

Quiz (Lecture 6)

Your name:

Q1: (2.5 points) Indicate if each of the following statements is true (T) or false (F):

- The size of each entry of the page table is determined by the size of the virtual memory T F
- The number of entries of the page table is determined by the size of virtual memory T F
- Two processes may share a page in the virtual memory T F
- A page fault causes a trap (exception) which invokes the operating system T F
- The page table entry of a page that is used by a process has a valid bit = 1 T F

Q2: (3 points) Complete the following sentences:

In an architecture with 40-bit virtual byte address, 2MB of physical memory, 2KB pages, and cache block size of 32 Bytes

The number of bits constituting the page offset is 11

The number of bits constituting a virtual page number is 29

The number of bits constituting the physical page number is 10

Q3: Consider the shown page table for a system with 16 virtual pages, each containing 8 words.

- (a) (1.5 points) For each of the following virtual word addresses (which ignores the 2-bit byte offset) indicate which address will cause a page fault and for those not causing a page fault find the physical word address.

0101101 → 111 101

0100001 → page fault

- (b) (1 point) Show the content of the page table after the two references (after any page fault is serviced). Note that one of the memory pages is vacant and you can find out which one it is.

Out of the 8 physical pages, page 110 is not used for any virtual page – hence virtual page 0100 = 4 will be mapped to physical page 110

	valid	Physical page number
0	1	101
1	0	
2	1	010
3	1	000
4	0 → 1	110
5	1	111
6	0	
7	1	001
8	0	
9	0	
10	0	
11	1	011
12	0	
13	0	
14	1	100
15	0	