

# **Output File**

## **Rushikesh Khamkar**

## Part 1 – Direct-mapped cache

**Output File – login-20-26:/COA/CS5375\$ ./cachesim direct  
trace\_for\_students/trace.hpcg**

```
=====
Cache type:      Direct-Mapped Cache
=====
Cache Hits:      1301327
Cache Misses:    198673
Cache Hit rate :13.2449
Cache miss rate:86.7551
```

**Output File – login-20-26:/COA/CS5375\$ ./cachesim direct  
trace\_for\_students/trace.stream**

```
=====
Cache type:      Direct-Mapped Cache
=====
Cache Hits:      1059918
Cache Misses:    2174137
Cache Hit rate :67.2263
Cache miss rate:32.7737
```

**Output File – login-20-26:/COA/CS5375\$ ./cachesim direct  
trace\_for\_students/trace.stream\_10**

```
=====
Cache type:      Direct-Mapped Cache
=====
Cache Hits:      0
Cache Misses:    10
Cache Hit rate :100
Cache miss rate:0
```

**Output File – login-20-26:/COA/CS5375\$ ./cachesim direct  
trace\_for\_students/trace.stream\_20**

```
=====
Cache type:      Direct-Mapped Cache
=====
Cache Hits:      4
Cache Misses:    16
Cache Hit rate :80
Cache miss rate:20
```

**Output File – login-20-26:/COA/CS5375\$ ./cachesim direct  
trace\_for\_students/hw2\_q4\_memoryaddr**

```
=====
Cache type:      Direct-Mapped Cache
=====
Cache Hits:      7
Cache Misses:    5
Cache Hit rate :41.6667
Cache miss rate:58.3333
```

## Part 2.1 – Fully associative cache

Cache Size – 32 KB

Cache Line Size – 16 Byte

```
login-20-26:/COA/CS5375$ ./cachesim fully trace_for_students/hw2_q4_memoryaddr
```

```
=====
Cache type:    Fully-Associative-Mapped Cache
=====
```

```
Cache Hits:    3
Cache Misses:  9
Cache Hit Rate: 25
Cache Miss Rate: 75
```

```
login-20-26:/COA/CS5375$ ./cachesim fully trace_for_students/trace.hpcg
```

```
=====
Cache type:    Fully-Associative-Mapped Cache
=====
```

```
Cache Hits:    1288222
Cache Misses:  211778
Cache Hit Rate: 85.8815
Cache Miss Rate: 14.1185
```

```
login-20-26:/COA/CS5375$ ./cachesim fully trace_for_students/trace.stream
```

```
=====
Cache type:    Fully-Associative-Mapped Cache
=====
```

```
Cache Hits:    1054425
Cache Misses:  2179630
Cache Hit Rate: 32.6038
Cache Miss Rate: 67.3962
```

```
login-20-26:/COA/CS5375$ ./cachesim fully trace_for_students/trace.stream_10
```

```
=====
Cache type:    Fully-Associative-Mapped Cache
=====
```

```
Cache Hits:    0
Cache Misses:  10
Cache Hit Rate: 0
Cache Miss Rate: 100
```

```
login-20-26:/COA/CS5375$ ./cachesim fully trace_for_students/trace.stream_20
```

```
=====
Cache type:    Fully-Associative-Mapped Cache
=====
```

```
Cache Hits:    3
Cache Misses:  17
Cache Hit Rate: 15
Cache Miss Rate: 85
```

**Cache Size – 32 KB**  
**Cache Line Size – 32 Byte**

**login-20-26:/C0A/CS5375\$ ./cachesim fully trace\_for\_students/hw2\_q4\_memoryaddr**

```
=====
Cache type:    Fully-Associative-Mapped Cache
=====
Cache Hits:    5
Cache Misses:  7
Cache Hit Rate: 41.6667
Cache Miss Rate: 58.3333
```

**login-20-26:/C0A/CS5375\$ ./cachesim fully trace\_for\_students/trace.hpcg**

```
=====
Cache type:    Fully-Associative-Mapped Cache
=====
Cache Hits:    1299198
Cache Misses:  200802
Cache Hit Rate: 86.6132
Cache Miss Rate: 13.3868
```

**login-20-26:/C0A/CS5375\$ ./cachesim fully trace\_for\_students/trace.stream**

```
=====
Cache type:    Fully-Associative-Mapped Cache
=====
Cache Hits:    1068973
Cache Misses:  2165082
Cache Hit Rate: 33.0536
Cache Miss Rate: 66.9464
```

**login-20-26:/C0A/CS5375\$ ./cachesim fully trace\_for\_students/trace.stream\_10**

```
=====
Cache type:    Fully-Associative-Mapped Cache
=====
Cache Hits:    0
Cache Misses:  10
Cache Hit Rate: 0
Cache Miss Rate: 100
```

**login-20-26:/C0A/CS5375\$ ./cachesim fully trace\_for\_students/trace.stream\_20**

```
=====
Cache type:    Fully-Associative-Mapped Cache
=====
Cache Hits:    4
Cache Misses:  16
Cache Hit Rate: 20
Cache Miss Rate: 80
```

**Cache Size – 32 KB**  
**Cache Line Size – 128 Byte**

**login-20-26:/COA/CS5375\$ ./cachesim fully trace\_for\_students/hw2\_q4\_memoryaddr**

```
=====
Cache type:    Fully-Associative-Mapped Cache
=====
Cache Hits:    7
Cache Misses:  5
Cache Hit Rate: 58.3333
Cache Miss Rate: 41.6667
```

**login-20-26:/COA/CS5375\$ ./cachesim fully trace\_for\_students/trace.hpcg**

```
=====
Cache type:    Fully-Associative-Mapped Cache
=====
Cache Hits:    1370059
Cache Misses:  129941
Cache Hit Rate: 91.3373
Cache Miss Rate: 8.66273
```

**login-20-26:/COA/CS5375\$ ./cachesim fully trace\_for\_students/trace.stream**

```
=====
Cache type:    Fully-Associative-Mapped Cache
=====
Cache Hits:    1078603
Cache Misses:  2155452
Cache Hit Rate: 33.3514
Cache Miss Rate: 66.6486
```

**login-20-26:/COA/CS5375\$ ./cachesim fully trace\_for\_students/trace.stream\_10**

```
=====
Cache type:    Fully-Associative-Mapped Cache
=====
Cache Hits:    0
Cache Misses:  10
Cache Hit Rate: 0
Cache Miss Rate: 100
```

**login-20-26:/COA/CS5375\$ ./cachesim fully trace\_for\_students/trace.stream\_20**

```
=====
Cache type:    Fully-Associative-Mapped Cache
=====
Cache Hits:    4
Cache Misses:  16
Cache Hit Rate: 20
Cache Miss Rate: 80
```

## Part 2.2 – N-way set associative cache

Cache Size – 32 KB

Cache Line Size – 16 Byte

Associativity – 2 Way

```
login-20-26:/C0A/CS5375$ ./cachesim n-way trace_for_students/hw2_q4_memoryaddr
```

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
```

```
Cache Hits:      3
Cache Misses:    9
Cache Hit Rate:  25.00%
Cache Miss Rate: 75.00%
```

```
login-20-26:/C0A/CS5375$ ./cachesim n-way trace_for_students/trace.hpcg
```

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
```

```
Cache Hits:      1271769
Cache Misses:    228231
Cache Hit Rate:  84.78%
Cache Miss Rate: 15.22%
```

```
login-20-26:/C0A/CS5375$ ./cachesim n-way trace_for_students/trace.stream
```

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
```

```
Cache Hits:      1047762
Cache Misses:    2186293
Cache Hit Rate:  32.40%
Cache Miss Rate: 67.60%
```

```
login-20-26:/C0A/CS5375$ ./cachesim n-way trace_for_students/trace.stream_10
```

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
```

```
Cache Hits:      0
Cache Misses:    10
Cache Hit Rate:  0.00%
Cache Miss Rate: 100.00%
```

```
login-20-26:/C0A/CS5375$ ./cachesim n-way trace_for_students/trace.stream_20
```

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
```

```
Cache Hits:      3
Cache Misses:    17
Cache Hit Rate:  15.00%
Cache Miss Rate: 85.00%
```

Cache Size – 32 KB

**Cache Line Size – 32 Byte**  
**Associativity – 2 Way**

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/hw2\_q4\_memoryaddr**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      5
Cache Misses:    7
Cache Hit Rate:  41.67%
Cache Miss Rate: 58.33%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.hpcg**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      1281537
Cache Misses:    218463
Cache Hit Rate:  85.44%
Cache Miss Rate: 14.56%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      1062550
Cache Misses:    2171505
Cache Hit Rate:  32.86%
Cache Miss Rate: 67.14%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream\_10**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      0
Cache Misses:    10
Cache Hit Rate:  0.00%
Cache Miss Rate: 100.00%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream\_20**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      4
Cache Misses:    16
Cache Hit Rate:  20.00%
Cache Miss Rate: 80.00%
```

Cache Size – 32 KB  
Cache Line Size – 128 Byte  
Associativity – 2 Way

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/hw2\_q4\_memoryaddr**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      7
Cache Misses:    5
Cache Hit Rate:  58.33%
Cache Miss Rate: 41.67%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.hpcg**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      1342201
Cache Misses:    157799
Cache Hit Rate:  89.48%
Cache Miss Rate: 10.52%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      1059412
Cache Misses:    2174643
Cache Hit Rate:  32.76%
Cache Miss Rate: 67.24%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream\_10**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      0
Cache Misses:    10
Cache Hit Rate:  0.00%
Cache Miss Rate: 100.00%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream\_20**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      4
Cache Misses:    16
Cache Hit Rate:  20.00%
Cache Miss Rate: 80.00%
```



Cache Size – 32 KB  
Cache Line Size – 16 Byte  
Associativity – 4 Way

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/hw2\_q4\_memoryaddr**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      3
Cache Misses:    9
Cache Hit Rate:  25.00%
Cache Miss Rate: 75.00%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.hpcg**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      1276953
Cache Misses:    223047
Cache Hit Rate:  85.13%
Cache Miss Rate: 14.87%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      1047889
Cache Misses:    2186166
Cache Hit Rate:  32.40%
Cache Miss Rate: 67.60%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream\_10**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      0
Cache Misses:    10
Cache Hit Rate:  0.00%
Cache Miss Rate: 100.00%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream\_20**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      3
Cache Misses:    17
Cache Hit Rate:  15.00%
Cache Miss Rate: 85.00%
```

Cache Size – 32 KB  
Cache Line Size – 32 Byte  
Associativity – 4 Way

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/hw2\_q4\_memoryaddr**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      5
Cache Misses:    7
Cache Hit Rate:  41.67%
Cache Miss Rate: 58.33%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.hpcg**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      1287347
Cache Misses:    212653
Cache Hit Rate:  85.82%
Cache Miss Rate: 14.18%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      1062641
Cache Misses:    2171414
Cache Hit Rate:  32.86%
Cache Miss Rate: 67.14%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream\_10**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      0
Cache Misses:    10
Cache Hit Rate:  0.00%
Cache Miss Rate: 100.00%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream\_20**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      4
Cache Misses:    16
Cache Hit Rate:  20.00%
Cache Miss Rate: 80.00%
```

Cache Size – 32 KB  
Cache Line Size – 128 Byte  
Associativity – 4 Way

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/hw2\_q4\_memoryaddr**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      7
Cache Misses:    5
Cache Hit Rate:  58.33%
Cache Miss Rate: 41.67%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.hpcg**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      1348040
Cache Misses:    151960
Cache Hit Rate:  89.87%
Cache Miss Rate: 10.13%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      1062332
Cache Misses:    2171723
Cache Hit Rate:  32.85%
Cache Miss Rate: 67.15%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream\_10**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      0
Cache Misses:    10
Cache Hit Rate:  0.00%
Cache Miss Rate: 100.00%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream\_20**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      4
Cache Misses:    16
Cache Hit Rate:  20.00%
Cache Miss Rate: 80.00%
```

**Cache Size – 32 KB**  
**Cache Line Size – 16 Byte**  
**Associativity – 8 Way**

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/hw2\_q4\_memoryaddr**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      3
Cache Misses:    9
Cache Hit Rate:  25.00%
Cache Miss Rate: 75.00%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.hpcg**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      1278518
Cache Misses:    221482
Cache Hit Rate:  85.23%
Cache Miss Rate: 14.77%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      1047918
Cache Misses:    2186137
Cache Hit Rate:  32.40%
Cache Miss Rate: 67.60%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream\_10**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      0
Cache Misses:    10
Cache Hit Rate:  0.00%
Cache Miss Rate: 100.00%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream\_20**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      3
Cache Misses:    17
Cache Hit Rate:  15.00%
Cache Miss Rate: 85.00%
```

**Cache Size – 32 KB**

**Cache Line Size – 32 Byte**  
**Associativity – 8 Way**

**login-20-26:/COA/CS5375\$ ./cachesim n-way trace\_for\_students/hw2\_q4\_memoryaddr**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      5
Cache Misses:    7
Cache Hit Rate:  41.67%
Cache Miss Rate: 58.33%
```

**login-20-26:/COA/CS5375\$ ./cachesim n-way trace\_for\_students/trace.hpcg**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      1288718
Cache Misses:    211282
Cache Hit Rate:  85.91%
Cache Miss Rate: 14.09%
```

**login-20-26:/COA/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      1062476
Cache Misses:    2171579
Cache Hit Rate:  32.85%
Cache Miss Rate: 67.15%
```

**login-20-26:/COA/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream\_10**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      0
Cache Misses:    10
Cache Hit Rate:  0.00%
Cache Miss Rate: 100.00%
```

**login-20-26:/COA/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream\_20**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      4
Cache Misses:    16
Cache Hit Rate:  20.00%
Cache Miss Rate: 80.00%
Cache Size – 32 KB
```

**Cache Line Size – 128 Byte**  
**Associativity – 8 Way**

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/hw2\_q4\_memoryaddr**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      5
Cache Misses:    7
Cache Hit Rate:  41.67%
Cache Miss Rate: 58.33%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.hpcg**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      1288890
Cache Misses:    211110
Cache Hit Rate:  85.93%
Cache Miss Rate: 14.07%
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      1062805
Cache Misses:    2171250
Cache Hit Rate:  32.86
Cache Miss Rate: 67.14
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream\_10**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      0
Cache Misses:    10
Cache Hit Rate:  0.00
Cache Miss Rate: 100.00
```

**login-20-26:/C0A/CS5375\$ ./cachesim n-way trace\_for\_students/trace.stream\_20**

```
=====
Cache type:      N-Way-Associative-Mapped Cache
=====
Cache Hits:      4
Cache Misses:    16
Cache Hit Rate:  20.00
Cache Miss Rate: 80.00
```

## Part 3 –Two-level cache simulation

**Output File – login-20-26:/COA/CS5375\$ ./cachesim two-level  
trace\_for\_students/trace.hpcg**

```
=====
Cache type:      l1
=====
Cache Hits:      1317655
Cache Misses:    182345
Cache Hit Rate : 87.843666077%
Cache Miss Rate : 12.156332970%
```

```
=====
Cache type:      l2
=====
Cache Hits:      1327929
Cache Misses:    172071
Cache Hit Rate : 88.528594971%
Cache Miss Rate : 11.471399307%
```

**Output File – login-20-26:/COA/CS5375\$ ./cachesim two-level  
trace\_for\_students/trace.stream**

```
=====
Cache type:      l1
=====
Cache Hits:      1070061
Cache Misses:    2163994
Cache Hit Rate : 33.087287903%
Cache Miss Rate : 66.912719727%
```

```
=====
Cache type:      l2
=====
Cache Hits:      1077514
Cache Misses:    2156541
Cache Hit Rate : 33.317737579%
Cache Miss Rate : 66.682258606%
```

**Output File – login-20-26:/COA/CS5375\$ ./cachesim two-level  
trace\_for\_students/trace.stream\_10**

```
=====
Cache type:      l1
=====
Cache Hits:      0
Cache Misses:    10
Cache Hit Rate : 0.000000000%
Cache Miss Rate : 100.000000000%
```

```
=====
Cache type:      l2
=====
Cache Hits:      0
Cache Misses:    10
Cache Hit Rate : 0.000000000%
Cache Miss Rate : 100.000000000%
```

**Output File – login-20-26:/COA/CS5375\$ ./cachesim two-level  
trace\_for\_students/trace.stream\_20**

```
=====
Cache type:      l1
=====
Cache Hits:      4
Cache Misses:    16
Cache Hit Rate : 20.000000000%
Cache Miss Rate : 80.000000000%
```

```
=====
Cache type:      l2
=====
Cache Hits:      4
Cache Misses:    16
Cache Hit Rate : 20.000000000%
Cache Miss Rate : 80.000000000%
```

**Output File – login-20-26:/COA/CS5375\$ ./cachesim two-level  
trace\_for\_students/hw2\_q4\_memoryaddr**

```
=====
Cache type:      l1
=====
Cache Hits:      7
Cache Misses:    5
Cache Hit Rate : 58.333332062%
Cache Miss Rate : 41.666664124%
```

```
=====
Cache type:      l2
=====
Cache Hits:      7
Cache Misses:    5
Cache Hit Rate : 58.333332062%
Cache Miss Rate : 41.666664124%
```