

## ASSIGNMENT No.

- (\*) TITLE : Write a java program (using OOP features) to implement paging simulation using
- 1) Least Recently Used (LRU)
  - 2) Optimal Algorithm.

- (\*) SOFTWARE AND HARDWARE REQ :  
Netbeans, gcc etc.

- (\*) THEORY :

### ① Page Replacement :

Page Replacement Algorithm are techniques using which an operating system decides which memory pages of memory to swap out, write to disk when a page of memory needs to be allocated. Paging happens whenever a page fault occurs and a free page cannot be used for allocation purpose accounting to reason that pages are not available or no. of free pages is lower than required pages.

### ② Reference String :

The string of memory reference is called reference string. These are generated artificially or by tracing a given system and recording the address of each memory references for a given page size, we need to consider only the page no, not the entire address.

## # LRU Page Replacement:

If the optimal algorithm is not feasible, perhaps an approximation of the optimal algorithm is possible. The key distinction b/w the FIFO and OPT algorithm is that the FIFO algo. uses the time when pages was brought into memory whereas OPT algorithm uses the time when pages is to be used. If we use the recent past as an approximate of near future, then we can replace the page that has not been used for longest period of time. This approach is LRU algorithm.

Eg:

7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 | 7 0 |

frame size = 3

7	0	1	2	0	3	0	4	2											
7	7	7	2		2		4	4											
	0	0	0		0		0	0											
		1	1		3		3	2											
0	3	2	1	2	0	1	7	0	1										
0			1		1		1												
3			3		0		0												
2			2		2		7												

Page fault = 12



(\*) Optimal Algorithm:

It is difficult to implement because it requires future knowledge of reference string as a result the optimal algorithm is used to mainly for comparison studies.

An optimal page replacement algorithm has the lowest page-fault rate of all algorithms exists & has been called OPT or MIN.

Replace the page that will not be used for the longest period of time use the time when a page is to be used.

eg: 7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1

frame size = 3

7	0	1	2	0	3	0	4	2	3	0
7	7	7	2		2		2			2
	0	0	0		0		4			0
		1	1		3		3			3

3	2	1	2	0	1	7	0	1
		2				7		
		0				0		
		1				1		

Page fault = 9

RU

(\*) CONCLUSION:

Hence, we have studied implementation of paging simulation using LRU & optimal algorithm.