Paging ex

Memory Size= 7 bits=> 2**7 = 126 bytes in my memory
Frame/page size=> number of bits per frame=> want 16 bytes/page
=> ln base 2 of 16 = 4 bits
Can address up to 2**3 VP's

0000000

VP # offset

What is the valid range of virtual addresses?
For P1 ->7 bit system, virtual addresses can go from
000 0000->010 1111 (see valid bits)
For P2
000 0000->001 1111

Page Table P1

VP #	valid	PP
0=000	1	2=010
1=001	1	5=101
2=010	1	3=011
3=011	0	
4	0	
5	:	
6		
7		

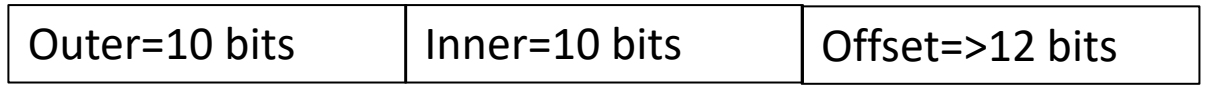
Page Table P2

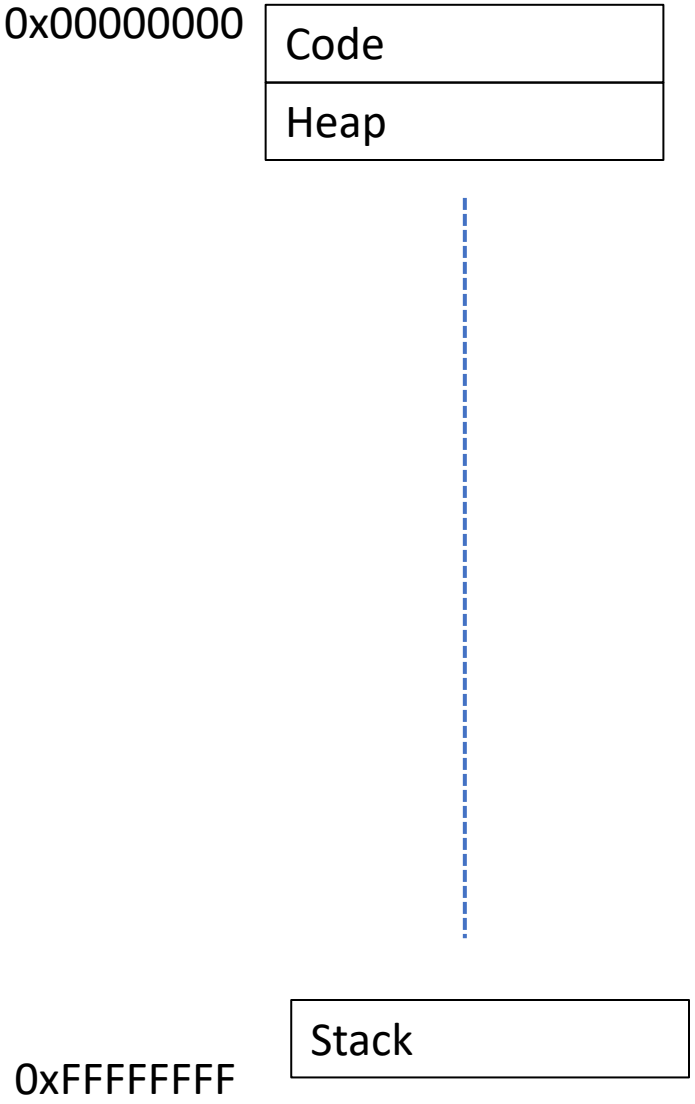
VP #	valid	PP
0=000	1	100
1=001	1	110
2=010	0	
3=011	0	
4	0	
5	:	
6		
7		

Physical memory

000 0000 000 1111	
001 0000 001 1111	
010 0000 010 1111	P1-0
011	P1-2
100	P2-0
101	P1 -1
110	P2-1

For a 32 bit system
20 bits VPN, 12 bits offset





1 Meg => how many pages?
2^20 pages/2^12 bytes/page
=2^8 or 256=> 256 rows for Code and Heap

2^20 rows ~ 1,000,000
1,000,000 -512 =
~999,500 rows wasted

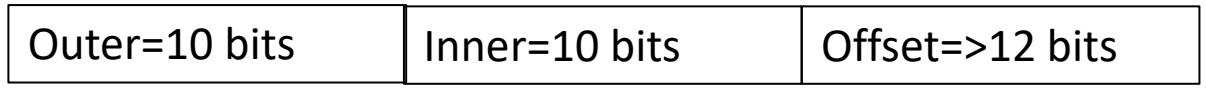
1 Meg needs 256 pages=> 256 rows for Stack

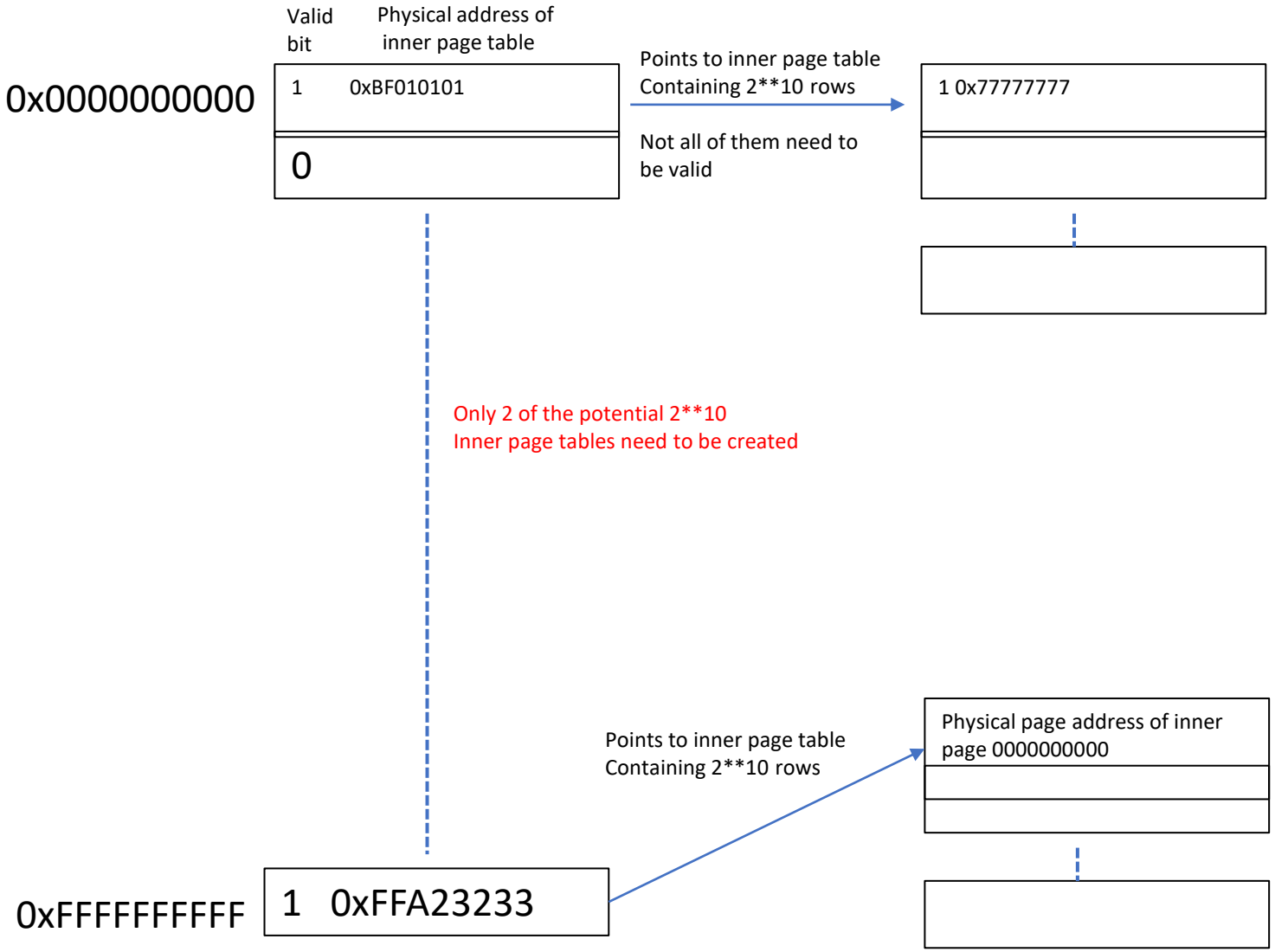
Remember:
If using 4K pages=> (2^12 bits)
2^10 ~1000
2^20 ~1,000,000

<u>If using single page table</u>
2^20 = 1,000,000 rows
2^20 *4 = 4MB for page table

Then have 2^(20) potential pages

For a 32 bit system
20 bits VPN, 12 bits offset





If using 4K pages=> (2^12 bits)
2^10 ~1000
2^20 ~1,000,000

<u>If using multilevel page table</u>

Remember a single level page table uses 2^20 * 4bytes entry = 4MB

Multilevel page table uses
Outer = 2^10*4bytes = 4kB
Inner? Only 2 inner pages Allocated
2 * 2^10*4bytes = 8kB
Total= 12kB