EASTERN UNIVERSITY SRI LANKA
DEPARTMENT OF MATHEMATICS
SECOND EXAMINATION IN SCIENCE – 2008/2009
FIRST SEMESTER (Feb./March, 2010)

CS 202 – OPERATING SYSTEMS

(Proper and Repeat)

Answer all questions

Time: 2 Hours

1.
a. What is 'race condition' in process synchronization?
b. Discuss the problems with concurrent execution of processes.
c. Describe the Critical Section problem of process synchronization.
d. Explain the use of semaphores in process synchronization.
e. Suggest a solution to the Critical Section problem using semaphores.

2.
a. Describe the spooling batch processing system.
b. Draw a diagram to show the changes on the state of a process.
c. Given the following information:

Process	CPU Burst	Arrival time
P1	5	0
P2	1	2
P3	4	6
P4	3	8
P5	2	13
P6	10	14

i. Draw the Gantt chart for each of the following scheduling algorithms and calculate the average waiting time and average turnaround time for each algorithm.
- Round robin scheduling (using a time quantum of 4);
- Shortest Job Next scheduling (Pre-emptive).

ii. Which is the most efficient algorithm for the particular problem? Justify your answer.

(P.T.O)

3. a. How do you confirm that a system is in deadlocked state?

   b. Describe the resource allocation graph and wait for graph. Use appropriate diagrams to support your answer.

   c. Consider the snapshot of system operation described below:

   The system has five processes namely, **P1, P2, P3, P4 & P5** and three resource namely **R1** (with 3 instances), **R2** (with 2 instances) and **R3** (with 2 instances).

   - P1 holds 2 instances of **R1** and requests an instance of **R2**
   - P2 holds an instance of **R2** and requests an instance of **R3**
   - P3 holds an instance of **R1**
   - P4 holds an instance of **R2** and requests an instance of **R3**
   - P5 holds an instance of **R3** and requests an instances of **R1 & R2**

   i. Draw the resource allocation graph and wait for graph for the above system.

   ii. Examine the system for deadlock, if it does, list the processes involved in system. Justify your answer.

4. a. Discuss the *First fit* and *Best fit* memory allocation schemes.

   b. What do you understand by "*memory fragmentation*"?

   c. List two advantages and two disadvantages of the paged memory allocation poli

   d. The following table shows the job details and the list of memory blocks of the system:

Job List:

Job no	Memory requested (Kb)
J1	20
J2	30
J3	10
J4	20
J5	15

Memory List:

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

   I. You are requested to allocate the jobs in the memory and to find fragmentation using first fit and best fit memory allocation methods.

   II. Which is the most efficient allocation scheme for the particular problem g above? Justify your answer.