EASTERN UNIVERSITY, SRI LANKA

DEPARTMENT OF MATHEMATICS

EXTERNAL DEGREE EXAMINATION IN SCIENCE – 2005/2006

SECOND YEAR, FIRST SEMESTER (March/ May, 2010)

EXTCS 202 – OPERATING SYSTEMS

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

Discuss the operating systems responsibility when a process termination taken place.

Define the two interrupting policies that can be imposed on scheduling.

Describe the *priority scheduling* algorithm.

Given the following information:

Process	CPU Burst	Arrival time
A	10	0
B	3	2
C	4	6
D	1	8
E	2	13
F	5	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.
   - 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.

a. What is '*race condition*' in process synchronization?
b. Describe the operations ***P(s)*** and ***V(s)*** on a *semaphore* ***'s'***.
c. What do you understand by the *Producer Consumer problem* of process synchronization?
d. Explain how the semaphore can be used to solve the *Producer Consumer problem*? You may use the following skeletons of producer and consumer processes, stating the name and initial values of the semaphores.

(P.T.O)

Q2. (cont...)

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);
```

3. a. Define *'Deadlock'*.

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

c. Consider the snapshot of system operation described below (with 5 processes ar 4 resources):

- Process **P1** holds resource **R2** and wants **R1**
- Process **P2** holds resource **R3** and wants **R1 & R2**
- Process **P3** wants resources **R1, R2, R3 & R4**
- Process **P4** wants resource **R3 & R4**
- Process **P5** holds Resource **R1 & R4.**

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

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

iii. Suggest one operation (request or resource allocation) in the system wi could lead the system into a deadlocked state.

4. a. Discuss two memory partitioning methods giving merits and demerits of them.

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

c. 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	20
J3	10
J4	30
J5	15

Memory List:

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

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

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