The Open University of Sri Lanka
Department of Mathematics and Computer Science
B.Sc. Degree Programme: Level 05
No Book Test (NBT) 2 - 2011/2012
CPU3242 – Operating Systems
Duration: One and Half Hours

Date: 19/10/2011   **Time: 4.00pm – 5.30pm**

Answer All Questions

QUESTION 1

1.1)   Why we need memory management in an operating system? Give 2 features each for *static allocation* and *dynamic allocation* of memory to a program.

1.2)   Explain the difference between a logical address and a physical address.

1.3)   Suppose the free memory manager of an operating system has the following unallocated blocks of memory namely A to E with below mentioned sizes. Two incoming processes P and Q requests for a 10KB of memory and 12KB of memory from the memory manager respectively. The process P comes first to the queue of the memory manager.

Free Block Name	Block Size
A	7KB
B	13KB
C	17KB
D	11KB
E	15KB

State the <u>name of the free block</u> that is allocated to each of the incoming processes P and Q based on the following algorithms. State all the assumptions you make.
   i.   Best Fit
   ii. Worst Fit
   iii. First Fit
   iv. Next Fit

1.4)   (i) What is the best algorithm in terms of the free block allocation speed from the list of algorithms mentioned in 1.3?

        (ii) Give the amount of total internal fragmentation after allocating memory to processes P and Q under first fit algorithm.

QUESTION 2

2.1)   What is the difference between a *page* and a *page frame* in the context of memory management?

2.2)   Explain the purposes of having *dirty bit, reference bit* and *present/absent bit* in a page table entry?

2.3)   Give the difference between *Raid 0* and *Raid 1* disk management schemes.

QUESTION 3

3.1)   What are the two basic properties of a password? Give 3 good mechanisms in determining a good password.

3.2)   Name two mechanical sources of having disk access latency.

3.3)   Suppose a disk drive has 4000 cylinders which are numbered from 0 to 3999. The drive currently services a request at cylinder 93 and the previous request was cylinder 103. The queue of pending requests in order as follows; 190,2700,870,1550,660,1900,1150,1450,110.

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms? (show the appropriate steps in your calculations)

   (i) FCFS
   (ii) SSTF
   (iii)SCAN