CPE 431/531   In Class Cache   Fall 2022

The University of Alabama in Huntsville
ECE Department
CPE 431/531 – 01
Fall 2022
In-Class Cache Problem

Here is a series of address references given as word addresses. Words are 32 bits. Assuming a 256 B cache that is four-way set-associative with 4-word blocks that is initially empty, label each reference in the list as a hit or a miss and show the final contents of the cache. Use LRU replacement. Show the history of the cache accesses, not just the final contents

Mixed up decimal and Hex when placing in cache but too lazy to change it

12

4 sets
2 index
2 block
0 byte

#	Binary	Tag 28	Index 2	Block Offset 2	Hit/Miss
2	00 0000 0010	0's?	0	10	Miss
16	00 0001 0000	0001	0	00	Miss
115	00 0111 0011	0111	0	11	Miss
4	00 0000 0100	0's	1	00	Miss
200	00 1100 1000	1100	2	00	Miss
31	00 0001 1111	0001	3	11	Miss
32	00 0010 0000	0010	0		H
0	00 0000 0000	0000	0		M
400	01 1001 0000	1 1001	0		M
500	01 1111 0100	1 1111	1		M
34	00 0010 0010	0 0010	0		M
1000	11 1110 1000		2		M
666	10 1001 1010		2		M
13	00 0000 1101		3		M
50	00 0011 0010	00 11	0		M
531	10 0001 0011	10 0001	0		M
778	11 0000 1010	11 0000	2		M
777	11 0000 1001		2		H
999	11 1110 0111		1		M
402	01 1001 0010		0		H
17	00 0001 0001		0		M
193	00 1100 0001		0		M
1	00 0000 0001		0		M
2	00 0000 0010		0		H
431	01 1010 1111		3		M
932	11 1010 0100	11 1010	1		M
3	00 0000 0011		0		H
11	00 0000 1011		2		M
16	00 0001 0000		0		H
21	00 0001 0101		1		M
13	00 0000 1101		3		H
64	00 0100 0000		0		M
48	00 0011 0000		0		M
19	00 0001 0011		0		M
11	00 0000 1011		2		H
3	00 0000 0011		0		H
22	00 0001 0110		1		H
4	00 0000 0100		1		M
27	00 0001 1011		2		M
6	00 0000 0110		1		H
11	00 0000 1011		2		H

0: 0-3; 14-17; 114-117
1: 930-933 4-7; 500-503; 998-998
2: 77 200-203; 1000-1003; 664-667
778-778; 10-13 24-27

0: 30-33; 0-3; 400-403

0: 0-3; 14-17; 114-117 30-33
5 30-531 400-403 34-37 50-53
0-3 64-67 14-17 190-1
1111   48-48
18-18

3: 30-31 10-13 ; 430-43

1: 930-933; 4/7; 540-503; 9
20-23 4-7