

32-byte pages 2^5 addresses per page (5-bit offset)
 32 KB addr space. Need 2 addresses (15 bits total)
 (10-bit VPN, 5-bit offset)
 1024 ~~pages~~ (virtual)
 physical mem: 128 pages (2^7 addresses, 7-bit PFN)
 32-byte pages, 2^5 addr, 5-bit offset
 12-bit total address len
 Multi-level 5-bit PDI, 5-bit PTI, 5-bit offset
 virtual address

PDE/PTE: 7-bit offset PT/PFN
 valid
 8-bit entry

PDIR: what page the PD is on.

6 1 1 c
~~110 0001 0001 1100~~
 11000 01000 11100
 24 8 28
 0x 18 E 31c

PDE 18: e1 1100 0001
 valid PT
 0x 41
 129
 Fault

PDE 24: a1 : 1010 0001
 a1 valid PT
 0x 21
 e9: 33= 33

PTE 18 in PT @ PFN 105: 1110 1001
 valid 105 PT 105
 7f: 0111 1111

full phys full phys addr: 0000111 1111 11100

PT @ PFN 33, entry #8 value b5

1011 0101
valid

PFN 0x35
 $5 + 16 + 3 = 53$

Phys addr: $\overbrace{01101011100}^{6 \quad b \quad c}$
 $\underline{0110 \quad 1011 \quad 1100}$
PFN 53 offset: 28
value: $\underline{+a \quad 08}$
~~0001 + 010~~

Virtual addr: 3da8

0011 1101 1010 1000
 $\underline{0011} \quad \underline{10110} \quad \underline{101000}$
PDI PTI offset
 $\underline{0111} \quad \underline{01101} \quad \underline{01000}$
15 13 8

PDE @ PDI 15: d6

1101 0110
valid PDE value: PFN: 86

PT @ PFN 86

$64 + 16 + 6 = 86$

PTE @ PTI 13: 7f FAULT

Virtual addr: 17f5

001 0111 1111 0101
~~000101~~ 1111 10101
PDI PTI offset

PDI: 5

PDE @ PDI 5: d4

1101 0100
valid PFN: $64 + 16 + 4 = 84$

PT @ PFN 84

PTE @ PTI 31: ce

~~1010~~ 1100 1110
valid PFN: $64 + 14 = 78$

Phys addr: 100 1110 10101

PFN 78, offset 21 \rightarrow ~~001c~~ ~~28~~

3

V addr 7f6c

0111 1111 0110 1100

~~01~~

1111 1101 0110

PDEI PTEI offset

31 27 12

PDE@PDI 31: ff

1111
valid

value: 7f = 127 (PFN of PT)

PT@PFN 127

PTE@PTI 27: 7f

FAULT invalid PTE

V addr 0bad

~~0000~~ 1011 1010 1101~~0000~~ 10

PDI

11101

PTI

01101

offset

2

29

13

PDE@PDI 2: e0

1110 0000
valid

value: 64+32 = 96 (0x60)

PT@PFN 96

PTE@PTI 29: invalid

sed 2

virtual addr 7570

~~0111~~

0101

0111

~~0000~~

11101

PDI

01011

PTI

10000

offset

29

11

16

PD@PFN 122 (given)

PDE@PDI 29: b3

1011
valid

0011

PFN of PT: 32+16+3 = 51

PT@PFN 51

PTE@PTI 11: 7f

invalid / FAULT