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Lab 4 Questions

1. Inclusion, non-inclusion, and exclusion. Explain how they influence the cache coherence protocol design. You can assume a MSI protocol to start with for all of them and explain the difference.

Non-inclusive caches suffer from more cache misses because the LLC contains the same data as all of its children. However, this means there is less traffic because the LLC does not need to query any of its children regarding contents.

2. Design writeup. Explain what optimizations you’ve done and tried for this lab. Did you observe any interesting interaction between the different techniques you tried? If you’ve implemented a special replacement algorithm, explain the operation of your implementation as well.

I used a Static Re-Replacement Interval Prediction replacement policy. This policy combines abilities of LRU and LFU to capture both near-intermediate and distant re-replacement intervals. As the program runs, this balances between recency and frequency to make decisions on what most hits have resulted on in the recent past.