

#### Republic of the Philippines Tarlac State University **COLLEGE OF COMPUTER STUDIES**

Tarlac City, Tarlac Tel. No. (045) 6068173



## A case study In partial fulfillment of the requirements for the course Operating Systems

### Implementation of the Page Replacement Algorithms (FIFO, LRU and Optimal Algorithm)

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#### I. DOCUMENTATION

#### 1. First Sample Input

Reference String: 7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1

Number of Page Frames: 3

Page Replacement Algorithms													
Page Frames: 3 Reference Page Strings: 7.0.12.0.3.0.42.3.0.3.2.1, CALCULATE.													
First-In-First-Out (FIFO)  Page Faults: 45													
7 7 7 2 2 2 2 4 4 4 0 0 0 0 0 0 7 7 7 0 0 0 0 0 3 3 3 2 2 2 2 2 1 1 1 1 0 0 0 1 1 1 1 1 0 0 0 1 3 3 3 3													
Optimal Algorithm  Fage Faults: 9													
7 7 7 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 7 7 7 0 0 0 0													
Least Recently Used (LRU)  Page Faults 12													
7 7 7 2 2 2 2 4 4 4 0 0 0 1 1 1 1 1 1 1 1 0 0 0 0 1 1 1 1													
Analysis													
Algorithm													
AREST REVENUELY OPER (MINO) A.E.													

Algorithm	Page Faults
First-In-First-Out (FIFO)	15
Optimal (OPT)	09
Least Recently Used (LRU)	12

Table 1: First Input Results

Table 1 shows that the Optimal Algorithm has the fewest page faults (09). While the Least Recently Used (LRU) Algorithm had slightly more page faults (12), and the First-In-First-Out (FIFO) Algorithm ended up with the most page faults (15) overall.



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#### 2. Second Sample Input

Reference String: 7,9,1,2,6,3,5,4,2,3,7,3,2,1,2,5,1,7,6,1

Number of Page Frames: 4

Page Replacement Algorithms														
Page Frames: 4		Re	CALCULATE											
	F	irst-I		st-Out (	FIFO)									
1 1 1	3 3 1 5	5	3 3	5 3		7	7 3	3	7 6 3 3	6				
	Optimal Algorithm  Page Faults 25													
7 7 7 7 7 0 0 0 6	3 3 1 5	3 4	3 3 4 4	3 3 4 4	3 1 4 4	4	5	5	1 1 5 5	5				
	Least Recently Used (LRU)  Page Faults: 14													
		3 5	3 3 5 5	3 3 7 7	3 3 7 7 4 4	3 7	3 5	3 5	7 7 5 5	7 5				
Analysis														
		ithm t-Out (FIF Algorithm		Page Fau 14	lts									
	Leas	t Recently	y Used (Li	RU)	14									

Algorithm	Page Faults
First-In-First-Out (FIFO)	14
Optimal (OPT)	11
Least Recently Used (LRU)	14

Table 2: Second Input Results

Table 2 shows that the Optimal Algorithm had the fewest page faults again (11). The Least Recently Used (LRU) Algorithm and the First-In-First-Out (FIFO) Algorithm had the same total of page faults (14).



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#### 3. Third Sample Input

Reference String: 3,5,9,8,6,6,7,8,7,5,3,6,8,1,4,8,6,8,2,4,5

Number of Page Frames: 5

Page Replacement Algorithms																					
Р	Page Frames: 5							Reference Page Strings: 3.5.9.8.6.8.7.8.7.5.3.6.8.1.4;											LATE		
Fi								st-Iı	n-Fi	rst-	Out	(FI	FO)								
									Page Faults: 13												
	3	3 3	3	3	3	7	7	7	7	7	7	7	7	7	7	6	6	6	6		
		5 5	5	5	5	5	5	5	5	3	9	9	1	3	3	3	3	1	1	2 5	
		,	8	8	8	8	8	8	8	8			8	4		4		4	4		
				6	6	6	6	6	6	6	6	6	6	6	8	8	8	8	8	8	
	Optimal Algorithm																				
	Optimai Ați Page Faul												•								
	3	3 3	3	3	3	3	3	3	3	3	3	3	1	4	4	4	4	4	4	4	
		5 5	5			5	5		5	5			5			5	5	5	5		
		9	9	9	9	7	7	7		7	7		7	7	7	7	7	2	2	2	
			8	6	6	6	6	6	8	6	6	6	6	6	6	6	6	6	6	6	
	6 6 6 6 6 6 6 6 6 6 6 6 6 6																				
						1	Leas	st R		-	Use	d (I	RU	)							
									Pag	e Faul	ts: 11										
		3 3	3							7		7		1		1		1	i		
		5 5	5	5	5	9	9	5	5	3	3	3	3	3	3	3	3	2	2	4	
			8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8		8	
				6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
									An	aly	sis										
Algorithm Page Faults																					
First-In-First-Out (FIFO) 13																					
Optimal algorithm 9  Least Recently Used (LRU) 11																					

Algorithm	Page Faults
First-In-First-Out (FIFO)	13
Optimal (OPT)	9
Least Recently Used (LRU)	11

Table 3: Third Input Results

Table 3 shows that the Optimal Algorithm wins with the least number of page faults (9). The Least Recently Used (LRU) Algorithm comes next with 11 total page faults, and the First-In-First-Out (FIFO) Algorithm comes last with 13 total page faults.