

Exercise session
(Memory management)

Operating Systems – EDA093/DIT401

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Exercise 1

- Suppose a process P has size of 100 bytes. Compute (1) the number of wasted bytes caused by internal fragmentation if the page and frame sizes are set to 2^4 bytes and (2) the size of the page table.

Exercise 1 - solution

- Page size = 16 bytes
- Number of pages required = $\text{ceil}(100/16) = 7$
- Wasted bytes because of internal fragmentation $16 - 100\%16 = 12$ bytes
- Page table = $7 * (8) = 56$ bits

Exercise 2

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

2375

19366

30000

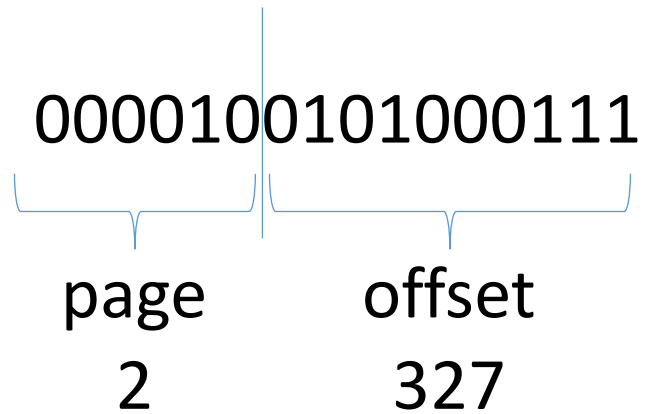
256

16385

Exercise 2 - solution

$$1 \text{ KB} = 2^{10}$$

2375



...

Exercise 3

Consider the following segment table:

| Segment | Base | Length |
|---------|------|--------|
| 0 | 219 | 600 |
| 1 | 2300 | 14 |
| 2 | 90 | 100 |
| 3 | 1327 | 580 |
| 4 | 1352 | 96 |

Tell which physical address would be accessed for the following logical addresses

0,430

1,10

2,500

3,400

4,112

Exercise 3 - solution

$$219 + 430 = 649$$

$$2300 + 10 = 2310$$

illegal reference, trap to operating system

$$1327 + 400 = 1727$$

illegal reference, trap to operating system