Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Computer Science and Technology
300 level 1st Semester Examination – Jul./Aug. 2016
CST322-2 Operating Systems and Concept Designs

Uva Wellassa University

Instructions to candidates
Duration: Two (02) hours
Number of questions: Four (04)
Mark allocation: 100
Answer all the questions

1.

a. Define the following terms in the context of operating system.
   i. Context switching
   ii. Convey effect
   iii. Degree of multiprogramming
   iv. Dispacher
   v. Rotational latency

(10 mark)

b. Consider the following set of processes with the length of the CPU burst time given in milliseconds.

Process	Arival Time	Burst Time
P1	0	16
P2	0	10
P3	6	4
P4	7	6
P5	8	10

   i. Draw Three(03) Gantt charts illustrating the execution of these processes using First Come First Served, Round Robin(quantum=2) and Round Robin(quantum=5) scheduling. (9 mark)
   ii. Calculate the average turnaround time of each scheduling algorithms? (6 mark)
   iii. Calculate the average waiting time of each scheduling algorithms? (6 mark)
   iv. Briefly explain how context switching varies according to time quantum in Round Robin Scheduling using Round Robin (quantum=2) and Round Robin(quantum=5) calculations. (5 mark)

2.

a. Explain the four(04) necessory conditions which lead to deadlock. (8 mark)
b. Write the Safety and Resource request algorithms of Banker's algorithm. (10 mark)
c. Consider the following snapshot of a system and answer the following questions using Banker's algorithm.
   i. List the data structures used in banker's algorithm. (4 mark)
   ii. Derive the Need matrix? (2 mark)

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iii. Is the system in a safe state?Justify your answer. (7 mark)

iv. Explain whether the request can be granted immediately if a new request from process P1 arrive for matrix (1,3,3,2)? (6 mark)

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	1	1	1	2	2	4	3	2	1	1	1	2
P1	2	1	2	0	5	3	4	2				
P2	1	2	1	1	2	2	2	2				
P3	1	0	1	1	1	0	2	1				

3.

a. Briefly explain demand paging concept in operating system. (6 mark)

b. Consider the following page-reference string. Find how many page faults would occur for the following replacement algorithms.(Frame size = 04)

3,4,2,4,1,5,3,6,4,2,4,1,2,4,5,1,2,3,4,5,6

i. LRU replacement
ii. FIFO replacement
iii. Optimal replacement

(9 mark)

4.

a. Suppose a disk drive has 5000 cylinders numbered from 0 to 4999. The drive is currently serving a request at cylinder 143 and the previous request was at cylinder 125. FIFO order of the pending requests queue is given below.

66, 1470, 813, 1584, 948, 150, 1022, 1830, 130.

Calculate the total distance (in cylinders) from the current head possition,that the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms?

i. FCFS
ii. SSTF
iii. C-SCAN
iv. LOOK

(12 mark)