

ECE 3055 Homework 1 – Due Feb 21

A direct mapping cache with WTWA (i.e. Write Through Write Allocate) is used to reduce the average memory access time on a computer. This cache holds 4096 entries, 16 bit data, and ties into a twenty-bit address bus with no byte or word select bits. Determine the contents of the cache and memory below after the memory requests shown are sent to the cache. Keep track of hits and misses so you can compute the cache miss rate when you are done. All values are in hex.

→ 12
2
= 3 hex
digits

Cache before

Block Tag	Data
1	20
2	50
3	2
4	40
5	5

Cache after

Block Tag	Data
1	<u>40</u>
2	<u>50</u>
3	<u>50</u>
4	40 ⁴⁰ <u>FACE</u>
5	<u>5</u>

Memory before

Address	Data
20004	FACE
50003	BABA
40001	1234
40004	CABE

Memory after

Address	Data
20004	<u>FACE</u>
50003	<u>0000</u>
40001	<u>OCAE</u>
40004	<u>CABE</u>

Memory requests

Address	Type	Data	Hit(y/n)
20004	Read		<u>N</u>
40001	Write	OCAE	
50003	Write	0000	
50003	Read		<u>Y</u>
20004	Read		<u>Y</u>
40001	Read		<u>Y</u>
40004	Read		<u>N</u>

Cache hit rate (include reads only) = 60 %