CS422A : Assignment-4

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Observations

- Comparing the first two parts, there was a slight increase in the L1 cache misses in Part 2 as compared to Part 1. A possible reason might be that in Part 1, a given L1 cache block was invalidated after a long time (when the corresponding block in L2 moved from MRU to LRU position). However, in Part 2, an L2 block can be evicted relatively earlier and hence, a particular L1 block might be invalidated a bit earlier as compared to Part 1. Thus, leading to a larger number of L1 cache miss counts in Part 2.

- However, an opposite effect was seen when comparing the first part with the third part. On using the NRU policy, L1 miss count slightly decreased as compared to the LRU policy.

- In Part-2, there were slightly lesser dead-on-fill blocks (as a % of total number of filled blocks), as compared to Part-1 and the reason might be the statement mentioned in the problem itself, i.e. in Part-1, a cache block had to be come down all the way from MRU to LRU position before getting evicted.

- The observed results are summarized as follows:

Part 1

400.perlbench

Metric	Value
Number of L1 Accesses	552608516
Number of L2 Accesses	296968436
L1 Cache Misses	296968436
L2 Cache Misses	288242194
Dead-on-fill blocks (as a % of total number of	98.24

blocks filled in the L2 cache)	
Blocks with >2 hits in L2 (as a % of number of blocks having at least one hit in L2 cache)	61.2

401.bzip2

Metric	Value
Number of L1 Accesses	602701597
Number of L2 Accesses	249089062
L1 Cache Misses	249089062
L2 Cache Misses	235020776
Dead-on-fill blocks (as a % of total number of blocks filled in the L2 cache)	97.36
Blocks with >2 hits in L2 (as a % of number of blocks having at least one hit in L2 cache)	93.08

403.gcc

Metric	Value
Number of L1 Accesses	504439712
Number of L2 Accesses	201719411
L1 Cache Misses	201719411
L2 Cache Misses	200171977
Dead-on-fill blocks (as a % of total number of blocks filled in the L2 cache)	99.3
Blocks with >2 hits in L2 (as a % of number of blocks having at least one hit in L2 cache)	7.63

429.mcf

Metric	Value

Number of L1 Accesses	512817647
Number of L2 Accesses	231981535
L1 Cache Misses	231981535
L2 Cache Misses	181415925
Dead-on-fill blocks (as a % of total number of blocks filled in the L2 cache)	95.3
Blocks with >2 hits in L2 (as a % of number of blocks having at least one hit in L2 cache)	69.32

450.soplex

Metric	Value
Number of L1 Accesses	471116158
Number of L2 Accesses	279602312
L1 Cache Misses	279602312
L2 Cache Misses	279407845
Dead-on-fill blocks (as a % of total number of blocks filled in the L2 cache)	99.96
Blocks with >2 hits in L2 (as a % of number of blocks having at least one hit in L2 cache)	22.75

456.hmmer

Metric	Value
Number of L1 Accesses	623217112
Number of L2 Accesses	495375342
L1 Cache Misses	495375342
L2 Cache Misses	495300780
Dead-on-fill blocks (as a % of total number of blocks filled in the L2 cache)	99.98
Blocks with >2 hits in L2 (as a % of number of blocks having at least one hit in L2 cache)	11.33

471.omnetpp

Metric	Value
Number of L1 Accesses	558849898
Number of L2 Accesses	238993815
L1 Cache Misses	238993815
L2 Cache Misses	235200221
Dead-on-fill blocks (as a % of total number of blocks filled in the L2 cache)	98.93
Blocks with >2 hits in L2 (as a % of number of blocks having at least one hit in L2 cache)	30.33

483.xalancbmk

Metric	Value
Number of L1 Accesses	517826683
Number of L2 Accesses	164498502
L1 Cache Misses	164498502
L2 Cache Misses	157362108
Dead-on-fill blocks (as a % of total number of blocks filled in the L2 cache)	99.46
Blocks with >2 hits in L2 (as a % of number of blocks having at least one hit in L2 cache)	27.22

Part 2

400.perlbench

Metric	Value
Number of L1 Accesses	552608516

Number of L2 Accesses	296968725
L1 Cache Misses	296968725
L2 Cache Misses	287608666

401.bzip2

Metric	Value
Number of L1 Accesses	602701596
Number of L2 Accesses	252700796
L1 Cache Misses	252700796
L2 Cache Misses	235015198

403.gcc

Metric	Value
Number of L1 Accesses	504446185
Number of L2 Accesses	201746836
L1 Cache Misses	201746836
L2 Cache Misses	200195379

429.mcf

Metric	Value
Number of L1 Accesses	512817647
Number of L2 Accesses	231981536
L1 Cache Misses	231981536
L2 Cache Misses	181486811

450.soplex

Metric	Value

Number of L1 Accesses	471599004
Number of L2 Accesses	292323173
L1 Cache Misses	292323173
L2 Cache Misses	279200596

456.hmmer

Metric	Value
Number of L1 Accesses	623217112
Number of L2 Accesses	495375446
L1 Cache Misses	495375446
L2 Cache Misses	495271876

471.omnetpp

Metric	Value
Number of L1 Accesses	559631569
Number of L2 Accesses	238994498
L1 Cache Misses	238994498
L2 Cache Misses	235808687

483.xalancbmk

Metric	Value
Number of L1 Accesses	518038102
Number of L2 Accesses	164584099
L1 Cache Misses	164584099
L2 Cache Misses	157582401

Part 3

400.perlbench

Metric	Value
Number of L1 Accesses	552608513
Number of L2 Accesses	297072218
L1 Cache Misses	297072218
L2 Cache Misses	288755746

401.bzip2

Metric	Value
Number of L1 Accesses	602701596
Number of L2 Accesses	258155879
L1 Cache Misses	258155879
L2 Cache Misses	234978289

403.gcc

Metric	Value
Number of L1 Accesses	504444163
Number of L2 Accesses	201747243
L1 Cache Misses	201747243
L2 Cache Misses	200201337

429.mcf

Metric	Value

Number of L1 Accesses	512817647
Number of L2 Accesses	231981535
L1 Cache Misses	231981535
L2 Cache Misses	181415925

450.soplex

Metric	Value
Number of L1 Accesses	471601173
Number of L2 Accesses	292654830
L1 Cache Misses	292654830
L2 Cache Misses	279199606

456.hmmer

Metric	Value
Number of L1 Accesses	623217112
Number of L2 Accesses	495375342
L1 Cache Misses	495375342
L2 Cache Misses	495280689

471.omnetpp

Metric	Value
Number of L1 Accesses	559217079
Number of L2 Accesses	239144239
L1 Cache Misses	239144239
L2 Cache Misses	235178149

483.xalancbmk

Metric	Value
Number of L1 Accesses	518038102
Number of L2 Accesses	164539774
L1 Cache Misses	164539774
L2 Cache Misses	157421376