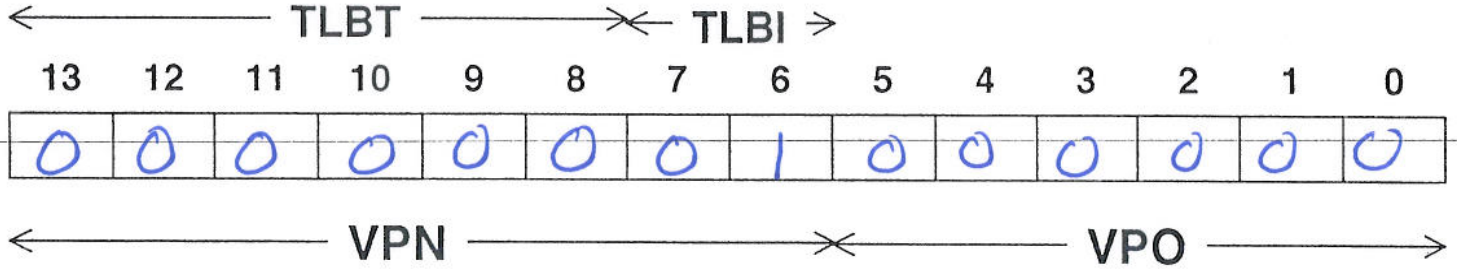
NAME _____

Address Translation Example #3

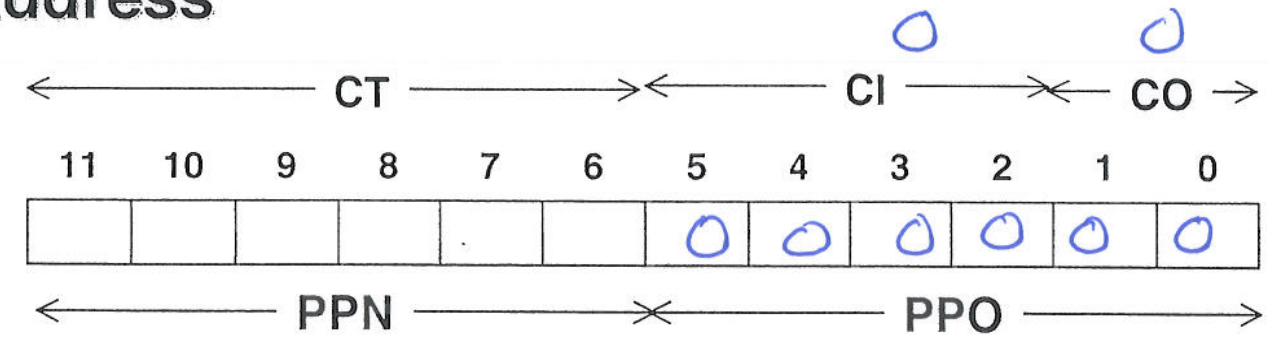
Q8

Virtual Address 0x0040



VPN 01 TLBI 1 TLBT 0 TLB Hit? N Page Fault? YES PPN: ____

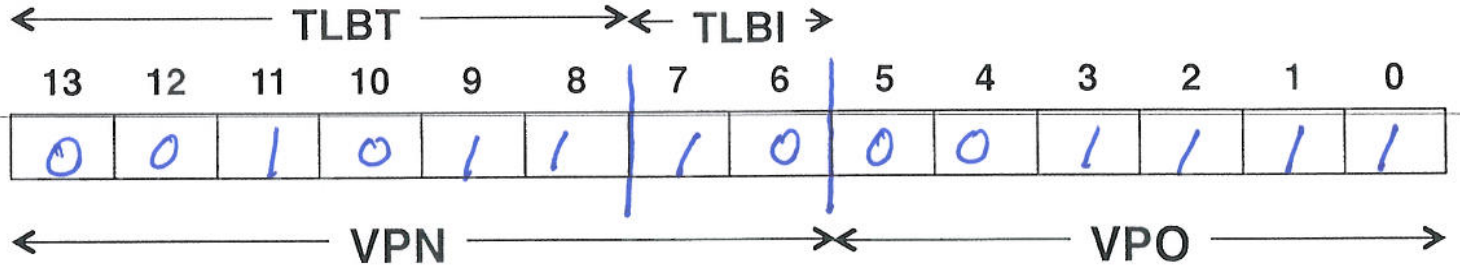
Physical Address



Offset 0 CI 0 CT ____ Hit? __ Byte: ____

Address Translation Example #2

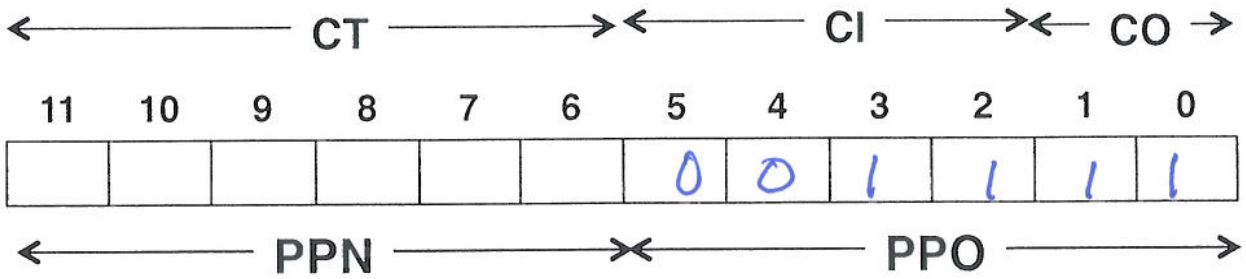
Virtual Address 0x0B8F



VPN 2E TLBI 2 TLBT 0B TLB Hit? N Page Fault? Y PPN: ____

↳ PAGE TABLE TAG MATCH IN SAMPLE TREAT AS PAGE MISS

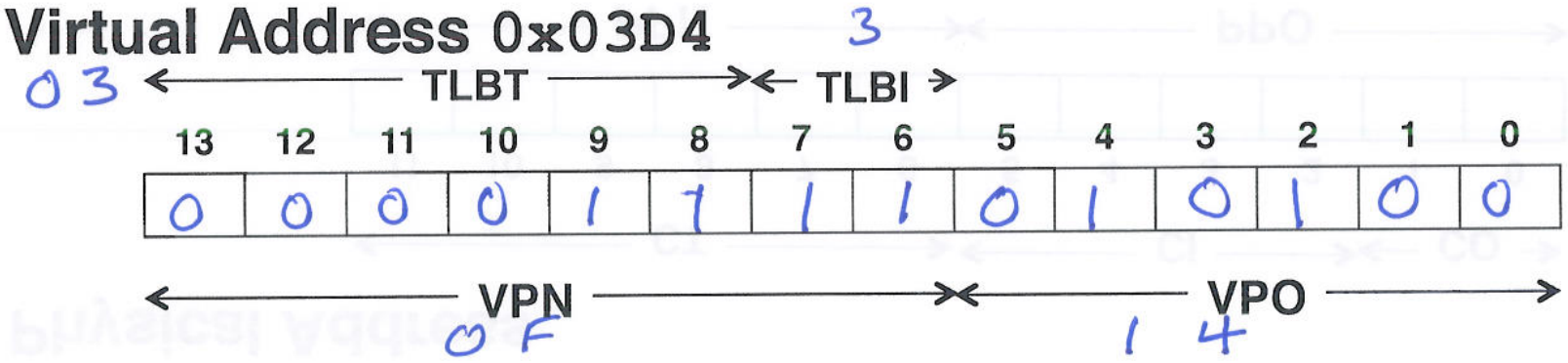
Physical Address



Offset 3 CI 3 CT ____ Hit? __ Byte: ____

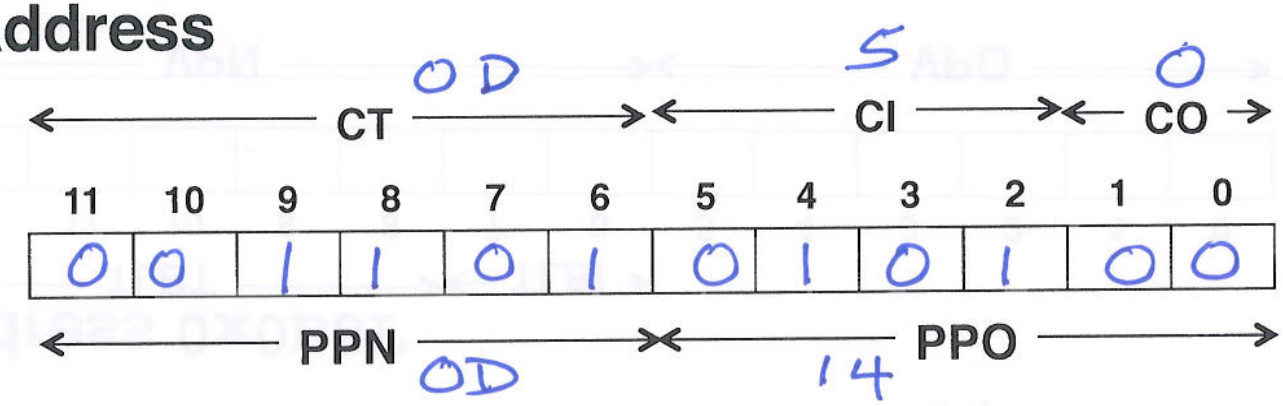
Address Translation Example #1

Virtual Address 0x03D4



VPN 0F TLBI 3 TLBT 03 TLB Hit? YES Page Fault? __ PPN: 0D

Physical Address



Offset 0 CI 5 CT 0D Hit? YES Byte: 36

Simple Memory System Page Table

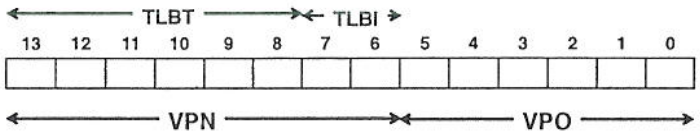
- Only shows first 16 entries

VPN	PPN	Valid	VPN	PPN	Valid
00	28	1	08	13	1
01	–	0	09	17	1
02	33	1	0A	09	1
03	02	1	0B	–	0
04	–	0	0C	–	0
05	16	1	0D	2D	1
06	–	0	0E	11	1
07	–	0	0F	0D	1

Simple Memory System TLB

TLB

- 16 entries
- 4-way associative: bits 6 & 7 – set, bits 8..13 - Tag



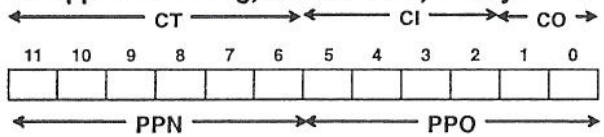
Set	Tag	PPN	Valid	Tag	PPN	Valid	Tag	PPN	Valid	Tag	PPN	Valid
0	03	–	0	09	0D	1	00	–	0	07	02	1
1	03	2D	1	02	–	0	04	–	0	0A	–	0
2	02	–	0	08	–	0	06	–	0	03	–	0
3	07	–	0	03	0D	1	0A	34	1	02	–	0

Line.....

Simple Memory System Cache

Cache

- 16 lines
- 4-byte line size
- Direct mapped: CT – Tag, CI- Set/Index, CO-Byte Position



Idx	Tag	Valid	B0	B1	B2	B3	Idx	Tag	Valid	B0	B1	B2	B3
0	19	1	99	11	23	11	8	24	1	3A	00	51	89
1	15	0	–	–	–	–	9	2D	0	–	–	–	–
2	1B	1	00	02	04	08	A	2D	1	93	15	DA	3B
3	36	0	–	–	–	–	B	0B	0	–	–	–	–
4	32	1	43	6D	8F	09	C	12	0	–	–	–	–
5	0D	1	36	72	F0	1D	D	16	1	04	96	34	15
6	31	0	–	–	–	–	E	13	1	83	77	1B	D3
7	16	1	11	C2	DF	03	F	14	0	–	–	–	–