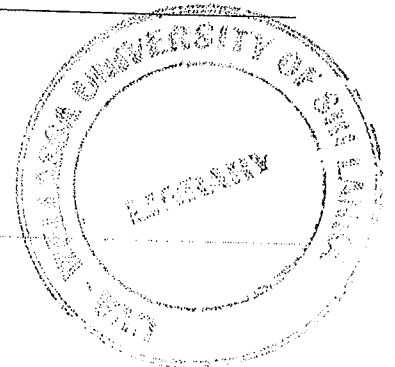


**Uva Wellassa University of Sri Lanka**  
**Faculty of Science and Technology**  
**Department of Computer Science and Technology**  
**300 level 1<sup>st</sup> Semester Examination – Jul./Aug. 2016**  
**CST322-2 Operating Systems and Concept Designs**



**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. Dispatcher
  - 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) necessary 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)

- 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 position, 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)