)**
    c. Mention three classical problems of synchronization. Explain any one in detail. **(08 Marks)**

4   a. Consider the following snapshot of a system :

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	1	0	7	5	3	3	3	2
P_1	2	0	0	3	2	2			
P_2	3	0	2	9	0	2			
P_3	2	1	1	2	2	2			
P_4	0	0	2	4	3	3			

   Answer the following questions using banker's algorithm
   i)   What is the content of the matrix need?
   ii) Is the system in a safe state?
   iii) If a request from process P_1 arrives for (1, 0, 2), can the request be granted
        immediately?   **(12 Marks)**
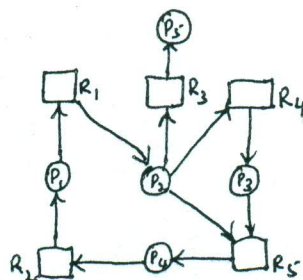   b. For the following resource-allocation graph, write the corresponding wait – for graph. **(04 Marks)**

Fig. Q4(b)

    c. Explain the different methods used to recover from deadlock.   **(04 Marks)**

PART – B

5 a. With a supporting paging hardware, explain in detail concept of paging with an example for a 32 –byte memory with 4 – type pages with a process being 16-bytes. How many bits are reserved for page number and page offset in the logical address. Suppose the logical address is 5, calculate the corresponding physical address, after populating memory and page table.
(10 Marks)

   b. Discuss on the performance of demand paging. (05 Marks)

   c. What is Belady's anomaly? Explain with an example. (05 Marks)

6 a. Mention any five :
   i) File attributes
   ii) File operations. (05 Marks)

   b. With supporting diagrams distinguish between single-level and two-level directory structure. (05 Marks)

   c. Compare contiguous and linked allocation methods for disk space. (05 Marks)

   d. Explain bit vector free-space management technique. (05 Marks)

7 a. With an illustrative example, distinguish between SSTF, FCFS, SCAN and LOOK DISK schedulings. (08 Marks)

   b. What are boot block and bad blocks? Explain. (06 Marks)

   c. Explain the goals and principles of protection. (06 Marks)

8 Write short notes on :
   a. Design principles of Linux system
   b. Linux virtual memory system
   c. Segmentation
   d. LRU page replacement algorithm. (20 Marks)

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