

Multi-level Page Tables

Due Oct 4, 2019 at 11:59pm**Points** 8**Questions** 4**Time Limit** None**Allowed Attempts** Unlimited

This quiz is no longer available as the course has been concluded.

Attempt History

	Attempt	Time	Score
KEPT	Attempt 2	less than 1 minute	8 out of 8
LATEST	Attempt 2	less than 1 minute	8 out of 8
	Attempt 1	25 minutes	2 out of 8

Score for this attempt: **8** out of 8

Submitted Oct 8, 2019 at 7:11pm

This attempt took less than 1 minute.

Question 1

2 / 2 pts

What data (one byte, hexademical) is at Virtual Address 36e4? (or, "error")

Correct!**Correct Answers**

0a

Virtual Address 36e4:

--> pde index:0xd [decimal 13] pde contents:0xe8 (valid 1, pfn 0x68 [decimal 104])

--> pte index:0x17 [decimal 23] pte contents:0x9a (valid 1, pfn 0x1a [decimal 26])

--> Translates to Physical Address 0x344 --> Value: 0a

Longer explanation (how much you want to switch between hex, decimal, and binary is somewhat up to you; I tend to use decimal for counting entries within a page and hex for everything else):

Write 0x36e4 in binary:

0011 0110 1110 0100

With 5 bits for page offset, 5 bits of inner page, and 5 bits for outer page, we can view the virtual address as:

01101 10111 00100

The upper 5 bits (13 decimal) tell us to look at the 13th entry in the page directory, which lives on page 0x49.

The 13th entry of the page directory is 0xe8 or 1110 1000. The upper bit of 1 tells us this entry is valid. The remaining 7 bits tell us the next page table resides at physical page 110 1000 = 0x68.

The next 5 bits of our virtual address (10111 = 23 decimal) tells us to look at the 23rd entry on page 0x68. The contents there are 0x9a or 1001 1010; since the upper bit is 1, this entry is also valid.

We now know the ppn for our final address is 11010 or 0x1a.

Look at page 0x1a at the offset 00100 (4) and you'll see the final data value of **0a**.

Question 2**2 / 2 pts**

What data (one byte, hexademical) is at Virtual Address 085e? (Or, "error")

Correct!**Correct Answers**

18

Virtual Address 085e:

--> pde index:0x2 [decimal 2] pde contents:0xec (valid 1, pfn 0x6c [decimal 108])

--> pte index:0x2 [decimal 2] pte contents:0xca (valid 1, pfn 0x4a [decimal 74])

--> Translates to Physical Address 0x95e --> Value: 18

Question 3**2 / 2 pts**

What data (one byte, hexademical) is at Virtual Address 4422? (Or, "error")

Correct!**Correct Answers**

error

Virtual Address 4422:

--> pde index:0x11 [decimal 17] pde contents:0xdf (valid 1, pfn 0x5f [decimal 95])

--> pte index:0x1 [decimal 1] pte contents:0x7f (valid 0, pfn 0x7f [decimal 127])

--> Fault (page table entry not valid)

Question 4

2 / 2 pts

What data (one byte, hexadecimal) is at Virtual Address 4c2d? (Or, "error")

Correct!

Correct Answers

11

Virtual Address 4c2d:

--> pde index:0x13 [decimal 19] pde contents:0x98 (valid 1, pfn 0x18 [decimal 24])

--> pte index:0x1 [decimal 1] pte contents:0xf5 (valid 1, pfn 0x75 [decimal 117])

--> Translates to Physical Address 0xead --> Value: 11

Quiz Score: **8** out of 8