# COL216 - Assignment 3

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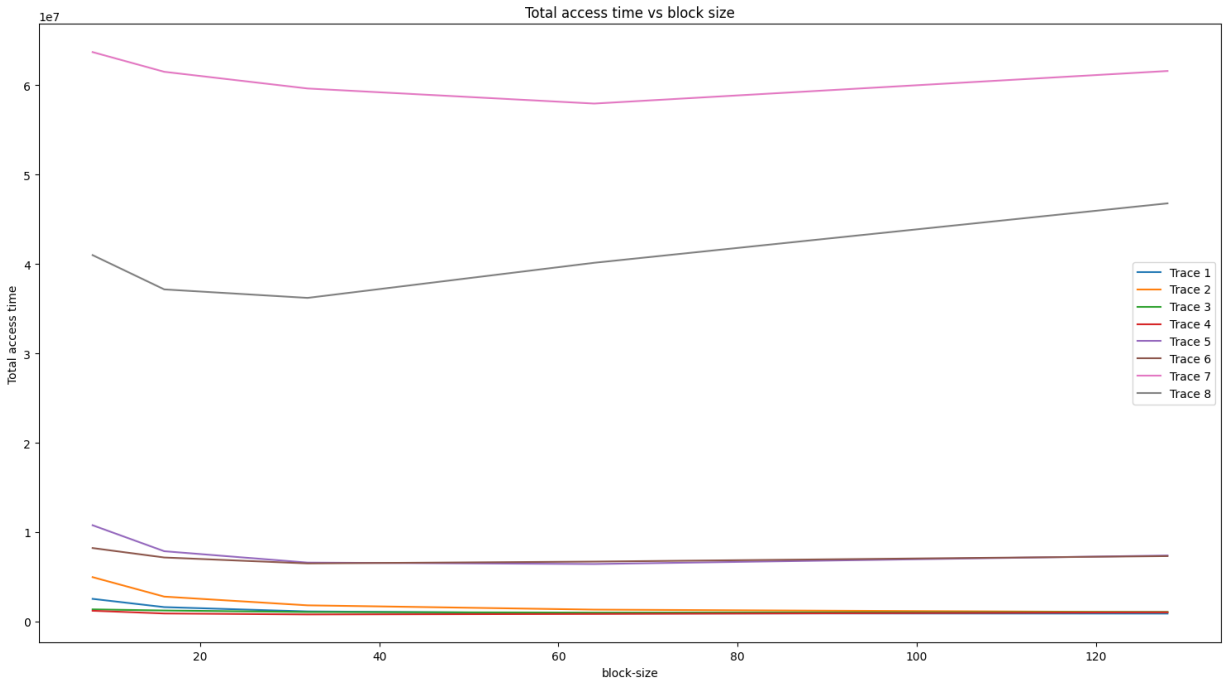
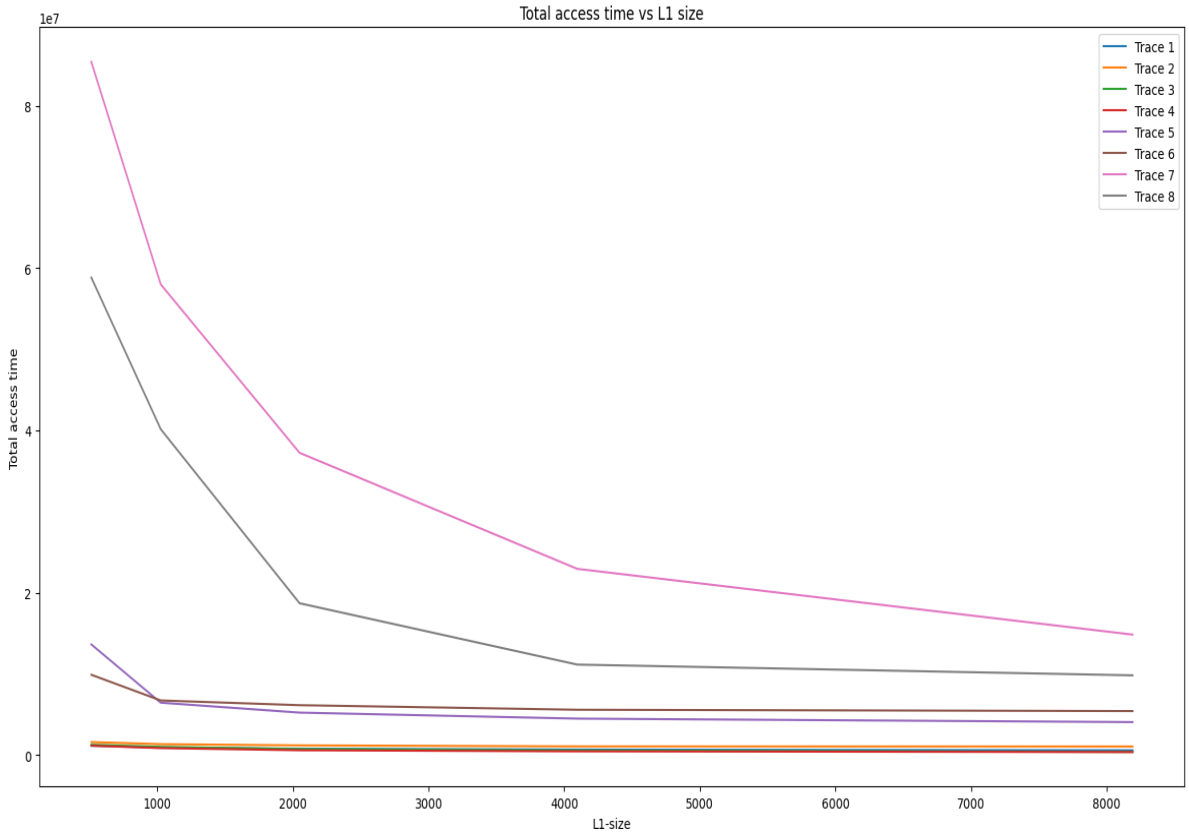
## Plot 1: Varying Block size




**Observation:**

We know that increasing block size will decrease the number of misses therefore the total access time decreases initially. But if we increase the block size too much, the number of writebacks will increase because more data gets dirty at each write. Therefore during the eviction, we would have to deal with more probability of writebacks.

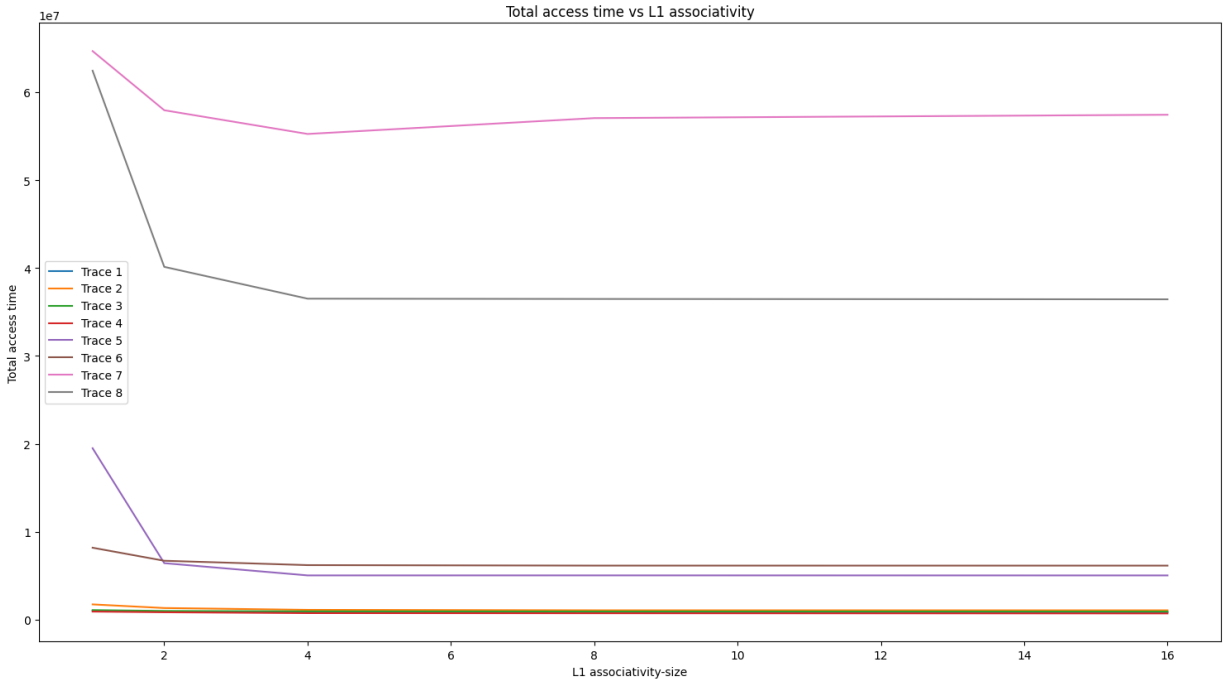
**Plot 2: Varying L1 size**




**Observation:**

We know that increasing L1_size will decrease the number of misses therefore the total access time decreases. But after a certain extend, It becomes constant as we cannot avoid the compulsory misses of L1 and L2, which occur when we access the block for the first time. This is because less replacement is happening and therefore the hit rate of L1 increases.

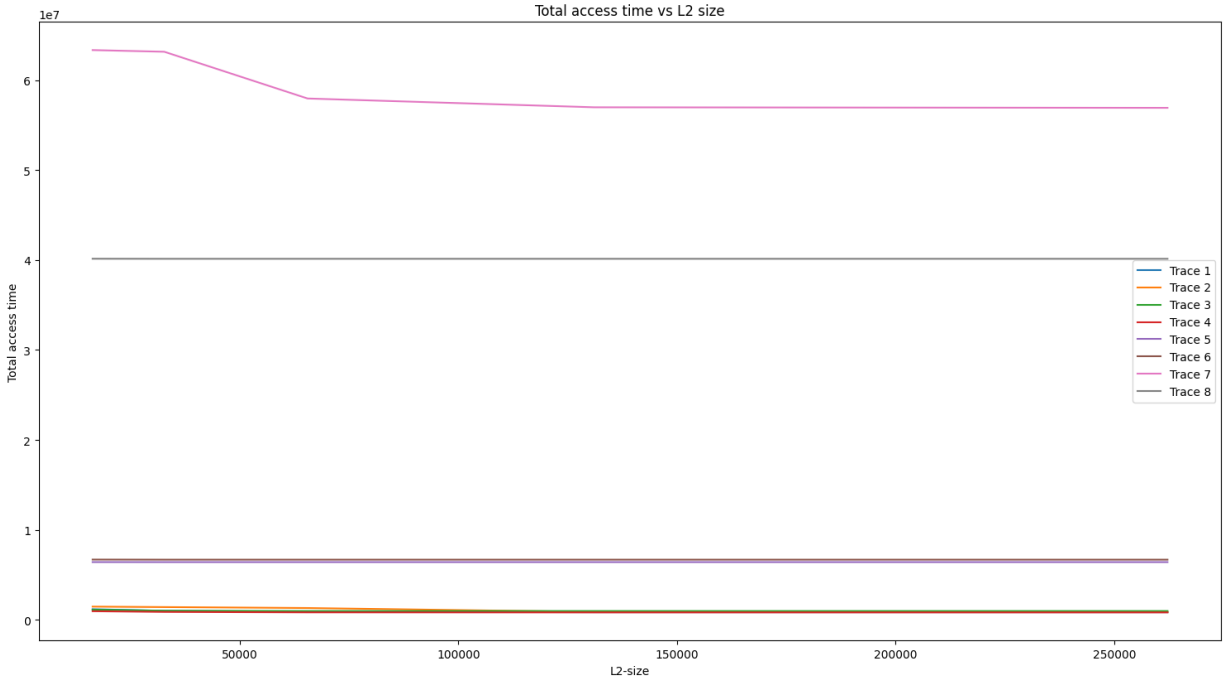
**Plot 3: Varying L1 associativity**




**Observation:**

We know that that the increase in associativity decrease the access time. Because it would lead to lesser number of misses since the data will already be present in the cache as each line can hold more number of block and probability of finding the required block will be more.
But increasing the associativity to only some extent can benefit us. Once the associtivity becomes equal to the maximum number of tagid's that can be present in that set, then there is no decrease in access time observed on increasing the associativity.

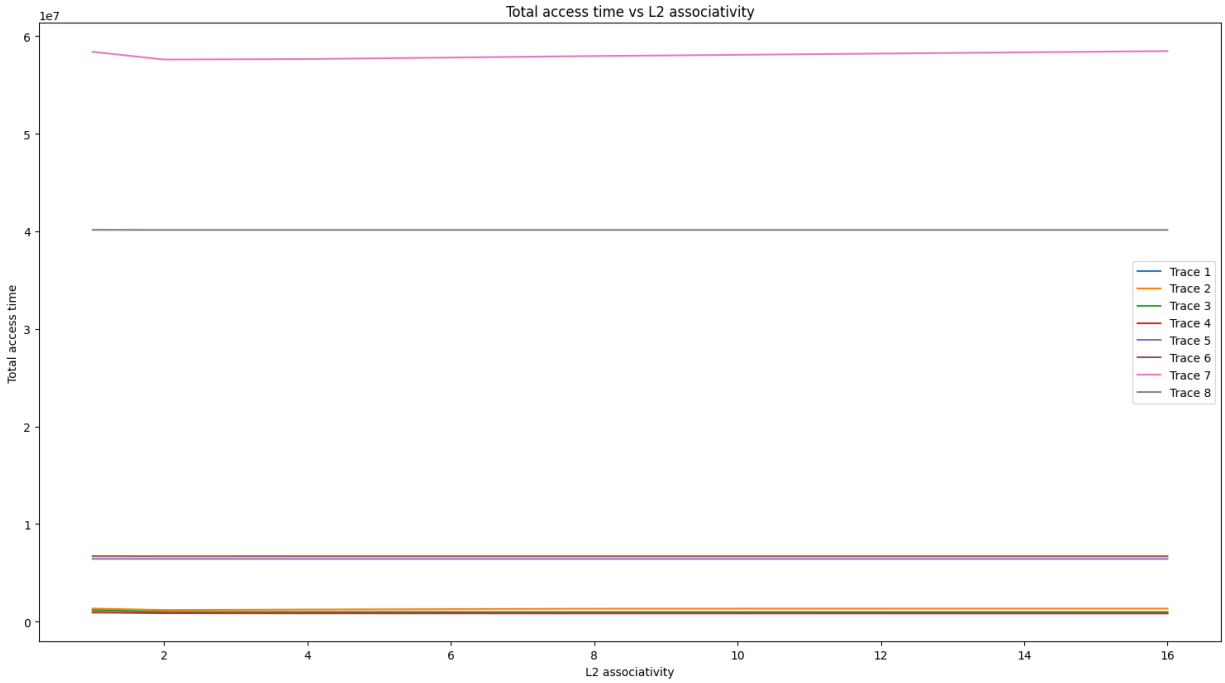
**Plot 4: Varying L2 size**




**Observation:**

We know that increasing L2 size will decrease the number of misses therefore the total access time decreases. But after a certain extend, It becomes constant as we cannot avoid the compulsory misses of L1 and L2, which occur when we access the block for the first time. It is because this increases the hit rate of L2 as less replacements in L2 but the hit rate for L1 is not changed. Therefore when we increase L1 size, the decrease in time is greater than increasing L2 size.

**Plot 5: Varying L2 associativity**




**Observation:**

The same argument (as in plot 3) applies here also. There is a minor dip in total access time in case of L2. This is because the use of L2 is not as significant as L1, we look into L2 only if we dont find a certain block in L1. Therefore the graph is mostly flat. Afterward the graph becomes stagnant which is because the associativity is more than the number of tagid's it needs to store.