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CSE 351
Homework 3
05/15/13

1.

Intel Xeon L1 data cache: $m = 38$, $C = 32768$, $B = 64$, $E = 8$

$$S = C / (B * E) = 32768 / (64 * 8) = 64$$

$$s = \log_2 S = \log_2 64 = 6$$

$$b = \log_2 B = \log_2 64 = 6$$

$$t = m - (s + b) = 38 - (6 + 6) = 26$$

AMD Opteron 6168 L2 unified cache: $m = 48$, $C = 524288$, $B = 64$, $E = 16$

$$S = C / (B * E) = 524288 / (64 * 16) = 512$$

$$s = \log_2 S = \log_2 512 = 9$$

$$b = \log_2 B = \log_2 64 = 6$$

$$t = m - (s + b) = 48 - (9 + 6) = 33$$

2.

Cache 1: $S = 2^s = 2^8 = 256$, $C = B * E * S = 8 * 1 * 256 = 2048$

Cache 2: $B = 2^b = 2^2 = 4$, $E = C / (B * S) = 2048 / (4 * 128) = 4$

Cache 3: $s = \log_2 S = \log_2 64 = 6$, $t = m - (s + b) = 32 - (6 + 1) = 25$

Cache 4: $B = C / (E * S) = 1024 / (2 * 16) = 32$, $b = \log_2 B = \log_2 32 = 5$

3.

A.

Tag: $0x45 = 01000101$

$0x38 = 00111000$

Address: $01000101001XX \Rightarrow 0x08A4, 0x08A5, 0x08A6, 0x08A7$

$00111000001XX \Rightarrow 0x0704, 0x0705, 0x0706, 0x0707$

B.

Tag: $0x91 = 10010001$

Address: $10010001110XX \Rightarrow 0x1238, 0x1239, 0x123A, 0x123B$

4.

A.

11	10	9	8	7	6	5	4	3	2	1	0
CT	CT	CT	CT	CT	CT	CT	CT	CI	CI	CO	CO

B.

Operation	Address	Hit?	Read value (or unknown)
Read	0x834	N	Unknown
Write	0x836	Y	—
Read	0xFFD	Y	0xC0