

8.20 Assuming a 1-KB page size, what are the page numbers and offsets for the following address references (Provided as decimal)

a. 3085 $\xrightarrow{\text{Page Size}} 3085 \div 1024 = 3.01 = 3 \text{ page numbers}$

offset $\rightarrow 3085 \bmod 1024 = 13 \text{ offset}$

b. 42095 $\xrightarrow{\text{Page Size}} 42095 \div 1024 = 41.11 = 41 \text{ page numbers}$

offset $\rightarrow 42095 \bmod 1024 = 111 \text{ offset}$

Since the paper size is 1-kb (1024 bits or 2^{10}). In conclusion we use this value to solve for both Page numbers & offsets

8.23 consider a logical address space^{256 Pages} with a 4-KB page size, mapped onto a physical memory of 64 frames.

a. How many bits are required in the logical address?

Pages \times Page Size $\rightarrow 256 \times 4096 = 2^8 \times 2^{12} = 2^{20}$

20 bits are required

b. How many bits are required in the physical address?

of Frames \times Frames (Page Size) $\rightarrow 64 \times 4096 \rightarrow 2^6 \times 2^{12} = 2^{18}$
18 bits

8.24 Consider a computer system with a 32-bit logical address and a 4-KB page size. The system supports up to 512 mb of physical memory. How many entries are there in the following? \leftarrow Means Pages

a. A conventional single-level page table

32 bit computer $= 2^{32}$

1024 bits = 1kB \rightarrow 4kB = 4096 $\rightarrow 2^{12}$

$\frac{2^{32}}{2^{12}} = 2^{20}$
Pages

HW 5 - Page Faults

9.21 Consider the following page reference string

7, 2, 3, 1, 2, 5, 3, 4, 6, 7, 7, 1, 0, 5, 4, 6, 2, 3, 0, 1

Assuming demand paging with three frames, How many page faults would occur for the following replacement algorithms?

FIFO

~~LRU~~ replacement (3 frames)

7	2	3	1	2	5	3	4	6	7	7	1	0	5	4	6	2	3	0	1
7	7	7	1		1		1	6	6		6	0	0	0	6	6			
	2	2	2		5		5	5	7		7	7	5	5	5	5			
		3	3		3		4	4	4		1	1	1	4	4	4			

3	0	1
6	0	0
2	2	1
3	3	3

17 page faults

LRU

~~FIFO~~ replacement (3 frames)

x ————— Least Recently Used

7	2	3	1	2	5	3	4	6	7	7	1	0	5	4
7	7	7	1		1	3	3	3	7		7	7	5	5
	2	2	2		2	2	4	4	4		1	1	1	4
		3	3		5	5	5	6	6		6	0	0	0

6	2	3	0	1
5	2	2	2	1
4	4	3	3	3
6	6	6	0	0

18 page faults