COA Project Report

# CACHE SIMULATOR

## Overall approach & Outline

# In this assignment, we will build a cache simulator. The type of simulator you will build is known as a trace-driven simulator because it takes as input a trace of events, in this case memory references.

# The trace, which we will provide for you, was acquired on another machine. Once acquired, it can be used to drive simulation studies. In this project, the memory reference events specified in the trace(s) will be used by our program to drive the movement of data into and out of the cache, thus simulating its behavior. Trace-driven simulators are very effective for studying caches.

* Number of instruction references
* Number of data references
* Number of instruction misses
* Number of data misses
* Number of hits

#### Data Suit

Content of trace.txt

trace.txt->Writes to file the memory address.

0x80000000 0x80000004 0x80000008 0x8000000C 0x8000001C 0x80000020 0x80000024 0x80000028 0x8000002C 0x80000030 0x80000034 0x80000038 0x80000024 0x80000028 0x8000002C 0x80000030

0x80000034 0x80000038 0x80000024 0x80000028 0x8000002C 0x80000030 0x80000034 0x80000038

0x80000024 0x80000028 0x8000002C 0x80000030 0x80000034 0x80000038 0x80000024 0x80000028

0x8000002C 0x80000030 0x80000034 0x80000038 0x80000024 0x80000028 0x8000002C 0x80000030

# Cache Structure and Functionalities

void mruUpdate(int index)

{

int i;

// find index in mru

for (i = 0; i < 8; i++)

if (mru[i] == index)

break;

// move earlier refs one later

while (i > 0) {

mru[i] = mru[i-1];

i--;

}

mru[0] = index;

}

while (fscanf(fp, "%x", &addr) > 0) {

/\* simulate fully associative cache with 8 words \*/

accesses += 1;

printf("%3d: 0x%08x ", accesses, addr);

for (i = 0; i < 8; i++) {

if (tag[i] == addr) {

hits += 1;

printf("Hit%d ", i);

mruUpdate(i);

break;

}

}

if (i == 8) {

/\* allocate entry \*/

printf("Miss ");

i = mru[7];

tag[i] = addr;

mruUpdate(i);

* **Learning Outcomes:** Undergoing this C project was nice experience. Aswe developed a Cache Simulator in C it involve of various concepts Computer organization and architecture and we learned about the applicative part of various concepts in COA , such as Cache working ,tag division into blocks, hit miss ratio ,various mapping techniques such as Direct mapping , Associative mapping ,set associative mapping was quite helpful and backbone of the Project.