**BLG322E – Computer Architecture**

**Assignment 5**

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**1)a)** 1mi = 2^20 \* 2^8; 4ki = 2^12 \* 2^8

Address = 20 bits => 1mib/16bytes => 2^16 blocks

Word = 8 bits = 1 byte

Each block = 16 words = 16 byte

Each frame = 16 words = 16 byte

4kib/16bytes => 2^8 frames = 256 frames in total

128 sets => 2 frame in each set

|  |  |  |
| --- | --- | --- |
| TAG | SET | WORD |
| 9 | 7 | 4 |

A: $0182F => 0000 0001 1000 0010 1111

Tag: 0000 0001 1 = 3

Set: 000 0010 = 2 => 1 word only => others go to set 3

Word: 1111 = 16 => 0 to 7 inclusive in set 3

B: $0382F => 0000 0011 1000 0010 1111

Tag: 0000 0011 1 = 7

Set: 000 0010 = 2 => 1 word only => others go to set 3

Word: 1111 = 16 => 0 to 7 inclusive in set 3

C: $07827 => 0000 0111 1000 0010 0111

Tag: 0000 0111 1 = 15

Set: 000 0010 = 2 => all in set 2

Word: 0111 = 7 => 7 to 15 inclusive => all in set 2

**b)**

First iteration:

READ A => MISS

SET 2 FRAME 0 => A[0]

READ B => MISS

SET 2 FRAME 1 => B[0]

READ A => HIT

READ C => MISS

SET 2 FRAME 0 => C[0-8]

Second iteration:

READ A => MISS

SET 3 FRAME 0 => A[1-8]

READ B => MISS

SET 3 FRAME 1 => B[1-8]

READ A => HIT

READ C => HIT

Iterations after the second:

READ A => HIT

READ B => HIT

READ A => HIT

READ C => HIT

31 HIT – 5 MISS