

# Project 1 Cache Simulator

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EEL 4768

10/31/20

## Part A



In this part of the project the Cache Size increases in multiples of 2, starting with 8KB and ending with 128KB. The associativity is fixed at 4 and the replacement policy is set to LRU (0) with a write back policy (1).

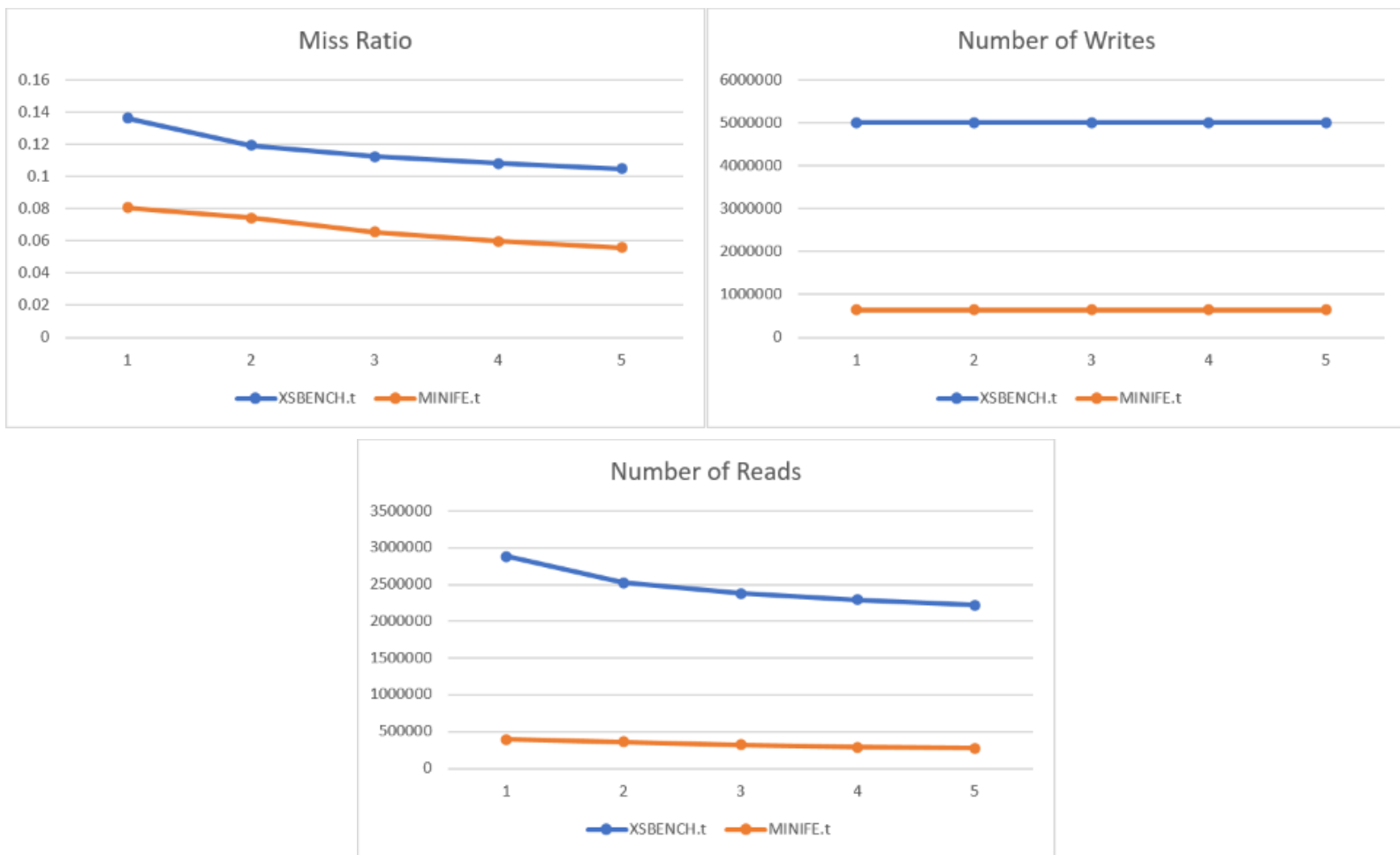
As you can see from the graphs shown in above as the cache size increases the Miss Ratio, Number of Writes, and the Number of Reads all decrease. The MINIFE trace file seems to take a slower and more mellow flat pattern, while the XSBENCH file tends to take a sharp decrease that slows as the cache size increases. This applies to all of the outputs; Miss Ratio, Number of Writes, and Number of Reads

## Part B



The first part of Part B is exactly the same as Part A, the Cache Size increases in multiples of 2, starting with 8KB and ending with 128KB. The associativity is fixed at 4 and the replacement policy is set to LRU (0) with a write back policy (1).

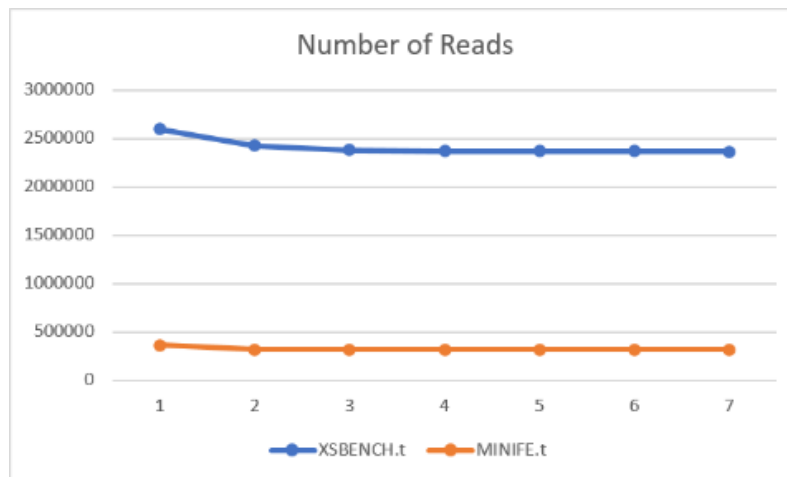
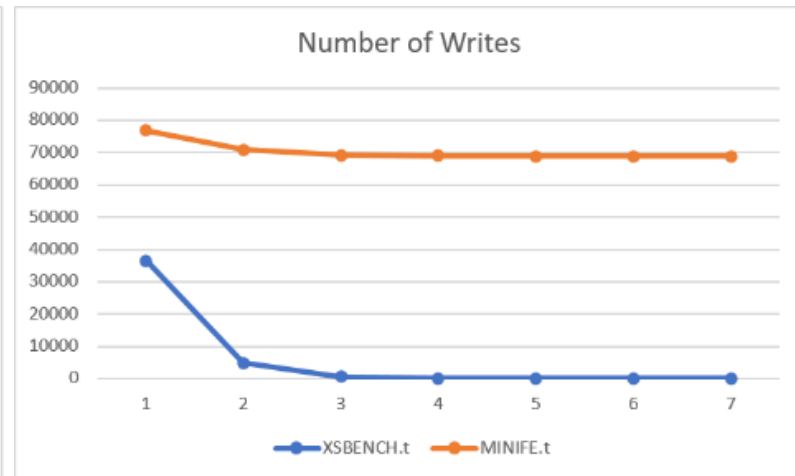
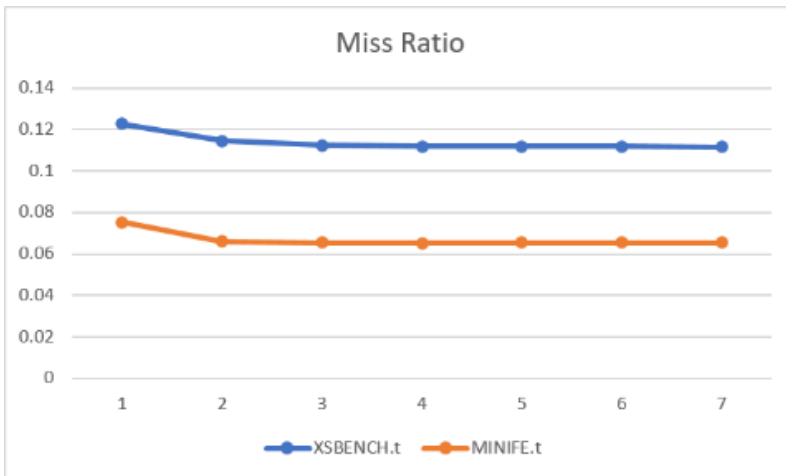
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Part B section 2 Has us do the same thing as section 1 except this time we use a write through (0) policy. The Cache Size increases in multiples of 2, starting with 8KB and ending with 128KB. The associativity is fixed at 4 and the replacement policy is set to LRU (0) with a write through policy (0).

As you can see from the graphs shown in above the number of reads and the Miss Ratio stay the same as they did for Part A and the first part of Part B. This is the first and only time that the number of writes is higher while using the XSBENCH trace than the MINIFE trace file; this is due to our write policy. As the cache size increases the Miss Ratio and Number of Reads both gradually decrease, but the Number of Writes stays the same throughout the run. This is what a write through policy does.

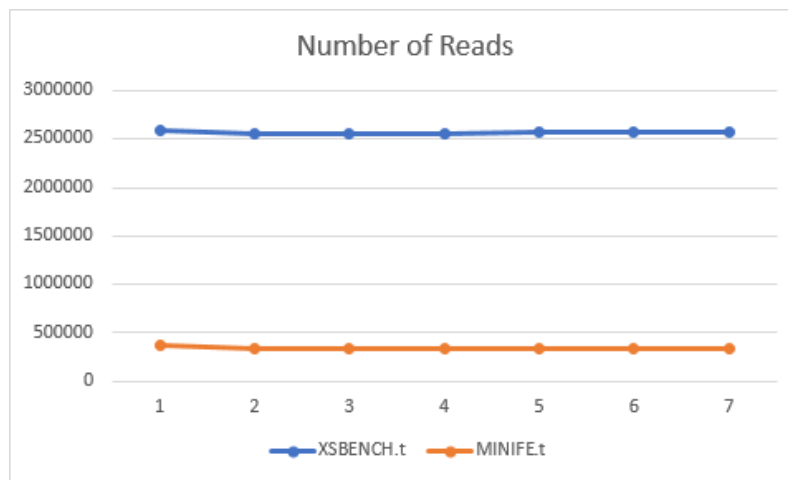
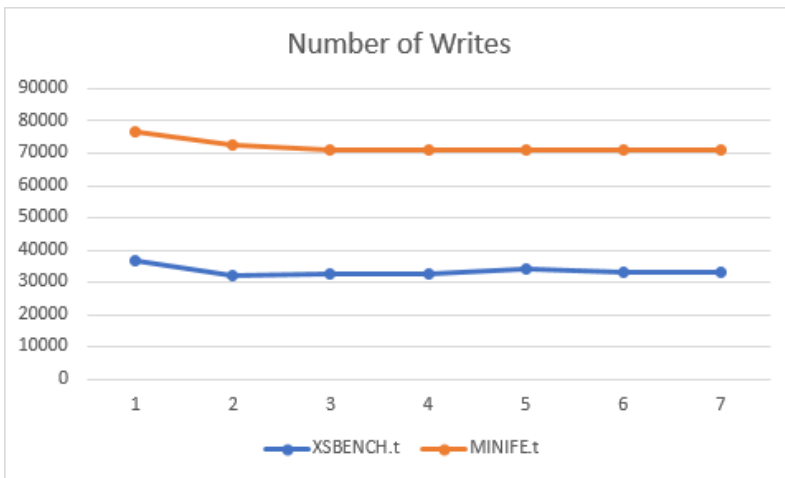
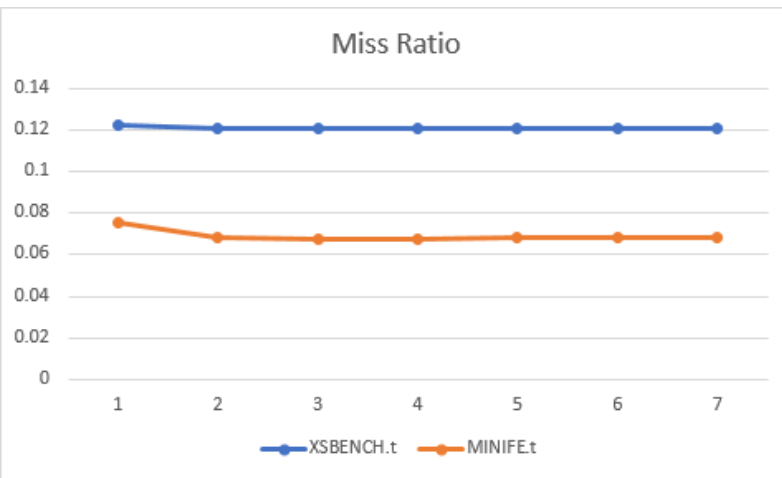
## Part C



Part C was a little different. The Cache Size stayed the same throughout all of the runs at 32KB. The associativity is increased in multiples of 2 starting at 1 and ending with 64. The replacement policy is set to LRU (0) with a write back policy (1).

As you can see from the graphs shown in above as the associativity increases curves flatten to a point where they do or almost go completely flat. There are a few places where the later tests have slightly higher values than those before them which does not follow the previously seen trends. The slow and gradual decrease in all 3 outputs till it reaches a point that it flattens out is caused by an increase in the associativity. Increasing the associativity beyond four or eight ways provides only small decreases in miss rate.

## Part D



Part D was the same as Part C as specified in the instructions, the only thing we change is the replacement policy so that we can see the effects of a different replacement policy and the change in associativity. The Cache Size stayed the same throughout all of the runs at 32KB. The associativity is increased in multiples of 2 starting at 1 and ending with 64. The replacement policy is set to FIFO (1) with a write back policy (1).

As you can see from the graphs shown in above the graphs don't move a whole lot. They are rather linear and don't follow a trend of increasing or decreasing. They do not seem to follow a trend though. If I had to describe a trend that the outputs follow I would say that the MINIFE starts high and reaches a minimum at the midpoint in the testing and then it begins to increase again. This however is not true for the XSBENCH, it slowly decreases and then bounces up and then decreases again and then back up, it's not very predictable. Increasing the associativity beyond four or eight ways provides only small decreases in miss rate.