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Nepal College Of Information Technology
Balkumari, lalitpur
Applied Operating System Assignment Sheet -2

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Q.1 Explain the difference between internal and external fragmentation.

Q.2 Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)?Which algorithm makes the most efficient use of memory?

Q.3 Why are segmentation and paging sometimes combined into one scheme?

Q.4 Consider the following segment table:

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

What are the physical addresses for the following logical addresses?
   a. 0,430
   b. 1,10
   c. 2,500
   d. 3,400
   e. 4,112

Q.5 What is the purpose of paging the page tables?

Q.6 What is the minimum number of page faults for an optimal page replacement strategy for the following reference string with four page frames? Now repeat this problem for LRU, Second Chance, FIFO, NRU, MFU.
   1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 5, 4, 2.

Q.7 What is the cause of thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem?

Q.8 A computer has four page frames. The time of loading, time of last access, and the *R* and *M* bits for each page are as shown below (the times are in clock ticks):

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Page	Loaded	Last ref.	R	M
0	126	280	1	0
1	230	265	0	1
2	140	270	0	0
3	110	285	1	1

(a) Which page will NRU replace?
(b) Which page will FIFO replace?
(c) Which page will LRU replace?
(d) Which page will second chance replace?

Q.9 Consider a file system that uses a modifed contiguous-allocation scheme with support for extents. A file is a collection of extents, with each extent corresponding to a contiguous set of blocks. A key issue in such systems is the degree of variability in the size of the extents. What are the advantages and disadvantages of the following schemes?

a. All extents are of the same size, and the size is predetermined.

b. Extents can be of any size and are allocated dynamically.

c. Extents can be of a few fixed sizes, and these sizes are predetermined.

Q.10 Fragmentation on a storage device could be eliminated by recompaction of the information. Typical disk devices do not have relocation or base registers (such as are used when memory is to be compacted), so how can we relocate files? Give three reasons why recompacting and relocation of files often are avoided.

Q.11 Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is

        86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130

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?

        a. FCFS   b. SSTF   c. SCAN   d. C-SCAN

Q.12 What are the advantages and disadvantages of supporting memory mapped I/O to device control registers?

Q.13 Explain the difference between deadlock, livelock and starvation.

Q.14 Differentiate between segmentation and paging.

Q.15 Explain Producer Consumer Problem using semaphore.