### 第四次作业

Given: A cache can hold 64 KByte data. Data are transferred between main memory and the cache in blocks of 4 bytes each. The main memory consists of 16 Mbytes, with each byte directly accessible by a 24-bit address.

(a) How many cache blocks in the cache?

(b) How many blocks in the memory?

(c) For the direct-mapping cache, how many bits for tag and cache line in a memory address, respectively?

(d) For the associative cache, how many bits for tag in a memory address?

(e) For the 4-way set associative cache, how many bits for tag and set in a memory address, respectively?

(f) How many tag comparisons are needed in each memory access for direct-mapping, associative and four-way set associate cache, respectively?



64K/4 = 16K = 2^14



16M/4 = 4M = 2^22



对于直接映射

|  |  |  |
| --- | --- | --- |
| 8bit  Tag | 14bit  Index select the set | 2bit Byteoffset |



对于全相联

|  |  |
| --- | --- |
| 22bit  Tag | 2bit Byteoffset |



对于四路组相联

|  |  |  |
| --- | --- | --- |
| 10bit  Tag | 12bit  Index select the set | 2bit Byteoffset |

直接映射需比较1次

四路组相联需比较4次

全相连需比较2^14次