```
--------------------------------------------------------------------------------
      astar-All-2way     Simulation Results
--------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2549106849  [25.49%]
  Number of writes  =   626305991  [6.26%]
  Number of inst    =  6824587160  [68.25%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  24005615139  [51.70%]
  Cycles for writes =  10994951788  [23.68%]
  Cycles for inst   =  11433827185  [24.62%]
  Total time        =  46434394112

Average cycles per activity:
  Read  = 9.42
  Write = 17.56
  Inst  = 1.68
Ideal: Exec. Time = 16824587160; CPI = 2.47
Ideal mis-aligned: Exec. Time = 23929686467; CPI = 3.51

Memory level: L1i
  Hits   =  11393817355  [100.00%]
  Misses =      497518  [0.00%]
  Total  =  11394314873
  Kickouts = 497262, Dirty kickouts = 0, Transfers = 497518

Memory level: L1d
  Hits   =  4261874755  [95.60%]
  Misses =   196297697  [4.40%]
  Total  =  4458172452
  Kickouts = 196297441, Dirty kickouts = 80765893, Transfers = 196297697

Memory level: L2
  Hits   =   160662256  [57.88%]
  Misses =   116898852  [42.12%]
  Total  =   277561108
  Kickouts = 116898340, Dirty kickouts = 59753876, Transfers = 116898852

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $100
  Memory cost    = $75
  Total cost     = $975
```

```
--------------------------------------------------------------------------------
      astar-All-4way     Simulation Results
--------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2549106849  [25.49%]
  Number of writes  =   626305991  [6.26%]
  Number of inst    =  6824587160  [68.25%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  23126240668  [50.79%]
  Cycles for writes =  11000753615  [24.16%]
  Cycles for inst   =  11406716641  [25.05%]
  Total time        =  45533710924

Average cycles per activity:
  Read  = 9.07
  Write = 17.56
  Inst  = 1.67
Ideal: Exec. Time = 16824587160; CPI = 2.47
Ideal mis-aligned: Exec. Time = 23929686467; CPI = 3.51

Memory level: L1i
  Hits   =  11394220237  [100.00%]
  Misses =       94636  [0.00%]
  Total  =  11394314873
  Kickouts = 94380, Dirty kickouts = 0, Transfers = 94636

Memory level: L1d
  Hits   =  4274666890  [95.88%]
  Misses =   183505562  [4.12%]
  Total  =  4458172452
  Kickouts = 183505306, Dirty kickouts = 75334151, Transfers = 183505562

Memory level: L2
  Hits   =   145435283  [56.17%]
  Misses =   113499066  [43.83%]
  Total  =   258934349
  Kickouts = 113498554, Dirty kickouts = 59270555, Transfers = 113499066

Cost analysis:
  L1i cache cost = $600
  L1d cache cost = $600
  L2  cache cost = $150
  Memory cost    = $75
  Total cost     = $1425
```

```
---------------------------------------------------------------------------
      astar-All-FA     Simulation Results
---------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2549106849  [25.49%]
  Number of writes  =   626305991  [6.26%]
  Number of inst    =  6824587160  [68.25%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  18015408791  [45.63%]
  Cycles for writes =  10066753018  [25.50%]
  Cycles for inst   =  11395359437  [28.87%]
  Total time        =  39477521246

Average cycles per activity:
  Read  = 7.07
  Write = 16.07
  Inst  = 1.67
Ideal: Exec. Time = 16824587160; CPI = 2.47
Ideal mis-aligned: Exec. Time = 23929686467; CPI = 3.51

Memory level: L1i
  Hits   =  11394307253  [100.00%]
  Misses =        7620  [0.00%]
  Total  =  11394314873
  Kickouts = 7364, Dirty kickouts = 0, Transfers = 7620

Memory level: L1d
  Hits   =  4292364560  [96.28%]
  Misses =   165807892  [3.72%]
  Total  =  4458172452
  Kickouts = 165807636, Dirty kickouts = 71377025, Transfers = 165807892

Memory level: L2
  Hits   =   155431402  [65.53%]
  Misses =    81761135  [34.47%]
  Total  =   237192537
  Kickouts = 81760623, Dirty kickouts = 52330695, Transfers = 81761135

Cost analysis:
  L1i cache cost = $1800
  L1d cache cost = $1800
  L2  cache cost = $500
  Memory cost    = $75
  Total cost     = $4175
```

```
---------------------------------------------------------------------------
      astar-defaults     Simulation Results
---------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2549106849  [25.49%]
  Number of writes  =   626305991  [6.26%]
  Number of inst    =  6824587160  [68.25%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  29021325420  [55.88%]
  Cycles for writes =  11433176077  [22.01%]
  Cycles for inst   =  11480910007  [22.11%]
  Total time        =  51935411504

Average cycles per activity:
  Read  = 11.38
  Write = 18.25
  Inst  = 1.68
Ideal: Exec. Time = 16824587160; CPI = 2.47
Ideal mis-aligned: Exec. Time = 23929686467; CPI = 3.51

Memory level: L1i
  Hits   =  11393011748  [99.99%]
  Misses =     1303125  [0.01%]
  Total  =  11394314873
  Kickouts = 1302869, Dirty kickouts = 0, Transfers = 1303125

Memory level: L1d
  Hits   =  4214841543  [94.54%]
  Misses =   243330909  [5.46%]
  Total  =  4458172452
  Kickouts = 243330653, Dirty kickouts = 94594555, Transfers = 243330909

Memory level: L2
  Hits   =   198286480  [58.45%]
  Misses =   140942109  [41.55%]
  Total  =   339228589
  Kickouts = 140941597, Dirty kickouts = 65799800, Transfers = 140942109

Cost analysis:
  L1i cache cost = $200
  L1d cache cost = $200
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $525
```

```
--------------------------------------------------------------------------------
      astar-L1-2way     Simulation Results
--------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2549106849  [25.49%]
  Number of writes  =   626305991  [6.26%]
  Number of inst    =  6824587160  [68.25%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  26226244755  [53.48%]
  Cycles for writes =  11378938976  [23.20%]
  Cycles for inst   =  11434789485  [23.32%]
  Total time        =  49039973216

Average cycles per activity:
  Read  = 10.29
  Write = 18.17
  Inst  = 1.68
Ideal: Exec. Time = 16824587160; CPI = 2.47
Ideal mis-aligned: Exec. Time = 23929686467; CPI = 3.51

Memory level: L1i
  Hits   =  11393817355  [100.00%]
  Misses =      497518  [0.00%]
  Total  =  11394314873
  Kickouts = 497262, Dirty kickouts = 0, Transfers = 497518

Memory level: L1d
  Hits   =  4261874755  [95.60%]
  Misses =   196297697  [4.40%]
  Total  =  4458172452
  Kickouts = 196297441, Dirty kickouts = 80765893, Transfers = 196297697

Memory level: L2
  Hits   =   145387883  [52.38%]
  Misses =   132173225  [47.62%]
  Total  =   277561108
  Kickouts = 132172713, Dirty kickouts = 62217961, Transfers = 132173225

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $925
```

```
--------------------------------------------------------------------------------
      astar-L1d-small     Simulation Results
--------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2549106849  [25.49%]
  Number of writes  =   626305991  [6.26%]
  Number of inst    =  6824587160  [68.25%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  33323479668  [58.95%]
  Cycles for writes =  11712805234  [20.72%]
  Cycles for inst   =  11490462399  [20.33%]
  Total time        =  56526747301

Average cycles per activity:
  Read  = 13.07
  Write = 18.70
  Inst  = 1.68
Ideal: Exec. Time = 16824587160; CPI = 2.47
Ideal mis-aligned: Exec. Time = 23929686467; CPI = 3.51

Memory level: L1i
  Hits   =  11393011748  [99.99%]
  Misses =     1303125  [0.01%]
  Total  =  11394314873
  Kickouts = 1302869, Dirty kickouts = 0, Transfers = 1303125

Memory level: L1d
  Hits   =  4001371773  [89.75%]
  Misses =   456800679  [10.25%]
  Total  =  4458172452
  Kickouts = 456800551, Dirty kickouts = 179643008, Transfers = 456800679

Memory level: L2
  Hits   =   501306381  [78.61%]
  Misses =   136440431  [21.39%]
  Total  =   637746812
  Kickouts = 136439919, Dirty kickouts = 65580547, Transfers = 136440431

Cost analysis:
  L1i cache cost = $200
  L1d cache cost = $100
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $425
```

```
-------------------------------------------------------------------------------
      astar-L1i-small     Simulation Results
-------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2549106849  [25.49%]
  Number of writes  =   626305991  [6.26%]
  Number of inst    =  6824587160  [68.25%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  29020269056  [55.80%]
  Cycles for writes =  11432412937  [21.98%]
  Cycles for inst   =  11556905551  [22.22%]
  Total time        =  52009587544

Average cycles per activity:
  Read  = 11.38
  Write = 18.25
  Inst  = 1.69
Ideal: Exec. Time = 16824587160; CPI = 2.47
Ideal mis-aligned: Exec. Time = 23929686467; CPI = 3.51

Memory level: L1i
  Hits   =  11391567196  [99.98%]
  Misses =     2747677  [0.02%]
  Total  =  11394314873
  Kickouts = 2747549, Dirty kickouts = 0, Transfers = 2747677

Memory level: L1d
  Hits   =  4214841543  [94.54%]
  Misses =   243330909  [5.46%]
  Total  =  4458172452
  Kickouts = 243330653, Dirty kickouts = 94594555, Transfers = 243330909

Memory level: L2
  Hits   =   199425854  [58.54%]
  Misses =   141247287  [41.46%]
  Total  =   340673141
  Kickouts = 141246775, Dirty kickouts = 65821284, Transfers = 141247287

Cost analysis:
  L1i cache cost = $100
  L1d cache cost = $200
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $425
```

```
--------------------------------------------------------------------------------
      astar-L1-small     Simulation Results
--------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2549106849  [25.49%]
  Number of writes  =   626305991  [6.26%]
  Number of inst    =  6824587160  [68.25%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  33324211848  [58.87%]
  Cycles for writes =  11711340562  [20.69%]
  Cycles for inst   =  11569088287  [20.44%]
  Total time        =  56604640697

Average cycles per activity:
  Read  = 13.07
  Write = 18.70
  Inst  = 1.70
Ideal: Exec. Time = 16824587160; CPI = 2.47
Ideal mis-aligned: Exec. Time = 23929686467; CPI = 3.51

Memory level: L1i
  Hits   =  11391567196  [99.98%]
  Misses =     2747677  [0.02%]
  Total  =  11394314873
  Kickouts = 2747549, Dirty kickouts = 0, Transfers = 2747677

Memory level: L1d
  Hits   =  4001371773  [89.75%]
  Misses =   456800679  [10.25%]
  Total  =  4458172452
  Kickouts = 456800551, Dirty kickouts = 179643008, Transfers = 456800679

Memory level: L2
  Hits   =   502425148  [78.60%]
  Misses =   136766216  [21.40%]
  Total  =   639191364
  Kickouts = 136765704, Dirty kickouts = 65606799, Transfers = 136766216

Cost analysis:
  L1i cache cost = $100
  L1d cache cost = $100
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $325
```

```
-------------------------------------------------------------------------------
      astar-L2-4way     Simulation Results
-------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2549106849  [25.49%]
  Number of writes  =   626305991  [6.26%]
  Number of inst    =  6824587160  [68.25%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  23250276263  [51.26%]
  Cycles for writes =  10673496632  [23.53%]
  Cycles for inst   =  11432214125  [25.21%]
  Total time        =  45355987020

Average cycles per activity:
  Read  = 9.12
  Write = 17.04
  Inst  = 1.68
Ideal: Exec. Time = 16824587160; CPI = 2.47
Ideal mis-aligned: Exec. Time = 23929686467; CPI = 3.51

Memory level: L1i
  Hits   =  11393817355  [100.00%]
  Misses =      497518  [0.00%]
  Total  =  11394314873
  Kickouts = 497262, Dirty kickouts = 0, Transfers = 497518

Memory level: L1d
  Hits   =  4261874755  [95.60%]
  Misses =   196297697  [4.40%]
  Total  =  4458172452
  Kickouts = 196297441, Dirty kickouts = 80765893, Transfers = 196297697

Memory level: L2
  Hits   =   167431165  [60.32%]
  Misses =   110129943  [39.68%]
  Total  =   277561108
  Kickouts = 110129431, Dirty kickouts = 59206672, Transfers = 110129943

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $150
  Memory cost    = $75
  Total cost     = $1025
```

```
---------------------------------------------------------------------------
      astar-L2-Big     Simulation Results
---------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2549106849  [25.49%]
  Number of writes  =   626305991  [6.26%]
  Number of inst    =  6824587160  [68.25%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  21384221747  [49.84%]
  Cycles for writes =  10091200004  [23.52%]
  Cycles for inst   =  11432956113  [26.65%]
  Total time        =  42908377864

Average cycles per activity:
  Read  = 8.39
  Write = 16.11
  Inst  = 1.68
Ideal: Exec. Time = 16824587160; CPI = 2.47
Ideal mis-aligned: Exec. Time = 23929686467; CPI = 3.51

Memory level: L1i
  Hits   =  11393817355  [100.00%]
  Misses =      497518  [0.00%]
  Total  =  11394314873
  Kickouts = 497262, Dirty kickouts = 0, Transfers = 497518

Memory level: L1d
  Hits   =  4261874755  [95.60%]
  Misses =   196297697  [4.40%]
  Total  =  4458172452
  Kickouts = 196297441, Dirty kickouts = 80765893, Transfers = 196297697

Memory level: L2
  Hits   =   178580547  [64.34%]
  Misses =    98980561  [35.66%]
  Total  =   277561108
  Kickouts = 98979537, Dirty kickouts = 53510239, Transfers = 98980561

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $925
```

```
--------------------------------------------------------------------------------
      astar-mem32_All-2way     Simulation Results
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
      astar-mem32_All-4way     Simulation Results
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
      astar-mem32_All-FA     Simulation Results
--------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
      astar-mem32_defaults     Simulation Results
--------------------------------------------------------------------------------
```

```
---------------------------------------------------------------------------
      astar-mem32_L1-2way     Simulation Results
---------------------------------------------------------------------------
```

```
-------------------------------------------------------------------------
      astar-mem-32     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2549106849  [25.49%]
  Number of writes  =   626305991  [6.26%]
  Number of inst    =  6824587160  [68.25%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  23271595940  [53.29%]
  Cycles for writes =  8930548277  [20.45%]
  Cycles for inst   =  11463590927  [26.25%]
  Total time        =  43665735144

Average cycles per activity:
  Read  = 9.13
  Write = 14.26
  Inst  = 6.40
Ideal: Exec. Time = 16824587160; CPI = 2.47
Ideal mis-aligned: Exec. Time = 23929686467; CPI = 3.51
  Ideal execution time   =  16824587160  [CPI 2.47]
  Ideal misaligned time  =  22677074485  [CPI 3.32]

Memory level: L1i
  Hits   =  11393011748  [99.99%]
  Misses =     1303125  [0.01%]
  Total  =  11394314873
  Kickouts = 1302869, Dirty kickouts = 0, Transfers = 1303125

Memory level: L1d
  Hits   =  4214841543  [94.54%]
  Misses =   243330909  [5.46%]
  Total  =  4458172452
  Kickouts = 243330653, Dirty kickouts = 94594555, Transfers = 243330909

Memory level: L2
  Hits   =   198286480  [58.45%]
  Misses =   140942109  [41.55%]
  Total  =   339228589
  Kickouts = 140941597, Dirty kickouts = 65799800, Transfers = 140942109

Cost analysis:
  L1i cache cost = $200
  L1d cache cost = $200
  L2  cache cost = $50
  Memory cost    = $175
  Total cost     = $625
```

```
-------------------------------------------------------------------------
      astar-mem-64     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2549106849  [25.49%]
  Number of writes  =   626305991  [6.26%]
  Number of inst    =  6824587160  [68.25%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  20396731200  [51.60%]
  Cycles for writes =  7679234377  [19.43%]
  Cycles for inst   =  11454931387  [28.98%]
  Total time        =  39530896964

Average cycles per activity:
  Read  = 8.00
  Write = 12.26
  Inst  = 5.79
Ideal: Exec. Time = 16824587160; CPI = 2.47
Ideal mis-aligned: Exec. Time = 23929686467; CPI = 3.51
  Ideal execution time   =  16824587160  [CPI 2.47]
  Ideal misaligned time  =  22677074485  [CPI 3.32]

Memory level: L1i
  Hits   =  11393011748  [99.99%]
  Misses =     1303125  [0.01%]
  Total  =  11394314873
  Kickouts = 1302869, Dirty kickouts = 0, Transfers = 1303125

Memory level: L1d
  Hits   =  4214841543  [94.54%]
  Misses =   243330909  [5.46%]
  Total  =  4458172452
  Kickouts = 243330653, Dirty kickouts = 94594555, Transfers = 243330909

Memory level: L2
  Hits   =   198286480  [58.45%]
  Misses =   140942109  [41.55%]
  Total  =   339228589
  Kickouts = 140941597, Dirty kickouts = 65799800, Transfers = 140942109

Cost analysis:
  L1i cache cost = $200
  L1d cache cost = $200
  L2  cache cost = $50
  Memory cost    = $275
  Total cost     = $725
```

```
-------------------------------------------------------------------------------
      bzip2-All-2way     Simulation Results
-------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1874397115  [18.74%]
  Number of writes  =   567216161  [5.67%]
  Number of inst    =  7558386724  [75.58%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  19599702681  [38.81%]
  Cycles for writes =  18932327356  [37.49%]
  Cycles for inst   =  11967527423  [23.70%]
  Total time        =  50499557460

Average cycles per activity:
  Read  = 10.46
  Write = 33.38
  Inst  = 1.58
Ideal: Exec. Time = 17558386724; CPI = 2.32
Ideal mis-aligned: Exec. Time = 23201139335; CPI = 3.07

Memory level: L1i
  Hits   =  11966585724  [100.00%]
  Misses =        7229  [0.00%]
  Total  =  11966592953
  Kickouts = 6973, Dirty kickouts = 0, Transfers = 7229

Memory level: L1d
  Hits   =  2376682331  [93.51%]
  Misses =   165045005  [6.49%]
  Total  =  2541727336
  Kickouts = 165044749, Dirty kickouts = 70704191, Transfers = 165045005

Memory level: L2
  Hits   =    81592046  [34.61%]
  Misses =   154164379  [65.39%]
  Total  =   235756425
  Kickouts = 154163867, Dirty kickouts = 64299983, Transfers = 154164379

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $100
  Memory cost    = $75
  Total cost     = $975
```

```
---------------------------------------------------------------------------
      bzip2-All-4way     Simulation Results
---------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1874397115  [18.74%]
  Number of writes  =   567216161  [5.67%]
  Number of inst    =  7558386724  [75.58%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  19276483134  [38.35%]
  Cycles for writes =  19026076053  [37.85%]
  Cycles for inst   =  11967495747  [23.81%]
  Total time        =  50270054934

Average cycles per activity:
  Read  = 10.28
  Write = 33.54
  Inst  = 1.58
Ideal: Exec. Time = 17558386724; CPI = 2.32
Ideal mis-aligned: Exec. Time = 23201139335; CPI = 3.07

Memory level: L1i
  Hits   =  11966585996  [100.00%]
  Misses =        6957  [0.00%]
  Total  =  11966592953
  Kickouts = 6701, Dirty kickouts = 0, Transfers = 6957

Memory level: L1d
  Hits   =  2378376456  [93.57%]
  Misses =   163350880  [6.43%]
  Total  =  2541727336
  Kickouts = 163350624, Dirty kickouts = 69948915, Transfers = 163350880

Memory level: L2
  Hits   =    79767974  [34.19%]
  Misses =   153538778  [65.81%]
  Total  =   233306752
  Kickouts = 153538266, Dirty kickouts = 63631592, Transfers = 153538778

Cost analysis:
  L1i cache cost = $600
  L1d cache cost = $600
  L2  cache cost = $150
  Memory cost    = $75
  Total cost     = $1425
```

```
---------------------------------------------------------------------------
      bzip2-All-FA     Simulation Results
---------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1874397115  [18.74%]
  Number of writes  =   567216161  [5.67%]
  Number of inst    =  7558386724  [75.58%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  18285268745  [38.77%]
  Cycles for writes =  16911508909  [35.86%]
  Cycles for inst   =  11967484275  [25.37%]
  Total time        =  47164261929

Average cycles per activity:
  Read  = 9.76
  Write = 29.81
  Inst  = 1.58
Ideal: Exec. Time = 17558386724; CPI = 2.32
Ideal mis-aligned: Exec. Time = 23201139335; CPI = 3.07

Memory level: L1i
  Hits   =  11966586014  [100.00%]
  Misses =        6939  [0.00%]
  Total  =  11966592953
  Kickouts = 6683, Dirty kickouts = 0, Transfers = 6939

Memory level: L1d
  Hits   =  2379071440  [93.60%]
  Misses =   162655896  [6.40%]
  Total  =  2541727336
  Kickouts = 162655640, Dirty kickouts = 69711198, Transfers = 162655896

Memory level: L2
  Hits   =    99223380  [42.70%]
  Misses =   133150653  [57.30%]
  Total  =   232374033
  Kickouts = 133150141, Dirty kickouts = 63118740, Transfers = 133150653

Cost analysis:
  L1i cache cost = $1800
  L1d cache cost = $1800
  L2  cache cost = $500
  Memory cost    = $75
  Total cost     = $4175
```

```
---------------------------------------------------------------------------
      bzip2-defaults     Simulation Results
---------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1874397115  [18.74%]
  Number of writes  =   567216161  [5.67%]
  Number of inst    =  7558386724  [75.58%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  21168923005  [40.97%]
  Cycles for writes =  18509292237  [35.82%]
  Cycles for inst   =  11988306327  [23.20%]
  Total time        =  51666521569

Average cycles per activity:
  Read  = 11.29
  Write = 32.63
  Inst  = 1.59
Ideal: Exec. Time = 17558386724; CPI = 2.32
Ideal mis-aligned: Exec. Time = 23201139335; CPI = 3.07

Memory level: L1i
  Hits   =  11965504642  [99.99%]
  Misses =     1088311  [0.01%]
  Total  =  11966592953
  Kickouts = 1088055, Dirty kickouts = 0, Transfers = 1088311

Memory level: L1d
  Hits   =  2360740266  [92.88%]
  Misses =   180987070  [7.12%]
  Total  =  2541727336
  Kickouts = 180986814, Dirty kickouts = 75658750, Transfers = 180987070

Memory level: L2
  Hits   =   100849192  [39.13%]
  Misses =   156884939  [60.87%]
  Total  =   257734131
  Kickouts = 156884427, Dirty kickouts = 66969105, Transfers = 156884939

Cost analysis:
  L1i cache cost = $200
  L1d cache cost = $200
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $525
```

```
---------------------------------------------------------------------------
      bzip2-L1-2way     Simulation Results
---------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1874397115  [18.74%]
  Number of writes  =   567216161  [5.67%]
  Number of inst    =  7558386724  [75.58%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  20290282521  [39.02%]
  Cycles for writes =  19745481896  [37.97%]
  Cycles for inst   =  11967529611  [23.01%]
  Total time        =  52003294028

Average cycles per activity:
  Read  = 10.82
  Write = 34.81
  Inst  = 1.58
Ideal: Exec. Time = 17558386724; CPI = 2.32
Ideal mis-aligned: Exec. Time = 23201139335; CPI = 3.07

Memory level: L1i
  Hits   =  11966585724  [100.00%]
  Misses =        7229  [0.00%]
  Total  =  11966592953
  Kickouts = 6973, Dirty kickouts = 0, Transfers = 7229

Memory level: L1d
  Hits   =  2376682331  [93.51%]
  Misses =   165045005  [6.49%]
  Total  =  2541727336
  Kickouts = 165044749, Dirty kickouts = 70704191, Transfers = 165045005

Memory level: L2
  Hits   =    72343025  [30.69%]
  Misses =   163413400  [69.31%]
  Total  =   235756425
  Kickouts = 163412888, Dirty kickouts = 65263422, Transfers = 163413400

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $925
```

```
-------------------------------------------------------------------------
      bzip2-L1d-small     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1874397115  [18.74%]
  Number of writes  =   567216161  [5.67%]
  Number of inst    =  7558386724  [75.58%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  21179775524  [41.43%]
  Cycles for writes =  17952796895  [35.12%]
  Cycles for inst   =  11988368687  [23.45%]
  Total time        =  51120941106

Average cycles per activity:
  Read  = 11.30
  Write = 31.65
  Inst  = 1.59
Ideal: Exec. Time = 17558386724; CPI = 2.32
Ideal mis-aligned: Exec. Time = 23201139335; CPI = 3.07

Memory level: L1i
  Hits   =  11965504642  [99.99%]
  Misses =     1088311  [0.01%]
  Total  =  11966592953
  Kickouts = 1088055, Dirty kickouts = 0, Transfers = 1088311

Memory level: L1d
  Hits   =  2336029598  [91.91%]
  Misses =   205697738  [8.09%]
  Total  =  2541727336
  Kickouts = 205697610, Dirty kickouts = 84391651, Transfers = 205697738

Memory level: L2
  Hits   =   141441999  [48.58%]
  Misses =   149735701  [51.42%]
  Total  =   291177700
  Kickouts = 149735189, Dirty kickouts = 66392358, Transfers = 149735701

Cost analysis:
  L1i cache cost = $200
  L1d cache cost = $100
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $425
```

```
---------------------------------------------------------------------------
      bzip2-L1i-small     Simulation Results
---------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1874397115  [18.74%]
  Number of writes  =   567216161  [5.67%]
  Number of inst    =  7558386724  [75.58%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  21168887421  [40.97%]
  Cycles for writes =  18509339581  [35.82%]
  Cycles for inst   =  11990304675  [23.21%]
  Total time        =  51668531677

Average cycles per activity:
  Read  = 11.29
  Write = 32.63
  Inst  = 1.59
Ideal: Exec. Time = 17558386724; CPI = 2.32
Ideal mis-aligned: Exec. Time = 23201139335; CPI = 3.07

Memory level: L1i
  Hits   =  11965490130  [99.99%]
  Misses =     1102823  [0.01%]
  Total  =  11966592953
  Kickouts = 1102695, Dirty kickouts = 0, Transfers = 1102823

Memory level: L1d
  Hits   =  2360740266  [92.88%]
  Misses =   180987070  [7.12%]
  Total  =  2541727336
  Kickouts = 180986814, Dirty kickouts = 75658750, Transfers = 180987070

Memory level: L2
  Hits   =   100852695  [39.13%]
  Misses =   156895948  [60.87%]
  Total  =   257748643
  Kickouts = 156895436, Dirty kickouts = 66969959, Transfers = 156895948

Cost analysis:
  L1i cache cost = $100
  L1d cache cost = $200
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $425
```

```
---------------------------------------------------------------------------
      bzip2-L1-small     Simulation Results
---------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1874397115  [18.74%]
  Number of writes  =   567216161  [5.67%]
  Number of inst    =  7558386724  [75.58%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  21179555688  [41.43%]
  Cycles for writes =  17952916491  [35.12%]
  Cycles for inst   =  11990524495  [23.45%]
  Total time        =  51122996674

Average cycles per activity:
  Read  = 11.30
  Write = 31.65
  Inst  = 1.59
Ideal: Exec. Time = 17558386724; CPI = 2.32
Ideal mis-aligned: Exec. Time = 23201139335; CPI = 3.07

Memory level: L1i
  Hits   =  11965490130  [99.99%]
  Misses =     1102823  [0.01%]
  Total  =  11966592953
  Kickouts = 1102695, Dirty kickouts = 0, Transfers = 1102823

Memory level: L1d
  Hits   =  2336029598  [91.91%]
  Misses =   205697738  [8.09%]
  Total  =  2541727336
  Kickouts = 205697610, Dirty kickouts = 84391651, Transfers = 205697738

Memory level: L2
  Hits   =   141445647  [48.57%]
  Misses =   149746565  [51.43%]
  Total  =   291192212
  Kickouts = 149746053, Dirty kickouts = 66393690, Transfers = 149746565

Cost analysis:
  L1i cache cost = $100
  L1d cache cost = $100
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $325
```

```
-------------------------------------------------------------------------
      bzip2-L2-4way     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1874397115  [18.74%]
  Number of writes  =   567216161  [5.67%]
  Number of inst    =  7558386724  [75.58%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  19218012465  [38.90%]
  Cycles for writes =  18215958176  [36.87%]
  Cycles for inst   =  11967539859  [24.23%]
  Total time        =  49401510500

Average cycles per activity:
  Read  = 10.25
  Write = 32.11
  Inst  = 1.58
Ideal: Exec. Time = 17558386724; CPI = 2.32
Ideal mis-aligned: Exec. Time = 23201139335; CPI = 3.07

Memory level: L1i
  Hits   =  11966585724  [100.00%]
  Misses =        7229  [0.00%]
  Total  =  11966592953
  Kickouts = 6973, Dirty kickouts = 0, Transfers = 7229

Memory level: L1d
  Hits   =  2376682331  [93.51%]
  Misses =   165045005  [6.49%]
  Total  =  2541727336
  Kickouts = 165044749, Dirty kickouts = 70704191, Transfers = 165045005

Memory level: L2
  Hits   =    88469976  [37.53%]
  Misses =   147286449  [62.47%]
  Total  =   235756425
  Kickouts = 147285937, Dirty kickouts = 63727745, Transfers = 147286449

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $150
  Memory cost    = $75
  Total cost     = $1025
```

```
---------------------------------------------------------------------------
      bzip2-L2-Big     Simulation Results
---------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1874397115  [18.74%]
  Number of writes  =   567216161  [5.67%]
  Number of inst    =  7558386724  [75.58%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  18767801181  [38.28%]
  Cycles for writes =  18297521656  [37.32%]
  Cycles for inst   =  11967513511  [24.41%]
  Total time        =  49032836348

Average cycles per activity:
  Read  = 10.01
  Write = 32.26
  Inst  = 1.58
Ideal: Exec. Time = 17558386724; CPI = 2.32
Ideal mis-aligned: Exec. Time = 23201139335; CPI = 3.07

Memory level: L1i
  Hits   =  11966585724  [100.00%]
  Misses =        7229  [0.00%]
  Total  =  11966592953
  Kickouts = 6973, Dirty kickouts = 0, Transfers = 7229

Memory level: L1d
  Hits   =  2376682331  [93.51%]
  Misses =   165045005  [6.49%]
  Total  =  2541727336
  Kickouts = 165044749, Dirty kickouts = 70704191, Transfers = 165045005

Memory level: L2
  Hits   =    90203610  [38.26%]
  Misses =   145552815  [61.74%]
  Total  =   235756425
  Kickouts = 145551791, Dirty kickouts = 62927057, Transfers = 145552815

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $925
```

```
-------------------------------------------------------------------------------
      gobmk-All-2way     Simulation Results
-------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1922316435  [19.22%]
  Number of writes  =   915303047  [9.15%]
  Number of inst    =  7162380518  [71.62%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  13195911623  [19.96%]
  Cycles for writes =  12253946255  [18.53%]
  Cycles for inst   =  40671067195  [61.51%]
  Total time        =  66120925073

Average cycles per activity:
  Read  = 6.86
  Write = 13.39
  Inst  = 5.68
Ideal: Exec. Time = 17162380518; CPI = 2.4
Ideal mis-aligned: Exec. Time = 25198023284; CPI = 3.52

Memory level: L1i
  Hits   =  11760551202  [96.61%]
  Misses =   412661231  [3.39%]
  Total  =  12173212433
  Kickouts = 412660975, Dirty kickouts = 0, Transfers = 412661231

Memory level: L1d
  Hits   =  3875982042  [96.13%]
  Misses =   155842197  [3.87%]
  Total  =  4031824239
  Kickouts = 155841941, Dirty kickouts = 95078017, Transfers = 155842197

Memory level: L2
  Hits   =   456124049  [68.74%]
  Misses =   207457396  [31.26%]
  Total  =   663581445
  Kickouts = 207456884, Dirty kickouts = 52591470, Transfers = 207457396

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $100
  Memory cost    = $75
  Total cost     = $975
```

```
--------------------------------------------------------------------------------
      gobmk-All-4way     Simulation Results
--------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1922316435  [19.22%]
  Number of writes  =   915303047  [9.15%]
  Number of inst    =  7162380518  [71.62%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  11145746026  [18.66%]
  Cycles for writes =  11639084956  [19.48%]
  Cycles for inst   =  36957387613  [61.86%]
  Total time        =  59742218595

Average cycles per activity:
  Read  = 5.80
  Write = 12.72
  Inst  = 5.16
Ideal: Exec. Time = 17162380518; CPI = 2.4
Ideal mis-aligned: Exec. Time = 25198023284; CPI = 3.52

Memory level: L1i
  Hits   =  11768803275  [96.68%]
  Misses =   404409158  [3.32%]
  Total  =  12173212433
  Kickouts = 404408902, Dirty kickouts = 0, Transfers = 404409158

Memory level: L1d
  Hits   =  3900603297  [96.75%]
  Misses =   131220942  [3.25%]
  Total  =  4031824239
  Kickouts = 131220686, Dirty kickouts = 82611655, Transfers = 131220942

Memory level: L2
  Hits   =   441968289  [71.49%]
  Misses =   176273466  [28.51%]
  Total  =   618241755
  Kickouts = 176272954, Dirty kickouts = 45735493, Transfers = 176273466

Cost analysis:
  L1i cache cost = $600
  L1d cache cost = $600
  L2  cache cost = $150
  Memory cost    = $75
  Total cost     = $1425
```

```
--------------------------------------------------------------------------------
      gobmk-All-FA     Simulation Results
--------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1922316435  [19.22%]
  Number of writes  =   915303047  [9.15%]
  Number of inst    =  7162380518  [71.62%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  10177636473  [18.76%]
  Cycles for writes =  11625209658  [21.43%]
  Cycles for inst   =  32434837313  [59.80%]
  Total time        =  54237683444

Average cycles per activity:
  Read  = 5.29
  Write = 12.70
  Inst  = 4.53
Ideal: Exec. Time = 17162380518; CPI = 2.4
Ideal mis-aligned: Exec. Time = 25198023284; CPI = 3.52

Memory level: L1i
  Hits   =  11768474955  [96.68%]
  Misses =   404737478  [3.32%]
  Total  =  12173212433
  Kickouts = 404737222, Dirty kickouts = 0, Transfers = 404737478

Memory level: L1d
  Hits   =  3914924730  [97.10%]
  Misses =   116899509  [2.90%]
  Total  =  4031824239
  Kickouts = 116899253, Dirty kickouts = 74510782, Transfers = 116899509

Memory level: L2
  Hits   =   449500040  [75.40%]
  Misses =   146647729  [24.60%]
  Total  =   596147769
  Kickouts = 146647217, Dirty kickouts = 40518813, Transfers = 146647729

Cost analysis:
  L1i cache cost = $1800
  L1d cache cost = $1800
  L2  cache cost = $500
  Memory cost    = $75
  Total cost     = $4175
```

```
-------------------------------------------------------------------------
      gobmk-defaults     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1922316435  [19.22%]
  Number of writes  =   915303047  [9.15%]
  Number of inst    =  7162380518  [71.62%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  19272524246  [24.88%]
  Cycles for writes =  14663275601  [18.93%]
  Cycles for inst   =  43519641089  [56.19%]
  Total time        =  77455440936

Average cycles per activity:
  Read  = 10.03
  Write = 16.02
  Inst  = 6.08
Ideal: Exec. Time = 17162380518; CPI = 2.4
Ideal mis-aligned: Exec. Time = 25198023284; CPI = 3.52

Memory level: L1i
  Hits   =  11735764313  [96.41%]
  Misses =   437448120  [3.59%]
  Total  =  12173212433
  Kickouts = 437447864, Dirty kickouts = 0, Transfers = 437448120

Memory level: L1d
  Hits   =  3818513808  [94.71%]
  Misses =   213310431  [5.29%]
  Total  =  4031824239
  Kickouts = 213310175, Dirty kickouts = 118587278, Transfers = 213310431

Memory level: L2
  Hits   =   512333089  [66.59%]
  Misses =   257012740  [33.41%]
  Total  =   769345829
  Kickouts = 257012228, Dirty kickouts = 67734865, Transfers = 257012740

Cost analysis:
  L1i cache cost = $200
  L1d cache cost = $200
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $525
```

```
--------------------------------------------------------------------------------
      gobmk-L1-2way     Simulation Results
--------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1922316435  [19.22%]
  Number of writes  =   915303047  [9.15%]
  Number of inst    =  7162380518  [71.62%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  15208682795  [21.29%]
  Cycles for writes =  13465048175  [18.85%]
  Cycles for inst   =  42753772271  [59.86%]
  Total time        =  71427503241

Average cycles per activity:
  Read  = 7.91
  Write = 14.71
  Inst  = 5.97
Ideal: Exec. Time = 17162380518; CPI = 2.4
Ideal mis-aligned: Exec. Time = 25198023284; CPI = 3.52

Memory level: L1i
  Hits   =  11760551202  [96.61%]
  Misses =   412661231  [3.39%]
  Total  =  12173212433
  Kickouts = 412660975, Dirty kickouts = 0, Transfers = 412661231

Memory level: L1d
  Hits   =  3875982042  [96.13%]
  Misses =   155842197  [3.87%]
  Total  =  4031824239
  Kickouts = 155841941, Dirty kickouts = 95078017, Transfers = 155842197

Memory level: L2
  Hits   =   425749513  [64.16%]
  Misses =   237831932  [35.84%]
  Total  =   663581445
  Kickouts = 237831420, Dirty kickouts = 58385376, Transfers = 237831932

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $925
```

```
---------------------------------------------------------------------------
      gobmk-L1d-small     Simulation Results
---------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1922316435  [19.22%]
  Number of writes  =   915303047  [9.15%]
  Number of inst    =  7162380518  [71.62%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  22086107086  [26.44%]
  Cycles for writes =  15349814889  [18.38%]
  Cycles for inst   =  46086225153  [55.18%]
  Total time        =  83522147128

Average cycles per activity:
  Read  = 11.49
  Write = 16.77
  Inst  = 6.43
Ideal: Exec. Time = 17162380518; CPI = 2.4
Ideal mis-aligned: Exec. Time = 25198023284; CPI = 3.52

Memory level: L1i
  Hits   =  11735764313  [96.41%]
  Misses =   437448120  [3.59%]
  Total  =  12173212433
  Kickouts = 437447864, Dirty kickouts = 0, Transfers = 437448120

Memory level: L1d
  Hits   =  3714997049  [92.14%]
  Misses =   316827190  [7.86%]
  Total  =  4031824239
  Kickouts = 316827062, Dirty kickouts = 163593096, Transfers = 316827190

Memory level: L2
  Hits   =   645196283  [70.29%]
  Misses =   272672123  [29.71%]
  Total  =   917868406
  Kickouts = 272671611, Dirty kickouts = 75739986, Transfers = 272672123

Cost analysis:
  L1i cache cost = $200
  L1d cache cost = $100
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $425
```

```
---------------------------------------------------------------------------
      gobmk-L1i-small     Simulation Results
---------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1922316435  [19.22%]
  Number of writes  =   915303047  [9.15%]
  Number of inst    =  7162380518  [71.62%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  19646223306  [23.91%]
  Cycles for writes =  14884871989  [18.12%]
  Cycles for inst   =  47633738421  [57.97%]
  Total time        =  82164833716

Average cycles per activity:
  Read  = 10.22
  Write = 16.26
  Inst  = 6.65
Ideal: Exec. Time = 17162380518; CPI = 2.4
Ideal mis-aligned: Exec. Time = 25198023284; CPI = 3.52

Memory level: L1i
  Hits   =  11581007415  [95.14%]
  Misses =   592205018  [4.86%]
  Total  =  12173212433
  Kickouts = 592204890, Dirty kickouts = 0, Transfers = 592205018

Memory level: L1d
  Hits   =  3818513808  [94.71%]
  Misses =   213310431  [5.29%]
  Total  =  4031824239
  Kickouts = 213310175, Dirty kickouts = 118587278, Transfers = 213310431

Memory level: L2
  Hits   =   655508270  [70.93%]
  Misses =   268594457  [29.07%]
  Total  =   924102727
  Kickouts = 268593945, Dirty kickouts = 69232540, Transfers = 268594457

Cost analysis:
  L1i cache cost = $100
  L1d cache cost = $200
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $425
```

```
-------------------------------------------------------------------------
      gobmk-L1-small     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1922316435  [19.22%]
  Number of writes  =   915303047  [9.15%]
  Number of inst    =  7162380518  [71.62%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  22726847026  [25.47%]
  Cycles for writes =  15681654857  [17.57%]
  Cycles for inst   =  50826690609  [56.96%]
  Total time        =  89235192492

Average cycles per activity:
  Read  = 11.82
  Write = 17.13
  Inst  = 7.10
Ideal: Exec. Time = 17162380518; CPI = 2.4
Ideal mis-aligned: Exec. Time = 25198023284; CPI = 3.52

Memory level: L1i
  Hits   =  11581007415  [95.14%]
  Misses =   592205018  [4.86%]
  Total  =  12173212433
  Kickouts = 592204890, Dirty kickouts = 0, Transfers = 592205018

Memory level: L1d
  Hits   =  3714997049  [92.14%]
  Misses =   316827190  [7.86%]
  Total  =  4031824239
  Kickouts = 316827062, Dirty kickouts = 163593096, Transfers = 316827190

Memory level: L2
  Hits   =   782748031  [72.97%]
  Misses =   289877273  [27.03%]
  Total  =  1072625304
  Kickouts = 289876761, Dirty kickouts = 78461836, Transfers = 289877273

Cost analysis:
  L1i cache cost = $100
  L1d cache cost = $100
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $325
```

```
-------------------------------------------------------------------------
      gobmk-L2-4way     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1922316435  [19.22%]
  Number of writes  =   915303047  [9.15%]
  Number of inst    =  7162380518  [71.62%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  12081202027  [19.45%]
  Cycles for writes =  11808765751  [19.02%]
  Cycles for inst   =  38209645975  [61.53%]
  Total time        =  62099613753

Average cycles per activity:
  Read  = 6.28
  Write = 12.90
  Inst  = 5.33
Ideal: Exec. Time = 17162380518; CPI = 2.4
Ideal mis-aligned: Exec. Time = 25198023284; CPI = 3.52

Memory level: L1i
  Hits   =  11760551202  [96.61%]
  Misses =   412661231  [3.39%]
  Total  =  12173212433
  Kickouts = 412660975, Dirty kickouts = 0, Transfers = 412661231

Memory level: L1d
  Hits   =  3875982042  [96.13%]
  Misses =   155842197  [3.87%]
  Total  =  4031824239
  Kickouts = 155841941, Dirty kickouts = 95078017, Transfers = 155842197

Memory level: L2
  Hits   =   480211579  [72.37%]
  Misses =   183369866  [27.63%]
  Total  =   663581445
  Kickouts = 183369354, Dirty kickouts = 49331778, Transfers = 183369866

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $150
  Memory cost    = $75
  Total cost     = $1025
```

```
-------------------------------------------------------------------------
      gobmk-L2-Big     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1922316435  [19.22%]
  Number of writes  =   915303047  [9.15%]
  Number of inst    =  7162380518  [71.62%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  11418689099  [19.93%]
  Cycles for writes =  10604480439  [18.51%]
  Cycles for inst   =  35258823739  [61.55%]
  Total time        =  57281993277

Average cycles per activity:
  Read  = 5.94
  Write = 11.59
  Inst  = 4.92
Ideal: Exec. Time = 17162380518; CPI = 2.4
Ideal mis-aligned: Exec. Time = 25198023284; CPI = 3.52

Memory level: L1i
  Hits   =  11760551202  [96.61%]
  Misses =   412661231  [3.39%]
  Total  =  12173212433
  Kickouts = 412660975, Dirty kickouts = 0, Transfers = 412661231

Memory level: L1d
  Hits   =  3875982042  [96.13%]
  Misses =   155842197  [3.87%]
  Total  =  4031824239
  Kickouts = 155841941, Dirty kickouts = 95078017, Transfers = 155842197

Memory level: L2
  Hits   =   502768376  [75.77%]
  Misses =   160813069  [24.23%]
  Total  =   663581445
  Kickouts = 160812045, Dirty kickouts = 38765960, Transfers = 160813069

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $925
```

```
-------------------------------------------------------------------------
      omnetpp-All-2way     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  33880472608  [44.87%]
  Cycles for writes =  7825980824  [10.37%]
  Cycles for inst   =  33797017651  [44.76%]
  Total time        =  75503471083

Average cycles per activity:
  Read  = 16.86
  Write = 6.32
  Inst  = 5.00
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94

Memory level: L1i
  Hits   =  11123145966  [97.05%]
  Misses =   338100123  [2.95%]
  Total  =  11461246089
  Kickouts = 338099867, Dirty kickouts = 0, Transfers = 338100123

Memory level: L1d
  Hits   =  5669434506  [95.62%]
  Misses =   259457110  [4.38%]
  Total  =  5928891616
  Kickouts = 259456854, Dirty kickouts = 105849456, Transfers = 259457110

Memory level: L2
  Hits   =   453267900  [64.44%]
  Misses =   250138789  [35.56%]
  Total  =   703406689
  Kickouts = 250138277, Dirty kickouts = 60980869, Transfers = 250138789

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $100
  Memory cost    = $75
  Total cost     = $975
```

```
-------------------------------------------------------------------------
      omnetpp-All-4way     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  29445020301  [45.56%]
  Cycles for writes =  7075879230  [10.95%]
  Cycles for inst   =  28104895749  [43.49%]
  Total time        =  64625795280

Average cycles per activity:
  Read  = 14.65
  Write = 5.72
  Inst  = 4.16
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94

Memory level: L1i
  Hits   =  11176886229  [97.52%]
  Misses =   284359860  [2.48%]
  Total  =  11461246089
  Kickouts = 284359604, Dirty kickouts = 0, Transfers = 284359860

Memory level: L1d
  Hits   =  5710864475  [96.32%]
  Misses =   218027141  [3.68%]
  Total  =  5928891616
  Kickouts = 218026885, Dirty kickouts = 85447461, Transfers = 218027141

Memory level: L2
  Hits   =   387962332  [66.00%]
  Misses =   199872130  [34.00%]
  Total  =   587834462
  Kickouts = 199871618, Dirty kickouts = 51135782, Transfers = 199872130

Cost analysis:
  L1i cache cost = $600
  L1d cache cost = $600
  L2  cache cost = $150
  Memory cost    = $75
  Total cost     = $1425
```

```
------------------------------------------------------------------------
      omnetpp-All-FA     Simulation Results
------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  25157269567  [45.28%]
  Cycles for writes =  6585593574  [11.85%]
  Cycles for inst   =  23816702881  [42.87%]
  Total time        =  55559566022

Average cycles per activity:
  Read  = 12.52
  Write = 5.32
  Inst  = 3.53
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94

Memory level: L1i
  Hits   =  11259288301  [98.24%]
  Misses =   201957788  [1.76%]
  Total  =  11461246089
  Kickouts = 201957532, Dirty kickouts = 0, Transfers = 201957788

Memory level: L1d
  Hits   =  5753056729  [97.03%]
  Misses =   175834887  [2.97%]
  Total  =  5928891616
  Kickouts = 175834631, Dirty kickouts = 72136579, Transfers = 175834887

Memory level: L2
  Hits   =   288582036  [64.14%]
  Misses =   161347218  [35.86%]
  Total  =   449929254
  Kickouts = 161346706, Dirty kickouts = 44738929, Transfers = 161347218

Cost analysis:
  L1i cache cost = $1800
  L1d cache cost = $1800
  L2  cache cost = $500
  Memory cost    = $75
  Total cost     = $4175
```

```
-------------------------------------------------------------------------
      omnetpp-defaults     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  44619155042  [45.99%]
  Cycles for writes =  10153638624  [10.47%]
  Cycles for inst   =  42244697827  [43.54%]
  Total time        =  97017491493

Average cycles per activity:
  Read  = 22.21
  Write = 8.20
  Inst  = 6.26
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94

Memory level: L1i
  Hits   =  11006133158  [96.03%]
  Misses =   455112931  [3.97%]
  Total  =  11461246089
  Kickouts = 455112675, Dirty kickouts = 0, Transfers = 455112931

Memory level: L1d
  Hits   =  5562301532  [93.82%]
  Misses =   366590084  [6.18%]
  Total  =  5928891616
  Kickouts = 366589828, Dirty kickouts = 162590750, Transfers = 366590084

Memory level: L2
  Hits   =   643964024  [65.42%]
  Misses =   340329741  [34.58%]
  Total  =   984293765
  Kickouts = 340329229, Dirty kickouts = 83598965, Transfers = 340329741

Cost analysis:
  L1i cache cost = $200
  L1d cache cost = $200
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $525
```

```
--------------------------------------------------------------------------
      omnetpp-L1-2way     Simulation Results
--------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  37014442624  [45.16%]
  Cycles for writes =  8446268860  [10.30%]
  Cycles for inst   =  36503963575  [44.54%]
  Total time        =  81964675059

Average cycles per activity:
  Read  = 18.42
  Write = 6.82
  Inst  = 5.41
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94

Memory level: L1i
  Hits   =  11123145966  [97.05%]
  Misses =   338100123  [2.95%]
  Total  =  11461246089
  Kickouts = 338099867, Dirty kickouts = 0, Transfers = 338100123

Memory level: L1d
  Hits   =  5669434506  [95.62%]
  Misses =   259457110  [4.38%]
  Total  =  5928891616
  Kickouts = 259456854, Dirty kickouts = 105849456, Transfers = 259457110

Memory level: L2
  Hits   =   414993528  [59.00%]
  Misses =   288413161  [41.00%]
  Total  =   703406689
  Kickouts = 288412649, Dirty kickouts = 66670847, Transfers = 288413161

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $925
```

```
-------------------------------------------------------------------------
      omnetpp-L1d-small     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  49070242502  [46.99%]
  Cycles for writes =  10633561033  [10.18%]
  Cycles for inst   =  44716782979  [42.82%]
  Total time        =  104420586514

Average cycles per activity:
  Read  = 24.42
  Write = 8.59
  Inst  = 6.62
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94

Memory level: L1i
  Hits   =  11006133158  [96.03%]
  Misses =   455112931  [3.97%]
  Total  =  11461246089
  Kickouts = 455112675, Dirty kickouts = 0, Transfers = 455112931

Memory level: L1d
  Hits   =  5423480899  [91.48%]
  Misses =   505410717  [8.52%]
  Total  =  5928891616
  Kickouts = 505410589, Dirty kickouts = 217210609, Transfers = 505410717

Memory level: L2
  Hits   =   814325803  [69.14%]
  Misses =   363408454  [30.86%]
  Total  =  1177734257
  Kickouts = 363407942, Dirty kickouts = 87599940, Transfers = 363408454

Cost analysis:
  L1i cache cost = $200
  L1d cache cost = $100
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $425
```

```
-------------------------------------------------------------------------
      omnetpp-L1i-small     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  45635285370  [43.31%]
  Cycles for writes =  10298001452  [9.77%]
  Cycles for inst   =  49440921283  [46.92%]
  Total time        =  105374208105

Average cycles per activity:
  Read  = 22.71
  Write = 8.32
  Inst  = 7.32
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94

Memory level: L1i
  Hits   =  10791448034  [94.16%]
  Misses =   669798055  [5.84%]
  Total  =  11461246089
  Kickouts = 669797927, Dirty kickouts = 0, Transfers = 669798055

Memory level: L1d
  Hits   =  5562301532  [93.82%]
  Misses =   366590084  [6.18%]
  Total  =  5928891616
  Kickouts = 366589828, Dirty kickouts = 162590750, Transfers = 366590084

Memory level: L2
  Hits   =   830511583  [69.27%]
  Misses =   368467306  [30.73%]
  Total  =  1198978889
  Kickouts = 368466794, Dirty kickouts = 85941999, Transfers = 368467306

Cost analysis:
  L1i cache cost = $100
  L1d cache cost = $200
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $425
```

```
--------------------------------------------------------------------------
      omnetpp-L1-small     Simulation Results
--------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  50670291246  [44.33%]
  Cycles for writes =  10804636869  [9.45%]
  Cycles for inst   =  52822645763  [46.22%]
  Total time        =  114297573878

Average cycles per activity:
  Read  = 25.22
  Write = 8.73
  Inst  = 7.82
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94

Memory level: L1i
  Hits   =  10791448034  [94.16%]
  Misses =   669798055  [5.84%]
  Total  =  11461246089
  Kickouts = 669797927, Dirty kickouts = 0, Transfers = 669798055

Memory level: L1d
  Hits   =  5423480899  [91.48%]
  Misses =   505410717  [8.52%]
  Total  =  5928891616
  Kickouts = 505410589, Dirty kickouts = 217210609, Transfers = 505410717

Memory level: L2
  Hits   =   992116313  [71.25%]
  Misses =   400303068  [28.75%]
  Total  =  1392419381
  Kickouts = 400302556, Dirty kickouts = 91544599, Transfers = 400303068

Cost analysis:
  L1i cache cost = $100
  L1d cache cost = $100
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $325
```

```
---------------------------------------------------------------------------
      omnetpp-L2-4way     Simulation Results
---------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  31083510424  [44.76%]
  Cycles for writes =  7466023388  [10.75%]
  Cycles for inst   =  30888515511  [44.48%]
  Total time        =  69438049323

Average cycles per activity:
  Read  = 15.47
  Write = 6.03
  Inst  = 4.57
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94

Memory level: L1i
  Hits   =  11123145966  [97.05%]
  Misses =   338100123  [2.95%]
  Total  =  11461246089
  Kickouts = 338099867, Dirty kickouts = 0, Transfers = 338100123

Memory level: L1d
  Hits   =  5669434506  [95.62%]
  Misses =   259457110  [4.38%]
  Total  =  5928891616
  Kickouts = 259456854, Dirty kickouts = 105849456, Transfers = 259457110

Memory level: L2
  Hits   =   488279575  [69.42%]
  Misses =   215127114  [30.58%]
  Total  =   703406689
  Kickouts = 215126602, Dirty kickouts = 54668770, Transfers = 215127114

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $150
  Memory cost    = $75
  Total cost     = $1025
```

```
--------------------------------------------------------------------------
      omnetpp-L2-Big     Simulation Results
--------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  29092369548  [44.19%]
  Cycles for writes =  6988619336  [10.62%]
  Cycles for inst   =  29748059303  [45.19%]
  Total time        =  65829048187

Average cycles per activity:
  Read  = 14.48
  Write = 5.65
  Inst  = 4.41
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94

Memory level: L1i
  Hits   =  11123145966  [97.05%]
  Misses =   338100123  [2.95%]
  Total  =  11461246089
  Kickouts = 338099867, Dirty kickouts = 0, Transfers = 338100123

Memory level: L1d
  Hits   =  5669434506  [95.62%]
  Misses =   259457110  [4.38%]
  Total  =  5928891616
  Kickouts = 259456854, Dirty kickouts = 105849456, Transfers = 259457110

Memory level: L2
  Hits   =   508143677  [72.24%]
  Misses =   195263012  [27.76%]
  Total  =   703406689
  Kickouts = 195261988, Dirty kickouts = 49889384, Transfers = 195263012

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $925
```

```
------------------------------------------------------------------------
      omnetpp-mem32_All-2way     Simulation Results
------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  27089750968  [42.96%]
  Cycles for writes =  6607499064  [10.48%]
  Cycles for inst   =  29361434731  [46.56%]
  Total time        =  63058684763

Average cycles per activity:
  Read  = 13.48
  Write = 5.34
  Inst  = 9.34
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  11123145966  [97.05%]
  Misses =   338100123  [2.95%]
  Total  =  11461246089
  Kickouts = 338099867, Dirty kickouts = 0, Transfers = 338100123

Memory level: L1d
  Hits   =  5669434506  [95.62%]
  Misses =   259457110  [4.38%]
  Total  =  5928891616
  Kickouts = 259456854, Dirty kickouts = 105849456, Transfers = 259457110

Memory level: L2
  Hits   =   453267900  [64.44%]
  Misses =   250138789  [35.56%]
  Total  =   703406689
  Kickouts = 250138277, Dirty kickouts = 60980869, Transfers = 250138789

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $100
  Memory cost    = $175
  Total cost     = $1075
```

```
--------------------------------------------------------------------------------
      omnetpp-mem32_All-4way     Simulation Results
--------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  23619135621  [43.27%]
  Cycles for writes =  6009677710  [11.01%]
  Cycles for inst   =  24956665469  [45.72%]
  Total time        =  54585478800

Average cycles per activity:
  Read  = 11.75
  Write = 4.85
  Inst  = 8.08
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  11176886229  [97.52%]
  Misses =   284359860  [2.48%]
  Total  =  11461246089
  Kickouts = 284359604, Dirty kickouts = 0, Transfers = 284359860

Memory level: L1d
  Hits   =  5710864475  [96.32%]
  Misses =   218027141  [3.68%]
  Total  =  5928891616
  Kickouts = 218026885, Dirty kickouts = 85447461, Transfers = 218027141

Memory level: L2
  Hits   =   387962332  [66.00%]
  Misses =   199872130  [34.00%]
  Total  =   587834462
  Kickouts = 199871618, Dirty kickouts = 51135782, Transfers = 199872130

Cost analysis:
  L1i cache cost = $600
  L1d cache cost = $600
  L2  cache cost = $150
  Memory cost    = $175
  Total cost     = $1525
```

```
--------------------------------------------------------------------------
      omnetpp-mem32_All-FA     Simulation Results
--------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  20246411607  [42.79%]
  Cycles for writes =  5637317334  [11.91%]
  Cycles for inst   =  21432391201  [45.30%]
  Total time        =  47316120142

Average cycles per activity:
  Read  = 10.08
  Write = 4.55
  Inst  = 7.01
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  11259288301  [98.24%]
  Misses =   201957788  [1.76%]
  Total  =  11461246089
  Kickouts = 201957532, Dirty kickouts = 0, Transfers = 201957788

Memory level: L1d
  Hits   =  5753056729  [97.03%]
  Misses =   175834887  [2.97%]
  Total  =  5928891616
  Kickouts = 175834631, Dirty kickouts = 72136579, Transfers = 175834887

Memory level: L2
  Hits   =   288582036  [64.14%]
  Misses =   161347218  [35.86%]
  Total  =   449929254
  Kickouts = 161346706, Dirty kickouts = 44738929, Transfers = 161347218

Cost analysis:
  L1i cache cost = $1800
  L1d cache cost = $1800
  L2  cache cost = $500
  Memory cost    = $175
  Total cost     = $4275
```

```
--------------------------------------------------------------------------
      omnetpp-mem32_defaults     Simulation Results
--------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  35537444002  [44.39%]
  Cycles for writes =  8428762424  [10.53%]
  Cycles for inst   =  36094136827  [45.08%]
  Total time        =  80060343253

Average cycles per activity:
  Read  = 17.69
  Write = 6.81
  Inst  = 11.86
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  11006133158  [96.03%]
  Misses =   455112931  [3.97%]
  Total  =  11461246089
  Kickouts = 455112675, Dirty kickouts = 0, Transfers = 455112931

Memory level: L1d
  Hits   =  5562301532  [93.82%]
  Misses =   366590084  [6.18%]
  Total  =  5928891616
  Kickouts = 366589828, Dirty kickouts = 162590750, Transfers = 366590084

Memory level: L2
  Hits   =   643964024  [65.42%]
  Misses =   340329741  [34.58%]
  Total  =   984293765
  Kickouts = 340329229, Dirty kickouts = 83598965, Transfers = 340329741

Cost analysis:
  L1i cache cost = $200
  L1d cache cost = $200
  L2  cache cost = $50
  Memory cost    = $175
  Total cost     = $625
```

```
--------------------------------------------------------------------------
      omnetpp-mem32_L1-2way     Simulation Results
--------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  29365411704  [43.34%]
  Cycles for writes =  7057798820  [10.42%]
  Cycles for inst   =  31338104215  [46.25%]
  Total time        =  67761314739

Average cycles per activity:
  Read  = 14.61
  Write = 5.70
  Inst  = 10.03
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  11123145966  [97.05%]
  Misses =   338100123  [2.95%]
  Total  =  11461246089
  Kickouts = 338099867, Dirty kickouts = 0, Transfers = 338100123

Memory level: L1d
  Hits   =  5669434506  [95.62%]
  Misses =   259457110  [4.38%]
  Total  =  5928891616
  Kickouts = 259456854, Dirty kickouts = 105849456, Transfers = 259457110

Memory level: L2
  Hits   =   414993528  [59.00%]
  Misses =   288413161  [41.00%]
  Total  =   703406689
  Kickouts = 288412649, Dirty kickouts = 66670847, Transfers = 288413161

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $50
  Memory cost    = $175
  Total cost     = $1025
```

```
--------------------------------------------------------------------------
      omnetpp-mem32_L1d-small     Simulation Results
--------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  39565087742  [45.80%]
  Cycles for writes =  8930456313  [10.34%]
  Cycles for inst   =  37884706699  [43.86%]
  Total time        =  86380250754

Average cycles per activity:
  Read  = 19.69
  Write = 7.21
  Inst  = 12.79
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  11006133158  [96.03%]
  Misses =   455112931  [3.97%]
  Total  =  11461246089
  Kickouts = 455112675, Dirty kickouts = 0, Transfers = 455112931

Memory level: L1d
  Hits   =  5423480899  [91.48%]
  Misses =   505410717  [8.52%]
  Total  =  5928891616
  Kickouts = 505410589, Dirty kickouts = 217210609, Transfers = 505410717

Memory level: L2
  Hits   =   814325803  [69.14%]
  Misses =   363408454  [30.86%]
  Total  =  1177734257
  Kickouts = 363407942, Dirty kickouts = 87599940, Transfers = 363408454

Cost analysis:
  L1i cache cost = $200
  L1d cache cost = $100
  L2  cache cost = $50
  Memory cost    = $175
  Total cost     = $525
```

```
--------------------------------------------------------------------------
      omnetpp-mem32_L1i-small     Simulation Results
--------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  36281944810  [41.61%]
  Cycles for writes =  8534545052  [9.79%]
  Cycles for inst   =  42381346043  [48.60%]
  Total time        =  87197835905

Average cycles per activity:
  Read  = 18.06
  Write = 6.89
  Inst  = 12.91
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  10791448034  [94.16%]
  Misses =   669798055  [5.84%]
  Total  =  11461246089
  Kickouts = 669797927, Dirty kickouts = 0, Transfers = 669798055

Memory level: L1d
  Hits   =  5562301532  [93.82%]
  Misses =   366590084  [6.18%]
  Total  =  5928891616
  Kickouts = 366589828, Dirty kickouts = 162590750, Transfers = 366590084

Memory level: L2
  Hits   =   830511583  [69.27%]
  Misses =   368467306  [30.73%]
  Total  =  1198978889
  Kickouts = 368466794, Dirty kickouts = 85941999, Transfers = 368467306

Cost analysis:
  L1i cache cost = $100
  L1d cache cost = $200
  L2  cache cost = $50
  Memory cost    = $175
  Total cost     = $525
```

```
-------------------------------------------------------------------------
      omnetpp-mem32_L1-small     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  40736192566  [43.05%]
  Cycles for writes =  9055787789  [9.57%]
  Cycles for inst   =  44831686843  [47.38%]
  Total time        =  94623667198

Average cycles per activity:
  Read  = 20.27
  Write = 7.32
  Inst  = 14.01
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  10791448034  [94.16%]
  Misses =   669798055  [5.84%]
  Total  =  11461246089
  Kickouts = 669797927, Dirty kickouts = 0, Transfers = 669798055

Memory level: L1d
  Hits   =  5423480899  [91.48%]
  Misses =   505410717  [8.52%]
  Total  =  5928891616
  Kickouts = 505410589, Dirty kickouts = 217210609, Transfers = 505410717

Memory level: L2
  Hits   =   992116313  [71.25%]
  Misses =   400303068  [28.75%]
  Total  =  1392419381
  Kickouts = 400302556, Dirty kickouts = 91544599, Transfers = 400303068

Cost analysis:
  L1i cache cost = $100
  L1d cache cost = $100
  L2  cache cost = $50
  Memory cost    = $175
  Total cost     = $425
```

```
-------------------------------------------------------------------------
      omnetpp-mem32_L2-4way     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  25056751184  [42.73%]
  Cycles for writes =  6345933748  [10.82%]
  Cycles for inst   =  27243529031  [46.45%]
  Total time        =  58646213963

Average cycles per activity:
  Read  = 12.47
  Write = 5.13
  Inst  = 8.68
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  11123145966  [97.05%]
  Misses =   338100123  [2.95%]
  Total  =  11461246089
  Kickouts = 338099867, Dirty kickouts = 0, Transfers = 338100123

Memory level: L1d
  Hits   =  5669434506  [95.62%]
  Misses =   259457110  [4.38%]
  Total  =  5928891616
  Kickouts = 259456854, Dirty kickouts = 105849456, Transfers = 259457110

Memory level: L2
  Hits   =   488279575  [69.42%]
  Misses =   215127114  [30.58%]
  Total  =   703406689
  Kickouts = 215126602, Dirty kickouts = 54668770, Transfers = 215127114

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $150
  Memory cost    = $175
  Total cost     = $1125
```

```
--------------------------------------------------------------------------
      omnetpp-mem32_L2-Big     Simulation Results
--------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  23606286108  [42.14%]
  Cycles for writes =  5998933416  [10.71%]
  Cycles for inst   =  26417732823  [47.16%]
  Total time        =  56022952347

Average cycles per activity:
  Read  = 11.75
  Write = 4.85
  Inst  = 8.30
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  11123145966  [97.05%]
  Misses =   338100123  [2.95%]
  Total  =  11461246089
  Kickouts = 338099867, Dirty kickouts = 0, Transfers = 338100123

Memory level: L1d
  Hits   =  5669434506  [95.62%]
  Misses =   259457110  [4.38%]
  Total  =  5928891616
  Kickouts = 259456854, Dirty kickouts = 105849456, Transfers = 259457110

Memory level: L2
  Hits   =   508143677  [72.24%]
  Misses =   195263012  [27.76%]
  Total  =   703406689
  Kickouts = 195261988, Dirty kickouts = 49889384, Transfers = 195263012

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $100
  Memory cost    = $175
  Total cost     = $1075
```

```
--------------------------------------------------------------------------------
      omnetpp-mem64_All-2way     Simulation Results
--------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  23694390148  [41.69%]
  Cycles for writes =  5998258184  [10.55%]
  Cycles for inst   =  27143643271  [47.76%]
  Total time        =  56836291603

Average cycles per activity:
  Read  = 11.79
  Write = 4.85
  Inst  = 8.42
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  11123145966  [97.05%]
  Misses =   338100123  [2.95%]
  Total  =  11461246089
  Kickouts = 338099867, Dirty kickouts = 0, Transfers = 338100123

Memory level: L1d
  Hits   =  5669434506  [95.62%]
  Misses =   259457110  [4.38%]
  Total  =  5928891616
  Kickouts = 259456854, Dirty kickouts = 105849456, Transfers = 259457110

Memory level: L2
  Hits   =   453267900  [64.44%]
  Misses =   250138789  [35.56%]
  Total  =   703406689
  Kickouts = 250138277, Dirty kickouts = 60980869, Transfers = 250138789

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $100
  Memory cost    = $275
  Total cost     = $1175
```

```
--------------------------------------------------------------------------------
      omnetpp-mem64_All-4way     Simulation Results
--------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  20706193281  [41.78%]
  Cycles for writes =  5476576950  [11.05%]
  Cycles for inst   =  23382550329  [47.18%]
  Total time        =  49565320560

Average cycles per activity:
  Read  = 10.31
  Write = 4.42
  Inst  = 7.34
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  11176886229  [97.52%]
  Misses =   284359860  [2.48%]
  Total  =  11461246089
  Kickouts = 284359604, Dirty kickouts = 0, Transfers = 284359860

Memory level: L1d
  Hits   =  5710864475  [96.32%]
  Misses =   218027141  [3.68%]
  Total  =  5928891616
  Kickouts = 218026885, Dirty kickouts = 85447461, Transfers = 218027141

Memory level: L2
  Hits   =   387962332  [66.00%]
  Misses =   199872130  [34.00%]
  Total  =   587834462
  Kickouts = 199871618, Dirty kickouts = 51135782, Transfers = 199872130

Cost analysis:
  L1i cache cost = $600
  L1d cache cost = $600
  L2  cache cost = $150
  Memory cost    = $275
  Total cost     = $1625
```

```
-------------------------------------------------------------------------
      omnetpp-mem64_All-FA     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  17790982627  [41.19%]
  Cycles for writes =  5163179214  [11.95%]
  Cycles for inst   =  20240235361  [46.86%]
  Total time        =  43194397202

Average cycles per activity:
  Read  = 8.85
  Write = 4.17
  Inst  = 6.40
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  11259288301  [98.24%]
  Misses =   201957788  [1.76%]
  Total  =  11461246089
  Kickouts = 201957532, Dirty kickouts = 0, Transfers = 201957788

Memory level: L1d
  Hits   =  5753056729  [97.03%]
  Misses =   175834887  [2.97%]
  Total  =  5928891616
  Kickouts = 175834631, Dirty kickouts = 72136579, Transfers = 175834887

Memory level: L2
  Hits   =   288582036  [64.14%]
  Misses =   161347218  [35.86%]
  Total  =   449929254
  Kickouts = 161346706, Dirty kickouts = 44738929, Transfers = 161347218

Cost analysis:
  L1i cache cost = $1800
  L1d cache cost = $1800
  L2  cache cost = $500
  Memory cost    = $275
  Total cost     = $4375
```

```
-------------------------------------------------------------------------
      omnetpp-mem64_defaults     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  30996588482  [43.30%]
  Cycles for writes =  7566324324  [10.57%]
  Cycles for inst   =  33018856327  [46.13%]
  Total time        =  71581769133

Average cycles per activity:
  Read  = 15.43
  Write = 6.11
  Inst  = 10.60
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  11006133158  [96.03%]
  Misses =   455112931  [3.97%]
  Total  =  11461246089
  Kickouts = 455112675, Dirty kickouts = 0, Transfers = 455112931

Memory level: L1d
  Hits   =  5562301532  [93.82%]
  Misses =   366590084  [6.18%]
  Total  =  5928891616
  Kickouts = 366589828, Dirty kickouts = 162590750, Transfers = 366590084

Memory level: L2
  Hits   =   643964024  [65.42%]
  Misses =   340329741  [34.58%]
  Total  =   984293765
  Kickouts = 340329229, Dirty kickouts = 83598965, Transfers = 340329741

Cost analysis:
  L1i cache cost = $200
  L1d cache cost = $200
  L2  cache cost = $50
  Memory cost    = $275
  Total cost     = $725
```

```
--------------------------------------------------------------------------
      omnetpp-mem64_L1-2way     Simulation Results
--------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  25540896244  [42.11%]
  Cycles for writes =  6363563800  [10.49%]
  Cycles for inst   =  28755174535  [47.40%]
  Total time        =  60659634579

Average cycles per activity:
  Read  = 12.71
  Write = 5.14
  Inst  = 8.98
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  11123145966  [97.05%]
  Misses =   338100123  [2.95%]
  Total  =  11461246089
  Kickouts = 338099867, Dirty kickouts = 0, Transfers = 338100123

Memory level: L1d
  Hits   =  5669434506  [95.62%]
  Misses =   259457110  [4.38%]
  Total  =  5928891616
  Kickouts = 259456854, Dirty kickouts = 105849456, Transfers = 259457110

Memory level: L2
  Hits   =   414993528  [59.00%]
  Misses =   288413161  [41.00%]
  Total  =   703406689
  Kickouts = 288412649, Dirty kickouts = 66670847, Transfers = 288413161

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $50
  Memory cost    = $275
  Total cost     = $1125
```

```
--------------------------------------------------------------------------
      omnetpp-mem64_L1d-small     Simulation Results
--------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  34812510362  [45.00%]
  Cycles for writes =  8078903953  [10.44%]
  Cycles for inst   =  34468668559  [44.56%]
  Total time        =  77360082874

Average cycles per activity:
  Read  = 17.33
  Write = 6.53
  Inst  = 11.46
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  11006133158  [96.03%]
  Misses =   455112931  [3.97%]
  Total  =  11461246089
  Kickouts = 455112675, Dirty kickouts = 0, Transfers = 455112931

Memory level: L1d
  Hits   =  5423480899  [91.48%]
  Misses =   505410717  [8.52%]
  Total  =  5928891616
  Kickouts = 505410589, Dirty kickouts = 217210609, Transfers = 505410717

Memory level: L2
  Hits   =   814325803  [69.14%]
  Misses =   363408454  [30.86%]
  Total  =  1177734257
  Kickouts = 363407942, Dirty kickouts = 87599940, Transfers = 363408454

Cost analysis:
  L1i cache cost = $200
  L1d cache cost = $100
  L2  cache cost = $50
  Memory cost    = $275
  Total cost     = $625
```

```
--------------------------------------------------------------------------
      omnetpp-mem64_L1i-small     Simulation Results
--------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  31605274530  [40.46%]
  Cycles for writes =  7652816852  [9.80%]
  Cycles for inst   =  38851558423  [49.74%]
  Total time        =  78109649805

Average cycles per activity:
  Read  = 15.73
  Write = 6.18
  Inst  = 11.57
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  10791448034  [94.16%]
  Misses =   669798055  [5.84%]
  Total  =  11461246089
  Kickouts = 669797927, Dirty kickouts = 0, Transfers = 669798055

Memory level: L1d
  Hits   =  5562301532  [93.82%]
  Misses =   366590084  [6.18%]
  Total  =  5928891616
  Kickouts = 366589828, Dirty kickouts = 162590750, Transfers = 366590084

Memory level: L2
  Hits   =   830511583  [69.27%]
  Misses =   368467306  [30.73%]
  Total  =  1198978889
  Kickouts = 368466794, Dirty kickouts = 85941999, Transfers = 368467306

Cost analysis:
  L1i cache cost = $100
  L1d cache cost = $200
  L2  cache cost = $50
  Memory cost    = $275
  Total cost     = $625
```

```
----------------------------------------------------------------------------
      omnetpp-mem64_L1-small     Simulation Results
----------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  35769143226  [42.19%]
  Cycles for writes =  8181363249  [9.65%]
  Cycles for inst   =  40836207383  [48.16%]
  Total time        =  84786713858

Average cycles per activity:
  Read  = 17.80
  Write = 6.61
  Inst  = 12.56
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  10791448034  [94.16%]
  Misses =   669798055  [5.84%]
  Total  =  11461246089
  Kickouts = 669797927, Dirty kickouts = 0, Transfers = 669798055

Memory level: L1d
  Hits   =  5423480899  [91.48%]
  Misses =   505410717  [8.52%]
  Total  =  5928891616
  Kickouts = 505410589, Dirty kickouts = 217210609, Transfers = 505410717

Memory level: L2
  Hits   =   992116313  [71.25%]
  Misses =   400303068  [28.75%]
  Total  =  1392419381
  Kickouts = 400302556, Dirty kickouts = 91544599, Transfers = 400303068

Cost analysis:
  L1i cache cost = $100
  L1d cache cost = $100
  L2  cache cost = $50
  Memory cost    = $275
  Total cost     = $525
```

```
--------------------------------------------------------------------------
      omnetpp-mem64_L2-4way     Simulation Results
--------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  22043371564  [41.40%]
  Cycles for writes =  5785888928  [10.87%]
  Cycles for inst   =  25421035791  [47.74%]
  Total time        =  53250296283

Average cycles per activity:
  Read  = 10.97
  Write = 4.67
  Inst  = 7.89
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  11123145966  [97.05%]
  Misses =   338100123  [2.95%]
  Total  =  11461246089
  Kickouts = 338099867, Dirty kickouts = 0, Transfers = 338100123

Memory level: L1d
  Hits   =  5669434506  [95.62%]
  Misses =   259457110  [4.38%]
  Total  =  5928891616
  Kickouts = 259456854, Dirty kickouts = 105849456, Transfers = 259457110

Memory level: L2
  Hits   =   488279575  [69.42%]
  Misses =   215127114  [30.58%]
  Total  =   703406689
  Kickouts = 215126602, Dirty kickouts = 54668770, Transfers = 215127114

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $150
  Memory cost    = $275
  Total cost     = $1225
```

```
-------------------------------------------------------------------------
      omnetpp-mem64_L2-Big     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  2009285423  [20.09%]
  Number of writes  =  1237898222  [12.38%]
  Number of inst    =  6752816355  [67.53%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  20863244388  [40.81%]
  Cycles for writes =  5504090456  [10.77%]
  Cycles for inst   =  24752569583  [48.42%]
  Total time        =  51119904427

Average cycles per activity:
  Read  = 10.38
  Write = 4.45
  Inst  = 7.57
Ideal: Exec. Time = 16752816355; CPI = 2.48
Ideal mis-aligned: Exec. Time = 26618750504; CPI = 3.94
  Ideal execution time   =  16752816355  [CPI 2.48]
  Ideal misaligned time  =  24142954060  [CPI 3.58]

Memory level: L1i
  Hits   =  11123145966  [97.05%]
  Misses =   338100123  [2.95%]
  Total  =  11461246089
  Kickouts = 338099867, Dirty kickouts = 0, Transfers = 338100123

Memory level: L1d
  Hits   =  5669434506  [95.62%]
  Misses =   259457110  [4.38%]
  Total  =  5928891616
  Kickouts = 259456854, Dirty kickouts = 105849456, Transfers = 259457110

Memory level: L2
  Hits   =   508143677  [72.24%]
  Misses =   195263012  [27.76%]
  Total  =   703406689
  Kickouts = 195261988, Dirty kickouts = 49889384, Transfers = 195263012

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $100
  Memory cost    = $275
  Total cost     = $1175
```

```
-------------------------------------------------------------------------
      sjeng-All-2way     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1892411647  [18.92%]
  Number of writes  =   751653128  [7.52%]
  Number of inst    =  7355935225  [73.56%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  9520499188  [22.14%]
  Cycles for writes =  9174094220  [21.34%]
  Cycles for inst   =  24301290801  [56.52%]
  Total time        =  42995884209

Average cycles per activity:
  Read  = 5.03
  Write = 12.21
  Inst  = 3.30
Ideal: Exec. Time = 17355935225; CPI = 2.36
Ideal mis-aligned: Exec. Time = 24792861569; CPI = 3.37

Memory level: L1i
  Hits   =  12325337739  [98.25%]
  Misses =   219027066  [1.75%]
  Total  =  12544364805
  Kickouts = 219026810, Dirty kickouts = 0, Transfers = 219027066

Memory level: L1d
  Hits   =  3258299627  [96.14%]
  Misses =   130955656  [3.86%]
  Total  =  3389255283
  Kickouts = 130955400, Dirty kickouts = 68155533, Transfers = 130955656

Memory level: L2
  Hits   =   315765967  [75.52%]
  Misses =   102372288  [24.48%]
  Total  =   418138255
  Kickouts = 102371776, Dirty kickouts = 31805946, Transfers = 102372288

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $100
  Memory cost    = $75
  Total cost     = $975
```

```
--------------------------------------------------------------------------------
      sjeng-All-4way     Simulation Results
--------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1892411647  [18.92%]
  Number of writes  =   751653128  [7.52%]
  Number of inst    =  7355935225  [73.56%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  8636165396  [21.92%]
  Cycles for writes =  8263103150  [20.97%]
  Cycles for inst   =  22497704605  [57.11%]
  Total time        =  39396973151

Average cycles per activity:
  Read  = 4.56
  Write = 10.99
  Inst  = 3.06
Ideal: Exec. Time = 17355935225; CPI = 2.36
Ideal mis-aligned: Exec. Time = 24792861569; CPI = 3.37

Memory level: L1i
  Hits   =  12328177413  [98.28%]
  Misses =   216187392  [1.72%]
  Total  =  12544364805
  Kickouts = 216187136, Dirty kickouts = 0, Transfers = 216187392

Memory level: L1d
  Hits   =  3282438507  [96.85%]
  Misses =   106816776  [3.15%]
  Total  =  3389255283
  Kickouts = 106816520, Dirty kickouts = 58561243, Transfers = 106816776

Memory level: L2
  Hits   =   296123400  [77.61%]
  Misses =    85442011  [22.39%]
  Total  =   381565411
  Kickouts = 85441499, Dirty kickouts = 28630852, Transfers = 85442011

Cost analysis:
  L1i cache cost = $600
  L1d cache cost = $600
  L2  cache cost = $150
  Memory cost    = $75
  Total cost     = $1425
```

```
--------------------------------------------------------------------------------
      sjeng-All-FA     Simulation Results
--------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1892411647  [18.92%]
  Number of writes  =   751653128  [7.52%]
  Number of inst    =  7355935225  [73.56%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  6396180212  [18.97%]
  Cycles for writes =  7411519539  [21.98%]
  Cycles for inst   =  19917359973  [59.06%]
  Total time        =  33725059724

Average cycles per activity:
  Read  = 3.38
  Write = 9.86
  Inst  = 2.71
Ideal: Exec. Time = 17355935225; CPI = 2.36
Ideal mis-aligned: Exec. Time = 24792861569; CPI = 3.37

Memory level: L1i
  Hits   =  12299225417  [98.05%]
  Misses =   245139388  [1.95%]
  Total  =  12544364805
  Kickouts = 245139132, Dirty kickouts = 0, Transfers = 245139388

Memory level: L1d
  Hits   =  3309920012  [97.66%]
  Misses =    79335271  [2.34%]
  Total  =  3389255283
  Kickouts = 79335015, Dirty kickouts = 50696226, Transfers = 79335271

Memory level: L2
  Hits   =   321413336  [85.67%]
  Misses =    53757549  [14.33%]
  Total  =   375170885
  Kickouts = 53757037, Dirty kickouts = 22378162, Transfers = 53757549

Cost analysis:
  L1i cache cost = $1800
  L1d cache cost = $1800
  L2  cache cost = $500
  Memory cost    = $75
  Total cost     = $4175
```

```
--------------------------------------------------------------------------------
      sjeng-defaults     Simulation Results
--------------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1892411647  [18.92%]
  Number of writes  =   751653128  [7.52%]
  Number of inst    =  7355935225  [73.56%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  14199767107  [27.61%]
  Cycles for writes =  9870999338  [19.20%]
  Cycles for inst   =  27353035169  [53.19%]
  Total time        =  51423801614

Average cycles per activity:
  Read  = 7.50
  Write = 13.13
  Inst  = 3.72
Ideal: Exec. Time = 17355935225; CPI = 2.36
Ideal mis-aligned: Exec. Time = 24792861569; CPI = 3.37

Memory level: L1i
  Hits   =  12312377087  [98.15%]
  Misses =   231987718  [1.85%]
  Total  =  12544364805
  Kickouts = 231987462, Dirty kickouts = 0, Transfers = 231987718

Memory level: L1d
  Hits   =  3191666517  [94.17%]
  Misses =   197588766  [5.83%]
  Total  =  3389255283
  Kickouts = 197588510, Dirty kickouts = 89091858, Transfers = 197588766

Memory level: L2
  Hits   =   377266166  [72.74%]
  Misses =   141402176  [27.26%]
  Total  =   518668342
  Kickouts = 141401664, Dirty kickouts = 37969437, Transfers = 141402176

Cost analysis:
  L1i cache cost = $200
  L1d cache cost = $200
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $525
```

```
-------------------------------------------------------------------------
      sjeng-L1-2way     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1892411647  [18.92%]
  Number of writes  =   751653128  [7.52%]
  Number of inst    =  7355935225  [73.56%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  11021885908  [23.81%]
  Cycles for writes =  9401105392  [20.31%]
  Cycles for inst   =  25870705805  [55.88%]
  Total time        =  46293697105

Average cycles per activity:
  Read  = 5.82
  Write = 12.51
  Inst  = 3.52
Ideal: Exec. Time = 17355935225; CPI = 2.36
Ideal mis-aligned: Exec. Time = 24792861569; CPI = 3.37

Memory level: L1i
  Hits   =  12325337739  [98.25%]
  Misses =   219027066  [1.75%]
  Total  =  12544364805
  Kickouts = 219026810, Dirty kickouts = 0, Transfers = 219027066

Memory level: L1d
  Hits   =  3258299627  [96.14%]
  Misses =   130955656  [3.86%]
  Total  =  3389255283
  Kickouts = 130955400, Dirty kickouts = 68155533, Transfers = 130955656

Memory level: L2
  Hits   =   295456405  [70.66%]
  Misses =   122681850  [29.34%]
  Total  =   418138255
  Kickouts = 122681338, Dirty kickouts = 33891644, Transfers = 122681850

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $925
```

```
-------------------------------------------------------------------------
      sjeng-L1d-small     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1892411647  [18.92%]
  Number of writes  =   751653128  [7.52%]
  Number of inst    =  7355935225  [73.56%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  18132505667  [31.74%]
  Cycles for writes =  10391215163  [18.19%]
  Cycles for inst   =  28612202985  [50.08%]
  Total time        =  57135923815

Average cycles per activity:
  Read  = 9.58
  Write = 13.82
  Inst  = 3.89
Ideal: Exec. Time = 17355935225; CPI = 2.36
Ideal mis-aligned: Exec. Time = 24792861569; CPI = 3.37

Memory level: L1i
  Hits   =  12312377087  [98.15%]
  Misses =   231987718  [1.85%]
  Total  =  12544364805
  Kickouts = 231987462, Dirty kickouts = 0, Transfers = 231987718

Memory level: L1d
  Hits   =  3056012220  [90.17%]
  Misses =   333243063  [9.83%]
  Total  =  3389255283
  Kickouts = 333242935, Dirty kickouts = 135165653, Transfers = 333243063

Memory level: L2
  Hits   =   545066603  [77.82%]
  Misses =   155329831  [22.18%]
  Total  =   700396434
  Kickouts = 155329319, Dirty kickouts = 41010847, Transfers = 155329831

Cost analysis:
  L1i cache cost = $200
  L1d cache cost = $100
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $425
```

```
-------------------------------------------------------------------------
      sjeng-L1i-small     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1892411647  [18.92%]
  Number of writes  =   751653128  [7.52%]
  Number of inst    =  7355935225  [73.56%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  14970807155  [26.79%]
  Cycles for writes =  9933734882  [17.77%]
  Cycles for inst   =  30981863599  [55.44%]
  Total time        =  55886405636

Average cycles per activity:
  Read  = 7.91
  Write = 13.22
  Inst  = 4.21
Ideal: Exec. Time = 17355935225; CPI = 2.36
Ideal mis-aligned: Exec. Time = 24792861569; CPI = 3.37

Memory level: L1i
  Hits   =  12181186946  [97.10%]
  Misses =   363177859  [2.90%]
  Total  =  12544364805
  Kickouts = 363177731, Dirty kickouts = 0, Transfers = 363177859

Memory level: L1d
  Hits   =  3191666517  [94.17%]
  Misses =   197588766  [5.83%]
  Total  =  3389255283
  Kickouts = 197588510, Dirty kickouts = 89091858, Transfers = 197588766

Memory level: L2
  Hits   =   495160049  [76.20%]
  Misses =   154698434  [23.80%]
  Total  =   649858483
  Kickouts = 154697922, Dirty kickouts = 38921832, Transfers = 154698434

Cost analysis:
  L1i cache cost = $100
  L1d cache cost = $200
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $425
```

```
-------------------------------------------------------------------------
      sjeng-L1-small     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1892411647  [18.92%]
  Number of writes  =   751653128  [7.52%]
  Number of inst    =  7355935225  [73.56%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  19225396703  [30.76%]
  Cycles for writes =  10510471755  [16.82%]
  Cycles for inst   =  32761006671  [52.42%]
  Total time        =  62496875129

Average cycles per activity:
  Read  = 10.16
  Write = 13.98
  Inst  = 4.45
Ideal: Exec. Time = 17355935225; CPI = 2.36
Ideal mis-aligned: Exec. Time = 24792861569; CPI = 3.37

Memory level: L1i
  Hits   =  12181186946  [97.10%]
  Misses =   363177859  [2.90%]
  Total  =  12544364805
  Kickouts = 363177731, Dirty kickouts = 0, Transfers = 363177859

Memory level: L1d
  Hits   =  3056012220  [90.17%]
  Misses =   333243063  [9.83%]
  Total  =  3389255283
  Kickouts = 333242935, Dirty kickouts = 135165653, Transfers = 333243063

Memory level: L2
  Hits   =   657535007  [79.07%]
  Misses =   174051568  [20.93%]
  Total  =   831586575
  Kickouts = 174051056, Dirty kickouts = 42644502, Transfers = 174051568

Cost analysis:
  L1i cache cost = $100
  L1d cache cost = $100
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $325
```

```
-------------------------------------------------------------------------
      sjeng-L2-4way     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1892411647  [18.92%]
  Number of writes  =   751653128  [7.52%]
  Number of inst    =  7355935225  [73.56%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  8932406336  [22.15%]
  Cycles for writes =  8546934100  [21.20%]
  Cycles for inst   =  22841733881  [56.65%]
  Total time        =  40321074317

Average cycles per activity:
  Read  = 4.72
  Write = 11.37
  Inst  = 3.11
Ideal: Exec. Time = 17355935225; CPI = 2.36
Ideal mis-aligned: Exec. Time = 24792861569; CPI = 3.37

Memory level: L1i
  Hits   =  12325337739  [98.25%]
  Misses =   219027066  [1.75%]
  Total  =  12544364805
  Kickouts = 219026810, Dirty kickouts = 0, Transfers = 219027066

Memory level: L1d
  Hits   =  3258299627  [96.14%]
  Misses =   130955656  [3.86%]
  Total  =  3389255283
  Kickouts = 130955400, Dirty kickouts = 68155533, Transfers = 130955656

Memory level: L2
  Hits   =   331323921  [79.24%]
  Misses =    86814334  [20.76%]
  Total  =   418138255
  Kickouts = 86813822, Dirty kickouts = 29147141, Transfers = 86814334

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $150
  Memory cost    = $75
  Total cost     = $1025
```

```
-------------------------------------------------------------------------
      sjeng-L2-Big     Simulation Results
-------------------------------------------------------------------------

Number of reference types:
  Number of reads   =  1892411647  [18.92%]
  Number of writes  =   751653128  [7.52%]
  Number of inst    =  7355935225  [73.56%]
  Total             =  10000000000

Total cycles for all activities:
  Cycles for reads  =  8246650988  [21.86%]
  Cycles for writes =  8075076680  [21.41%]
  Cycles for inst   =  21396288609  [56.73%]
  Total time        =  37718016277

Average cycles per activity:
  Read  = 4.36
  Write = 10.74
  Inst  = 2.91
Ideal: Exec. Time = 17355935225; CPI = 2.36
Ideal mis-aligned: Exec. Time = 24792861569; CPI = 3.37

Memory level: L1i
  Hits   =  12325337739  [98.25%]
  Misses =   219027066  [1.75%]
  Total  =  12544364805
  Kickouts = 219026810, Dirty kickouts = 0, Transfers = 219027066

Memory level: L1d
  Hits   =  3258299627  [96.14%]
  Misses =   130955656  [3.86%]
  Total  =  3389255283
  Kickouts = 130955400, Dirty kickouts = 68155533, Transfers = 130955656

Memory level: L2
  Hits   =   345209116  [82.56%]
  Misses =    72929139  [17.44%]
  Total  =   418138255
  Kickouts = 72928115, Dirty kickouts = 25232504, Transfers = 72929139

Cost analysis:
  L1i cache cost = $400
  L1d cache cost = $400
  L2  cache cost = $50
  Memory cost    = $75
  Total cost     = $925
```