EASTERN UNIVERSITY, SRI LANKA
DEPARTMENT OF MATHEMATICS
SECOND YEAR EXAMINATION IN SCIENCE-2012/2013
FIRST SEMESTER (MAR. / APR. , 2016)
CS 202 – OPERATING SYSTEMS
PROPER & REPEAT

Time allowed: 2 Hours

Answer all questions

Q1. An Operating System is a program that acts as an intermediary between a user of a computer and the computer hardware.

a. What are the significant features of **Multitasking** and **Multiprogramming**?

b. What is **Spooling**? Why is it used?

c. State the difference between **Process** and **Program** in Operating System.

d. Draw the process state diagram and explain briefly each state of a process.

e. Briefly explain the types of schedulers that are handled by the Operating System.

Q2. CPU scheduling is the method to select from among the processes in memory that are ready to execute, and allocates the CPU to one of them.

a. Describe the **Shortest Job First scheduling** giving its advantages and disadvantages.

b. Explain how size of the time quantum used in Round Robin scheduling affects the performance of CPU scheduling.

c. Compare various scheduling algorithms in Operating System.

d. Consider the following set of processes, with arrival times and length of the CPU burst times given in milliseconds.

Process	Burst Time	Arrival Time
P1	17	0
P2	25	12
P3	8	28
P4	32	36
P5	18	46

I. Draw the Gantt chart for the following scheduling algorithms:
   a. Preemptive Shortest Job First.
   b. Round Robin (using a time quantum of 10 milliseconds).

II. Calculate the waiting time and the turnaround time for each proces each of those scheduling in part (I). Also compute the average wai and the average turnaround time for each of those algorithms.

III. Identify the scheduling algorithm from part (I) that result in t average waiting time.

Q3. A cooperating process is one that can affect or be affected by other processes e in the system.

a. What do you understand by **Race Condition**? Explain using a suitable exa

b. Explain the **Dining Philosophers Problem** of process synchronization and semaphores could be used to solve the problem.

c. Briefly explain what it meant by **Deadlock** and state the necessary conditio deadlock to occur.

d. Consider the snapshot of system operation described below:
   The system has three processes namely P1, P2 & P3 and three resources nam R2 and R3. R1 has two instances, R2 has two instances and R3 has one inst
   - P1 holds R2,R3 and requests R1
   - P2 holds R1 and requests R2
   - P3 holds R2,R3

   I. Draw the corresponding Resource Allocation Graph.
   II. State with reasons whether the system is in a deadlocked state or not.

Q4. Memory management is the functionality of an operating system which handles o manages primary memory.

a. Describe the following memory allocation methods:
   I. First-fit allocation,
   II. Best-fit allocation.

b. Explain the difference between **Internal** and **External** fragmentation.

c. Distinguish between **Paging** and **Segmentation** in memory management.

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

Job List

Job No	Memory Requested
J1	115
J2	500
J3	358
J4	200
J5	375

Memory List

Memory Location	Block Size
100	300
400	600
800	350
1000	200
1800	750
2000	125

I. Use the first-fit and best-fit memory allocation policies to allocate the memory blocks to the jobs given and calculate the memory fragmentation in each case.

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