Shri Vile Parle Kelavani Mandal's
DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING
(Autonomous College Affiliated to the University of Mumbai)
NAAC Accredited with "A" Grade (CGPA : 3.18)

EXPERIMENT - 5

AIM: To simulates a direct-mapped cache

Submission Sheet

SAP ID	Name of Student	Date of Experiment	Date of Submission	Remarks
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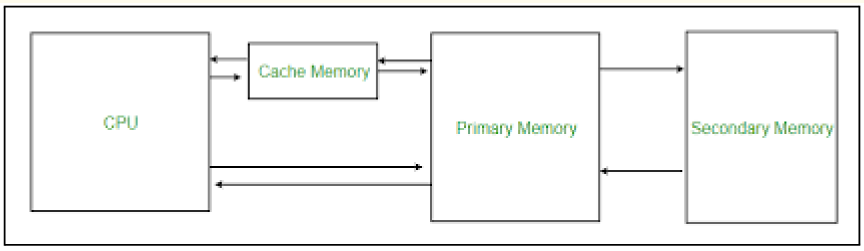
THEORY:

cache memory, also called cache, supplementary memory system that temporarily stores frequently used instructions and data for quicker processing by the central processing unit (CPU) of a computer. The cache augments, and is an extension of, a computer's main memory. Both main memory and cache are internal random-access memories (RAMs) that use semiconductor-based transistor circuits. Cache holds a copy of only the most frequently used information or program codes stored in the main memory. The smaller capacity of the cache reduces the time required to locate data within it and provide it to the CPU for processing.

When a computer's CPU accesses its internal memory, it first checks to see if the information it needs is stored in the cache. If it is, the cache returns the data to the CPU. If the information is not in the cache, the CPU retrieves it from the main memory. Disk cache memory operates similarly, but the cache is used to hold data that have recently been written on, or retrieved from, a magnetic disk or other external storage device.

```
Hit ratio = hit / (hit + miss) = no. of hits/total accesses.
```



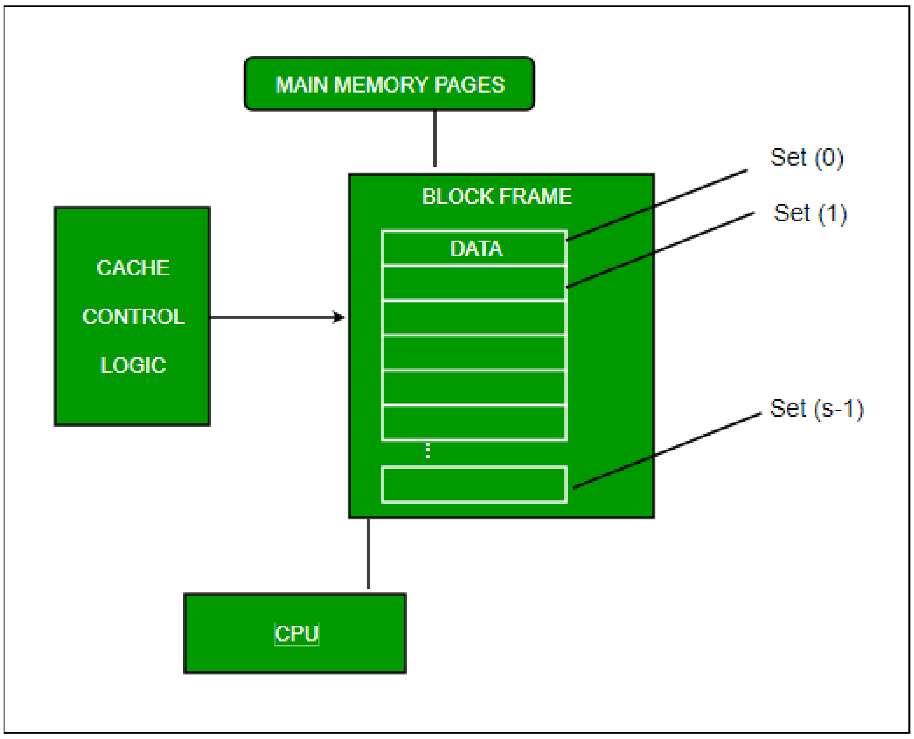
DIRECT CACHE MAPPING:

The simplest technique, known as direct mapping, maps each block of main memory into only one possible cache line. or

In Direct mapping, assign each memory block to a specific line in the cache. If a line is previously taken up by a memory block when a new block needs to be loaded, the old block is trashed. An address space is split into two parts: index field and a tag field. The cache is used to store the tag field whereas the rest is stored in the main memory. Direct mapping`s performance is directly proportional to the Hit ratio.

```
i = j modulo m
where
i=cache line number
j= main memory block number
m=number of lines in the cache
```

For purposes of cache access, each main memory address can be viewed as consisting of three fields. The least significant w bits identify a unique word or byte within a block of main memory. In most contemporary machines, the address is at the byte level. The remaining s bits specify one of the 2s blocks of main memory. The cache logic interprets these s bits as a tag of s-r bits (most significant portion) and a line field of r bits. This latter field identifies one of the m=2r lines of the cache.



8 Bit:

CODE:

```
#include <stdio.h>

int tag[8];

int main( )
{
   int addr;
   int i, j, t;
   int hits, accesses;
   FILE *fp;

   fp = fopen("trace.txt", "r");
   hits = 0;
   accesses = 0;
   while (fscanf(fp, "%x", &addr) > 0) {
      /* simulate a direct-mapped cache with 8 words */
      accesses += 1;
      printf("%3d: 0x%08x ", accesses, addr);
      i = (addr >> 2) & 7;
      t = addr | 0x1f;
      if (tag[i] == t) {
         hits += 1;
         printf("Hit%d ", i);
      } else {
         /* allocate entry */
         printf("Miss ");
         tag[i] = t;
      }
      for (i = 0; i < 8; i++)
         printf("0x%08x ", tag[i]);
      printf("\n");
   }
   printf("Hits = %d, Accesses = %d, Hit ratio = %f\n", hits, accesses,
((float)hits)/accesses);
   close(fp);
}
```

OUTPUT:

```
1: 0x80000000 Miss 0x8000001f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
  2: 0x80000004 Miss 0x8000001f 0x8000001f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
  3: 0x80000008 Miss 0x8000001f 0x8000001f 0x8000001f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
  4: 0x8000000c Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000 0x00000000 0x00000000 0x00000000
  5: 0x00000020 Miss 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x00000000 0x00000000 0x00000000 0x00000000
  6: 0x80000010 Miss 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000 0x00000000 0x00000000
  7: 0x80000014 Miss 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000 0x00000000
  8: 0x80000018 Miss 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
  9: 0x8000000c Hit3 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 10: 0x00000024 Miss 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 11: 0x80000010 Hit4 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 12: 0x80000014 Hit5 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 13: 0x80000018 Hit6 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 14: 0x8000000c Hit3 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 15: 0x00000028 Miss 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 16: 0x80000010 Hit4 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 17: 0x80000014 Hit5 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 18: 0x80000018 Hit6 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 19: 0x8000000c Hit3 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 20: 0x0000002c Miss 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 21: 0x80000010 Hit4 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 22: 0x80000014 Hit5 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 23: 0x80000018 Hit6 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 24: 0x8000000c Miss 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 25: 0x00000030 Miss 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x0000003f 0x8000001f 0x8000001f 0x00000000
 26: 0x80000010 Miss 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 27: 0x80000014 Hit5 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 28: 0x80000018 Hit6 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 29: 0x8000000c Hit3 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 30: 0x00000034 Miss 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x0000003f 0x8000001f 0x00000000
 31: 0x80000010 Hit4 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x0000003f 0x8000001f 0x00000000
 32: 0x80000014 Miss 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 33: 0x80000018 Hit6 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 34: 0x8000000c Hit3 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 35: 0x00000038 Miss 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x0000003f 0x00000000
 36: 0x80000010 Hit4 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x0000003f 0x00000000
 37: 0x80000014 Hit5 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x0000003f 0x00000000
 38: 0x80000018 Miss 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 39: 0x8000000c Hit3 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
 40: 0x0000003c Miss 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 41: 0x80000010 Hit4 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 42: 0x80000014 Hit5 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 43: 0x80000018 Hit6 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 44: 0x8000000c Hit3 0x0000003f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 45: 0x00000040 Miss 0x0000005f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 46: 0x80000010 Hit4 0x0000005f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 47: 0x80000014 Hit5 0x0000005f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 48: 0x80000018 Hit6 0x0000005f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 49: 0x8000000c Hit3 0x0000005f 0x0000003f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 50: 0x00000044 Miss 0x0000005f 0x0000005f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 51: 0x80000010 Hit4 0x0000005f 0x0000005f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 52: 0x80000014 Hit5 0x0000005f 0x0000005f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 53: 0x80000018 Hit6 0x0000005f 0x0000005f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 54: 0x8000000c Hit3 0x0000005f 0x0000005f 0x0000003f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 55: 0x00000048 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 56: 0x80000010 Hit4 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 57: 0x80000014 Hit5 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 58: 0x80000018 Hit6 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 59: 0x8000000c Hit3 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 60: 0x0000004c Miss 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 61: 0x80000010 Hit4 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 62: 0x80000014 Hit5 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 63: 0x80000018 Hit6 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 64: 0x8000000c Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 65: 0x00000050 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x0000005f 0x8000001f 0x8000001f 0x0000003f
 66: 0x80000010 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 67: 0x80000014 Hit5 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 68: 0x80000018 Hit6 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 69: 0x8000000c Hit3 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 70: 0x00000054 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x0000005f 0x8000001f 0x0000003f
 71: 0x80000010 Hit4 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x0000005f 0x8000001f 0x0000003f
 72: 0x80000014 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 73: 0x80000018 Hit6 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 74: 0x8000000c Hit3 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 75: 0x00000058 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x0000005f 0x0000003f
 76: 0x80000010 Hit4 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x0000005f 0x0000003f
 77: 0x80000014 Hit5 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x0000005f 0x0000003f
 78: 0x80000018 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 79: 0x8000000c Hit3 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000003f
 80: 0x0000005c Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 81: 0x80000010 Hit4 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 82: 0x80000014 Hit5 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 83: 0x80000018 Hit6 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 84: 0x8000000c Hit3 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 85: 0x00000060 Miss 0x0000007f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 86: 0x80000010 Hit4 0x0000007f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 87: 0x80000014 Hit5 0x0000007f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 88: 0x80000018 Hit6 0x0000007f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 89: 0x8000000c Hit3 0x0000007f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 90: 0x00000064 Miss 0x0000007f 0x0000007f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 91: 0x80000010 Hit4 0x0000007f 0x0000007f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 92: 0x80000014 Hit5 0x0000007f 0x0000007f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 93: 0x80000018 Hit6 0x0000007f 0x0000007f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 94: 0x8000000c Hit3 0x0000007f 0x0000007f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 95: 0x00000068 Miss 0x0000007f 0x0000007f 0x0000007f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 96: 0x80000010 Hit4 0x0000007f 0x0000007f 0x0000007f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 97: 0x80000014 Hit5 0x0000007f 0x0000007f 0x0000007f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 98: 0x80000018 Hit6 0x0000007f 0x0000007f 0x0000007f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
 99: 0x8000000c Hit3 0x0000007f 0x0000007f 0x0000007f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
100: 0x0000006c Miss 0x0000007f 0x0000007f 0x0000007f 0x0000007f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
101: 0x80000010 Hit4 0x0000007f 0x0000007f 0x0000007f 0x0000007f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
102: 0x80000014 Hit5 0x0000007f 0x0000007f 0x0000007f 0x0000007f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
103: 0x80000018 Hit6 0x0000007f 0x0000007f 0x0000007f 0x0000007f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
Hits = 68, Accesses = 103, Hit ratio = 0.660194
```

16 Bit:

CODE:

```
#include <stdio.h>

int tag[16];

int main( )
{
   int addr;
   int i, j, t;
   int hits, accesses;
   FILE *fp;
```

```
    fp = fopen("trace.txt", "r");
    hits = 0;
    accesses = 0;
    while (fscanf(fp, "%x", &addr) > 0) {
        /* simulate a direct-mapped cache with 8 words */
        accesses += 1;
        printf("%3d: 0x%08x ", accesses, addr);
        i = (addr >> 2) & 15;
        t = addr | 0x1f;
        if (tag[i] == t) {
            hits += 1;
            printf("Hit%d ", i);
        } else {
            /* allocate entry */
            printf("Miss ");
            tag[i] = t;
        }
        for (i = 0; i < 16; i++)
            printf("0x%08x ", tag[i]);
        printf("\n");
    }
    printf("Hits = %d, Accesses = %d, Hit ratio = %f\n", hits, accesses,
((float)hits)/accesses);
    close(fp);
}
```

OUTPUT:

```
  1: 0x80000000 Miss 0x8000001f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
  2: 0x80000004 Miss 0x8000001f 0x8000001f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
  3: 0x80000008 Miss 0x8000001f 0x8000001f 0x8000001f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
  4: 0x8000000c Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
  5: 0x00000020 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000 0x00000000 0x00000000 0x00000000
0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
  6: 0x80000010 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000 0x00000000 0x00000000
0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
  7: 0x80000014 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000 0x00000000
0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
  8: 0x80000018 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
  9: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
 10: 0x00000024 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
```

```
0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
 11: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
 12: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
 13: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
 14: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
 15: 0x00000028 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
 16: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
 17: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
 18: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
 19: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
 20: 0x0000002c Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000
 21: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000
 22: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000
 23: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000
 24: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000
 25: 0x00000030 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000
 26: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000
 27: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000
 28: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000
 29: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000
 30: 0x00000034 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000
 31: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000
 32: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000
 33: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000
 34: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000
 35: 0x00000038 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000
 36: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000
 37: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000
 38: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000
 39: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000
 40: 0x0000003c Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 41: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 42: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 43: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
```

```
 44: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 45: 0x00000040 Miss 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 46: 0x80000010 Hit4 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 47: 0x80000014 Hit5 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 48: 0x80000018 Hit6 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 49: 0x8000000c Hit3 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 50: 0x00000044 Miss 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 51: 0x80000010 Hit4 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 52: 0x80000014 Hit5 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 53: 0x80000018 Hit6 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 54: 0x8000000c Hit3 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 55: 0x00000048 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 56: 0x80000010 Hit4 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 57: 0x80000014 Hit5 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 58: 0x80000018 Hit6 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 59: 0x8000000c Hit3 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 60: 0x0000004c Miss 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 61: 0x80000010 Hit4 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 62: 0x80000014 Hit5 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 63: 0x80000018 Hit6 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 64: 0x8000000c Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 65: 0x00000050 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x0000005f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 66: 0x80000010 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 67: 0x80000014 Hit5 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 68: 0x80000018 Hit6 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 69: 0x8000000c Hit3 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 70: 0x00000054 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x0000005f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 71: 0x80000010 Hit4 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x0000005f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 72: 0x80000014 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 73: 0x80000018 Hit6 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 74: 0x8000000c Hit3 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 75: 0x00000058 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x0000005f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 76: 0x80000010 Hit4 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x0000005f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 77: 0x80000014 Hit5 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x0000005f 0x00000000
```

```
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 78: 0x80000018 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 79: 0x8000000c Hit3 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 80: 0x0000005c Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 81: 0x80000010 Hit4 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 82: 0x80000014 Hit5 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 83: 0x80000018 Hit6 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 84: 0x8000000c Hit3 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 85: 0x00000060 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 86: 0x80000010 Hit4 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 87: 0x80000014 Hit5 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 88: 0x80000018 Hit6 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 89: 0x8000000c Hit3 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 90: 0x00000064 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 91: 0x80000010 Hit4 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 92: 0x80000014 Hit5 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 93: 0x80000018 Hit6 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 94: 0x8000000c Hit3 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 95: 0x00000068 Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000007f 0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 96: 0x80000010 Hit4 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000007f 0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 97: 0x80000014 Hit5 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000007f 0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 98: 0x80000018 Hit6 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000007f 0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
 99: 0x8000000c Hit3 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000007f 0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
100: 0x0000006c Miss 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000007f 0x0000007f 0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
101: 0x80000010 Hit4 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000007f 0x0000007f 0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
102: 0x80000014 Hit5 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000007f 0x0000007f 0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
103: 0x80000018 Hit6 0x0000005f 0x0000005f 0x0000005f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x0000005f
0x0000007f 0x0000007f 0x0000007f 0x0000007f 0x0000003f 0x0000003f 0x0000003f 0x0000003f
Hits = 72, Accesses = 103, Hit ratio = 0.699029
```

32 Bit:

CODE:

```
#include <stdio.h>
#include <stdio.h>
int tag[32];
 int main( )
{
          int addr;
          int i, j, t;
          int hits, accesses;
          FILE *fp;

          fp = fopen("trace.txt", "r");
          hits = 0;
          accesses = 0;
          while (fscanf(fp, "%x", &addr) > 0) {
          /* simulate a direct-mapped cache with 8 words */
            accesses += 1;
      printf("%3d: 0x%08x ", accesses, addr);
          i = (addr >> 2) & 31;
          t = addr | 0x1f;
          if (tag[i] == t) {
          hits += 1;
          printf("Hit%d ", i);
          } else {
          /* allocate entry */
          printf("Miss ");
          tag[i] = t;
          }
          for (i = 0; i < 32; i++)
          printf("0x%08x ", tag[i]);
      printf("\n");
          }
   printf("Hits = %d, Accesses = %d, Hit ratio = %f\n", hits, accesses,
((float)hits)/accesses);
          close(fp);
}
```

OUTPUT:

```
1: 0x80000000 Miss 0x8000001f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
  2: 0x80000004 Miss 0x8000001f 0x8000001f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
  3: 0x80000008 Miss 0x8000001f 0x8000001f 0x8000001f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
  4: 0x8000000c Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
  5: 0x00000020 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000 0x00000000 0x00000000 0x00000000
0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
  6: 0x80000010 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000 0x00000000 0x00000000
0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
  7: 0x80000014 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000 0x00000000
0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
  8: 0x80000018 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
  9: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 10: 0x00000024 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 11: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 12: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 13: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 14: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 15: 0x00000028 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 16: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 17: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
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0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 18: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 19: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 20: 0x0000002c Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 21: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 22: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 23: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 24: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 25: 0x00000030 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 26: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 27: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 28: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 29: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 30: 0x00000034 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 31: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 32: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 33: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 34: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
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0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 35: 0x00000038 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 36: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 37: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 38: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 39: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 40: 0x0000003c Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 41: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 42: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 43: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 44: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 45: 0x00000040 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 46: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 47: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 48: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 49: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 50: 0x00000044 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
```

```
 51: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 52: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 53: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 54: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 55: 0x00000048 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 56: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 57: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 58: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 59: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 60: 0x0000004c Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 61: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 62: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 63: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 64: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 65: 0x00000050 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 66: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 67: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
```

```
0x00000000 0x00000000 0x00000000 0x00000000
 68: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 69: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 70: 0x00000054 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 71: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 72: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 73: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 74: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 75: 0x00000058 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 76: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 77: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 78: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 79: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 80: 0x0000005c Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 81: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 82: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 83: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 84: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
```

```
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x00000000 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 85: 0x00000060 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 86: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 87: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 88: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 89: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x00000000 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 90: 0x00000064 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x0000007f 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 91: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x0000007f 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 92: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x0000007f 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 93: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x0000007f 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 94: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x0000007f 0x00000000 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 95: 0x00000068 Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x0000007f 0x0000007f 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 96: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x0000007f 0x0000007f 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 97: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x0000007f 0x0000007f 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 98: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x0000007f 0x0000007f 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
 99: 0x8000000c Hit3 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x0000007f 0x0000007f 0x00000000
0x00000000 0x00000000 0x00000000 0x00000000
100: 0x0000006c Miss 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x0000007f 0x0000007f 0x0000007f
0x00000000 0x00000000 0x00000000 0x00000000
101: 0x80000010 Hit4 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
```

```
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x0000007f 0x0000007f 0x0000007f
0x00000000 0x00000000 0x00000000 0x00000000
102: 0x80000014 Hit5 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x0000007f 0x0000007f 0x0000007f
0x00000000 0x00000000 0x00000000 0x00000000
103: 0x80000018 Hit6 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x8000001f 0x00000000
0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000003f 0x0000005f 0x0000005f
0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000005f 0x0000007f 0x0000007f 0x0000007f 0x0000007f
0x00000000 0x00000000 0x00000000 0x00000000
Hits = 76, Accesses = 103, Hit ratio = 0.737864
```

Comparison Table

Number of Bits	Hits	Accesses	Hit Ratio
8	68	103	0.660194
16	72	103	0.699029
32	76	103	0.737864

CONCLUSION:

Cache memory is the closest to the CPU, it reduces the access time from Main Memory. There are 3 ways to map cache to Main memory: Direct mapping, Associative mapping, and Set-Associative mapping. In Direct mapping, each memory block is assigned to a specific line in the cache. It is a simple way to map blocks but it has a lower cache hit ratio, as there is only one cache line available in a set. Every time a new memory is referenced to the same set, the cache line is replaced, this is the drawback of Direct Mapping.
As seen from the comparison table above which is derived from our program output, as we go on increasing the number of bits in cache memory, the hit ratio also increases.