



EASTERN UNIVERSITY, SRI LANKA
EXTERNAL DEGREE EXAMINATION IN SCIENCE – 2009/2010
SECOND YEAR, FIRST SEMESTER (May/June, 2012)

EXTCS 202 – OPERATING SYSTEMS

(Proper and Repeat)

Answer all questions

Time allowed: 2 hours

Q1

- State clearly what an operating system is and briefly describe the functions of an operating system.
- State the advantages of a spooling system over a batch processing system.
- Describe briefly the process state transition model. You should describe each of the states and explain how the state of a process changes from one to another.
- Explain the operating systems responsibility when a process is created and terminated.
- Describe briefly Job Scheduling and CPU scheduling.
- Describe briefly the process interrupting policies and explain those with the aid of suitable examples.
- Describe briefly the Critical Section problem with regard to process synchronization.

Q2

- Define the following terms with regard to process scheduling.
 - Response time
 - Turnaround time
 - Waiting time
- Explain the Round Robin scheduling giving its advantages and disadvantages.
- Consider the following set of processes, with the arrival times and the length of the CPU-burst times given in milliseconds.

Process	Burst time	Arrival time
A	7	0
B	3	1
C	7	3
D	4	5
E	3	7
F	6	12

- (i) Draw the Gantt chart for each of the following scheduling algorithms
- (α) Round robin (using a time quantum of 4 milliseconds)
 - (β) Pre-emptive Shortest job next
- (ii) Calculate the waiting time and the turnaround time for each process using each of those scheduling algorithms in part (i). Also compute the average waiting time and the average turnaround time for each of those algorithms.
- (iii) Identify the scheduling algorithm from part (i) that result in the minimal average waiting time.

Q3

- a) State clearly what it meant by process deadlock and state the necessary conditions for deadlock to occur.
- b) How can you prevent the system from a deadlock?
- c) Consider the snapshot of system operation described below:

The system has four processes namely, P1, P2, P3 & P4 and seven resources namely R1, R2, R3, R4, R5, R6 & R7.

- P1 holds R1 and requests R4
- P2 holds R6 and requests R2
- P3 holds R2, R5 & R7
- P4 holds R3 & R4 and requests R7

- (i) Draw the corresponding resource allocation graph.
- (ii) State with reasons whether the system is in a deadlocked state or not.
- (iii) If a request from P3 arrives for additional resource R1, show the new state of system and verify the system is now safe or not.

Q4

- a. What do you understand by “memory fragmentation”?
- b. Explain briefly the paged memory management scheme with the aid of a diagram.
- c. Explain the following memory allocation methods.
- First-fit allocation.
 - Best-fit allocation.



d. The following tables focus the job details and the list of memory blocks of a system.

Job List

Job No	Memory requested
J1	20
J2	10
J3	15
J4	30

Memory List

Memory Location	Block Size
100	30
200	15
300	50
400	20
500	10

- (i) You are requested to allocate the jobs in the memory and to find the fragmentation using the above two allocation methods.
- (ii) Which is the most efficient allocation policy for the particular problem given above? Justify your answer.