EASTERN UNIVERSITY, SRILANKA
SECOND EXAMINATION IN SCIENCE (2007/2008)
(December/ January, 2008)
CS 202 – OPERATING SYSTEMS
(Proper and Repeat)

swer all questions **Time allowed: 2 Hours**

1)

a. Define the terms "Job Scheduling" and "CPU Scheduling".

b. Draw the process state diagram and briefly explain each state transition.

c. Define the operations **P(s)** and **V(s)** on a semaphore '**s**'.

d. The following is a skeleton of the solution of the Producer Consumer problem using (counting) semaphores:

```
Producer
do {
    /* produce data */
    P(_ _ _ _);
    P(_ _ _ _);
      /* write the data into the buffer */
    V(_ _ _ _);
    V(_ _ _ _);
} while (1);
```

```
Consumer
do {
    P(_ _ _ _);
    P(_ _ _ _);
      /* remove data from the buffer */
    V(_ _ _ _);
    V(_ _ _ _);
      /* consume the data */
} while (1);
```

i. What do you understand by the "Producer Consumer problem"?

ii. Define the required semaphores giving their initial values. Insert the appropriate semaphore into **P()** and **V()** operators to give the correct solution.

2)

a. Define the "Response time", "Waiting time" and "Turn around time".

b. What do you understand by the "Context Switching"?

c. Explain the "Priority scheduling" giving advantages and disadvantages.

d. Given the following information:

Process	Arrival time	Burst time
A	0	6
B	3	2
C	5	1
D	9	7
E	10	5
F	12	3
G	14	4
H	16	5

i. Draw the Gantt chart for each of the following scheduling algorithms and calculate the average waiting time and average turn around time for each algorithm.

- Round robin (using a time quantum of 4);
- Pre-emptive Priority scheduling.

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

Q3)

a. Define "**Deadlock**"?

b. Describe the necessary conditions for a dead lock to occur.

c. How do you recover the system from a dead lock?

d. Consider the following system with 6 processes and 4 resources:

- Process P1 holds R1 and wants R2 and R3.
- Process P2 holds nothing but wants R2 and R3.
- Process P3 holds nothing but wants R3 and R4.
- Process P4 holds R2 and wants R1.
- Process P5 holds R3 and wants R2.
- Process P6 holds R4 and wants R2 and R3.

i). Draw the "Resource Allocation Graph" for the above system.
ii). Draw the "Wait for graph" for the above system.
iii). Examine the system for deadlock situation and if the system is deadlocke processes involved in deadlock, justify your answer.

Q4)

a. Describe the Fixed partitioning and Dynamic partitioning schemes.

b. Explain the First-fit and Best-fit memory allocation schemes.

c. Explain the memory deallocation methods for the following scenarios in the dyn partitioning scheme.

- Memory block to be deallocated is isolated from the other free blocks;
- Memory block to be deallocated is adjacent to another free block;
- Memory block to be deallocated is between two free blocks;

d. The following tables focus the free and busy list of memory blocks of a dyn partitioned system:

Free list:

Beginning address	Memory block size	Status
5225	5	free
6785	600	free
7560	20	free
7800	5	free
10250	4050	free

Busy list:

Job name	Beginning address	Memory block size	Status
A	7580	20	busy
B	7600	200	busy
C	7805	1000	busy
D	8805	445	busy
E	9250	1000	busy

If the jobs finish its execution one after the other in the following order, show the fre after the completion of each job.

I. Completion of Job B.
II. Completion of Job A
III. Completion of Job D