

## Lecture 12 Activity Solution

### Model 1: Caches

1. Most convenient: backpack. Least convenient: parent's house
2. Parent's house.
3. The most important and related books and notes.
4. Move some outdated notes from backpack to dorm or parent's house.

### Model 2: Lookup

1. 0x00 00 FF 50
2. The last few bits.
3. Most diversity: 4. Least diversity: 36,37 and 38.
4. The bit diversity goes down as it becomes more significant.
5. Around the fourth least significant bit.
6. Omitted

### Model 3: Hardware

1. s bits are required.
2. b bits are required.
3. m-b-s bits are in the tag.
4. Direct mapped.
5. It's not in the cache.
6. B should be greater than or equal to 16.
- 7.

| Address | E = 1 | E = 2 |
|---------|-------|-------|
| 0x80    | miss  | miss  |
| 0x40    | miss  | miss  |
| 0x20    | miss  | miss  |
| 0x40    | miss  | hit   |
| 0x80    | miss  | miss  |

8. It will reduce the miss rate by reducing conflict misses.
9. The miss rate will be 1.

### Model 4: Replacement

1. Omitted.
2. Omitted.
3. A(miss), B(miss), A(hit), C(miss), B(miss), C(hit), A(miss).
4. A policy which evicts the last recently used data could have done better.
5. It should discard the line.

### Model 5: Writing to Cache Lines

1. It comes from cache and other memory systems.
2. It shouldn't. There is temporal locality.
3. It must cache the new value. No.
4. yes.
5. WBWA: The writes are faster and multiple writes in a block require only one write to the main memory.  
WTWNA: It's easier to implement and the data in memory is more consistent.