CS1551/CS512

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RAMAIAH INSTITUTE OF TECHNOLOGY

(Autonomous Institute, Affiliated to VTU)
Bangalore – 560 054

SEMESTER END EXAMINATIONS – JANUARY 2017

Course & Branch : B.E: Computer Science Engineering. **Semester : V**
Subject : Operating Systems **Max. Marks : 100**
Subject Code : CS1551/CS512 **Duration : 3 Hrs**

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT-I

1. a) Describe the various process API's provided by an operating system. CO1 (05)
   b) Explain the various steps for creation of a process. CO1 (07)
   c) Illustrate a process state diagram and show the trace for CPU bound and I/O bound processes. CO1 (08)

2. a) Describe limited direct execution protocol for context switching with a timeline. CO1 (08)
   b) Illustrate with a suitable program fork(), wait() and execvp() system calls. CO1 (06)
   c) Explain the various design goals of an operating system. CO1 (06)

UNIT-II

3. a) Consider the following set of processes with arrival time and burst time CO2 (08)

Process	Burst-Time	Priority	Arrival Time
P1	6	4	0
P2	5	2	1
P3	3	4	2
P4	5	3	3

Draw the Gantt chart and find the average waiting time and turnaround time by using the following scheduling algorithms
i) FCFS algorithm ii) Preemptive Priority algorithm.

   b) Identify the problems in implementing Multi Level Feedback Queue and provide the solutions for those identified problems. CO2 (06)
   c) Prove that "resource utilization using SJF scheduling algorithm is better than FCFS scheduling algorithm" with an example. CO2 (06)

4. a) Consider the following set of processes with arrival time and burst time ; CO2 (08)

Process	Burst-Time	Arrival Time
P1	7	0
P2	2	1
P3	3	2
P4	1	3

Draw the Gantt chart and find the average waiting time and turnaround time by using the following scheduling algorithms

i) Shortest Job First algorithm ii) Round-Robin algorithm(time slice=2ms)

	b)	List out and explain the different criteria to be considered for selecting best scheduling algorithm.	CO2	(06)
	c)	Explain any two issued in multiprocessor scheduling and also provide solutions for the same	CO2	(06)

UNIT-III

5.	a)	Write the equivalent assembly code for the following code and show the number of memory accesses required with a neat memory trace.
		int array[100];
		…
		for(i=0; i<100; i++)
		array[i]=0;
			CO3	(08)

	b)	Discuss in brief the implementation of different LRU approximation algorithms.	CO3	(06)
	c)	Consider the following page reference string 0,1,2,3,0,1,2,3,0,1,2,3,4,5,6,7 How many page faults would occur for the following replacement algorithms assuming 3 frames? (i) LRU replacement (ii) FIFO replacement(iii) Optimal replacement	CO3	(06)
6.	a)	Illustrate with a neat diagram and example hybrid approach of reducing the page table size.	CO3	(08)
	b)	Write the code snippet for Multi-level Page Table Control Flow.	CO3	(06)
	c)	A paging system has the following parameters: 2^32 bytes of physical memory, paging size of 2^10 bytes, 2^16 pages of logical address space and each page entry takes 4bytes. Answer the following using these data i) How many bits are there in logical address? ii)What is the size of logical and physical memory? ii) How many bits are there in physical address? iii) How many entries are there in page table? iv) What is the size of the page table?	CO3	(06)

UNIT-IV

7.	a)	Demonstrate the sequence of thread execution (three thread traces) with simple thread creation code.	CO4	(10)
	b)	Define the term monitor and provide the solution for dining philosopher problem using monitor.	CO4	(10)
8.	a)	With a program explain the working of pthread_join( ) function.	CO4	(10)
	b)	Explain briefly the methods used in the prevention technique to handle the deadlock.	CO4	(10)

UNIT-V

9.	a)	Describe briefly the shortest seek time first algorithm related to disk management with an example.	CO5	(08)
	b)	With a neat diagram describe the policy used by fast file system when it allocates memory for large files.	CO5	(06)
	c)	Discuss different fields of the inode structure that holds the metadata for a given file.	CO5	(06)

10.	a)	With a neat diagram explain the organization structure of a cylinder.	CO5	(06)
	b)	Define the following with respect to disk: i) Rotational delay ii) Seek time iii) Transfer time iv) Settle time	CO5	(08)
	c)	Suppose that a disk drive has 200 cylinders numbered from 0-199. The drive is currently serving a request at cylinder 90, the following is the queue of pending requests in FIFO order, 178, 47, 96, 52, 136, 172, 15 Starting from the current head position, what is the total distance that the disk arm moves to satisfy the pending requests for each of the following disk-scheduling algorithms? i. Shortest Seek Time First ii. C-SCAN	CO5	(06)

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