

Worksheet 10 Attempt

1) Reference String = Virtual address

Page size (whole #)

10 11 104 170 73 309 185 245 246 434 458 304

Page size

100	0	0	1	1	0	3	1	2	2	4	4	3
200	0	0	0	0	0	1	0	1	1	2	2	1

2.) Page = $\frac{\text{Virtual address}}{\text{page size}}$ (whole #)

VA	2581	4029	1981	1189
Pg	5	7	3	2

Time t	0	1	2	3	...	i	...
Frame	0					0	
	1					7	
	2					→ 2	
	3					5	

VA	Page
2581	5
4029	7
1981	3
1189	2

← fault @ i+1

3.)

Time t	1	2	3	4	5	6	7	8	9	10	11	12	13	14
RS	0	1	4	0	2	3	0	1	0	2	3	4	2	3
Frame 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	4	4	4	4	4	1	1	1	4	4	4	4
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

X X X

optimal

b)

Time t	1	2	3	4	5	6	7	8	9	10	11	12	13	14
RS	0	1	4	0	2	3	0	1	0	2	3	4	2	3
Frame 0	0	0	4	4	4	4	4	4	4	4	3	3	3	3
1	1	1	1	0	0	0	0	0	0	0	0	4	4	4
2	2	2	2	2	2	2	2	1	1	1	1	1	1	1
3	3	3	3	3	3	3	3	3	3	2	2	2	2	2

X X X X

FIFO

c)

Time t	1	2	3	4	5	6	7	8	9	10	11	12	13	14
RS	0	1	4	0	2	3	0	1	0	2	3	4	2	3
Frame 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	3	3	3	3	3	3	3	3	3
2	2	2	4	4	4	4	4	1	1	1	4	4	4	4
3	3	3	3	3	2	2	2	2	2	2	2	2	2	2

X X X X X

Pg fault

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

LU

4.)

Time t	1	2	3	4	5	6	7	8	9	10	11	12
RS	0	1	2	3	0	1	4	0	1	2	3	4
Frame → 0	0	1	2	3	0	1	4	0	1	2	3	4
		X	X	X	X	X	X	X	X	X	X	X

} 1 Frame
11 faults

Time t	1	2	3	4	5	6	7	8	9	10	11	12
RS	0	1	2	3	0	1	4	0	1	2	3	4
Frame → 0	0	0	2	2	0	0	1	1	1	1	3	3
1	1	1	1	1	3	3	1	1	0	0	2	4
			X	X	X	X	X	X	X	X	X	X

} 2 Frames
10 faults

Time t	1	2	3	4	5	6	7	8	9	10	11	12
RS	0	1	2	3	0	1	4	0	1	2	3	4
Frame → 0	0	0	0	3	3	3	4	4	4	4	4	4
1	1	1	1	1	1	0	0	0	0	2	2	2
2	2	2	2	2	2	1	1	1	1	1	3	3
				X	X	X	X			X	X	

} 3 Frames
6 faults

Time t	1	2	3	4	5	6	7	8	9	10	11	12
RS	0	1	2	3	0	1	4	0	1	2	3	4
Frame → 0	0	0	0	0	0	0	4	4	4	1	3	3
1	1	1	1	1	1	1	1	0	0	0	0	4
2	2	2	2	2	2	2	2	2	1	1	1	1
3	3	3	3	3	3	3	3	3	3	2	2	2
							X	X	X	X	X	X

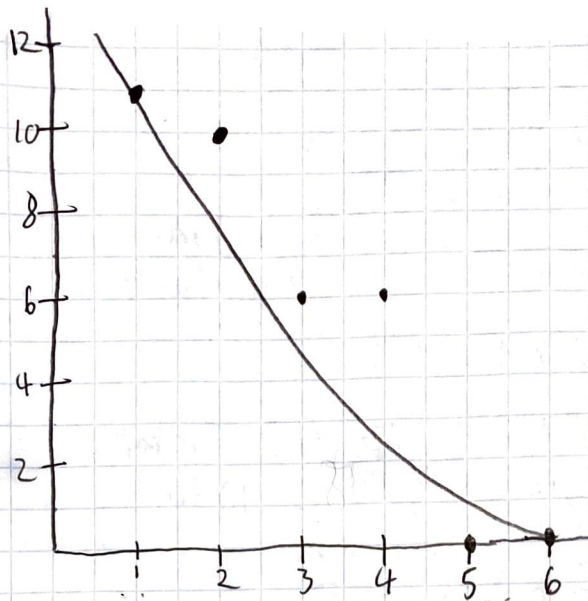
} 4 Frames
6 Faults

Time t	1	2	3	4	5	6	7	8	9	10	11	12
RS	0	1	2	3	0	1	4	0	1	2	3	4
Frame 0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4	4

} 5 Frames
0 Faults

- 6 frames would also have zero faults since $5 < 6$.

Number of Faults



# Frames	# Faults
1	11
2	10
3	6
4	6
5	0
6	0
7	0

- From the above graph, we can see that as the number of frames increases, the number of faults decreases exponentially until reaching zero at 5 total frames. This inverse relationship seems to imply that increasing the total number of frames will decrease the total number of faults until a certain threshold is met; then it becomes unnecessary to add additional frames.