

Exercise

A virtual memory system with on-demand paging uses a page size of 512 words, a virtual memory of 16 pages numbered from 0 to 15, and a physical memory of 4 frames numbered from 0 to 3. The current content of memory is:

#Frame	Page
0	Pág. 4 of process
1	Pág. 9 of process
2	Pág. 5 of process
3	Pág. 1 of process

- Show the content of the page table.
- Physical addresses equivalent to logicals 1628, 851, 2700 y 2432.
- What does it happen when logical address is used 1330?

Solution

- Looking at the content of RAM and considering that the page table of the process has a descriptor per page, the answer is:

Page	Frame	Valid Bit
0		0
1	3	1
2	-	0
3	-	0
4	0	1
5	2	1
6	-	0
7	-	0
8	-	0
9	1	1
10	-	0
11	-	0
12	-	0
13	-	0
14	-	0
15	-	0

- Address translation is made looking up the page table:

Page = logical address / page size = logical address / 512

Offset = logical address *mod* page size

Physical address = Frame * 512 + offset

Logical address	Page	Offset	Physical address
1628	3	92	604
851	1	339	1875
2700	5	140	1164
2432	4	384	384

- c) If the logical address 1330 is referenced, a page fault is obtained because this logical address belongs to page 2, whose validity bit is 0 in the page table. Thus, page 2 is not in RAM memory and the memory manager raises a page fault.