

# Cache Description

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Our cache is a one level ,512K ,4-way cache. Therefore, the cache has 32sets, each set has 4 blocks and each block has 4 bytes. It is a big cache compared with a only 2048k memory. Thus, a one-level cache would ensure enough hit-rate.

Data and instruction are not split in our cache because there is no meaning by seperating data from instruction in the cache for our processor and we want the the data and instrcution to be fethced at the same speed. We use a write-through strategy when we write data back from cache to memory and it suppose to have write buffer. However, cache and memory are treated by Java as the same using a physical memory space. We will add a write buffer in the future.

The LRU stategy is used in our cache beacuse LRU is supposed to be the most prevailing and popular strategy though it is costly to implement. We use a double-linked list to implement the LRU. The list contains a head and a tail and whenever a block is visited within a set, it is placed in the first place in the list. Therefore, the last block in the list is always the least recently used block. And in

our simple 4-way set, the list is represented using an array which contains the position of the block in the list.