

# Computer Operating Systems

## Problem#1

Explain the basic method of paging. Include descriptions of:

- a. Its advantages over earlier methods of memory management
- b. necessary hardware support,
- c. basic page table implementation, (You do not need to discuss hierarchical or multilevel paging, hashed or inverted page tables),
- d. the role of a translation lookaside buffer (TLB),
- e. valid/invalid bits
- f. what pages can be shared and how shared pages are implemented.

## Problem #2

- a. What is the Optimal Page Replacement Strategy? Explain how Least Recently Used (LRU) approximates this and what is its difficulties or disadvantages. Can you suggest how a LRU type algorithm could be implemented in a system which has a modified bit but not a referenced bit?
- b. Illustrate Optimal and LRU assuming 3 pages may be held in memory and references are to page numbers :  
7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1  
State any assumptions you make and comment on the results?

## Problem#3

Explain briefly the following seek algorithms:

FCFS, SSTF, SCAN, C-SCAN.

Give a sequence of track requests for each algorithm which could result in indefinite postponement, if such exists.

If 2 or more requests come sequentially for the same track, how should each algorithm handle them. Justify your answer.