Language used: C++

HITS and MISSES Table for Direct Mapped Cache:

TRACES	HITS	MISSES	HIT Percentage
gcc.trace	483504	32179	93.7599
gzip.trace	320883	160161	66.7055
mcf.trace	7505	719725	1.032
twolf.trace	476770	6054	98.7461
swim.trace	280738	22455	92.5938

HITS and MISSES Table for 4 Way Set Associative Cache:

TRACES	HITS	MISSES	HIT Percentage
gcc.trace	483871	31812	93.8311
gzip.trace	320883	160161	66.7055
mcf.trace	7508	719722	1.03241
twolf.trace	476844	5980	98.7615
swim.trace	280825	22368	92.6225

How to compile?

For Direct mapped cache use:

g++ IMT2019014_DirectMappedCache.cpp

./a.out

The terminal asks for file name. Suppose you want hits and misses for gcc.trace then just type gcc.trace. Do not use quotes.
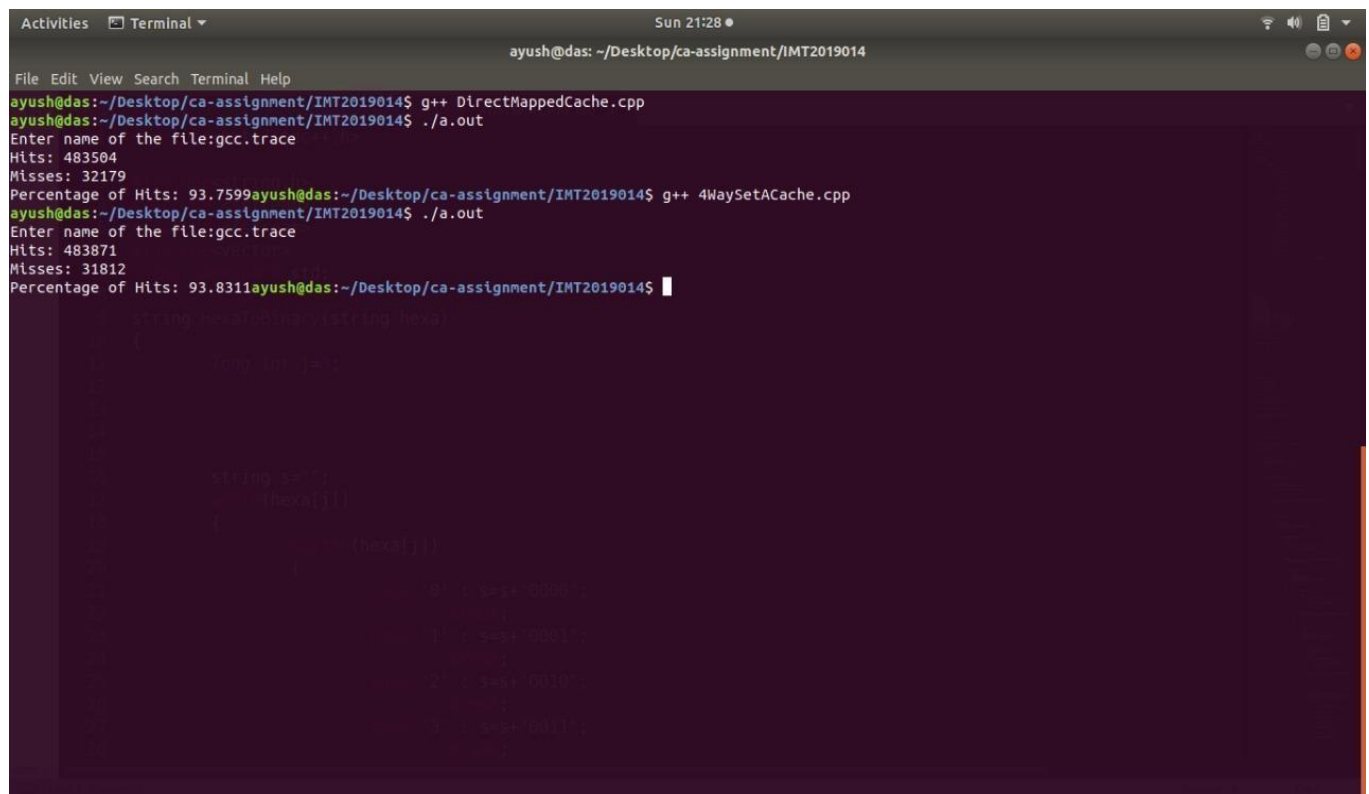
Output is displayed.

Observations:

Hit ratio is more for 4 way set associative cache than Direct Mapped Cache.

Also, Direct mapped cache is much simpler to implement than 4 way set associative cache.

Because of the replacement policy, the 4-way set associative cache seems to take more time.

Replacement policy used: Least Recently Used (LRU)

Used stack to implement this policy.