

SOLUTIONS:

- Cache line size (*CacheLineSize* folder):

Number of accesses	Number of misses
4	1
5	2
6	2
7	2
8	2
9	3

We are accessing sequentially an array of integers, each occupying 4B. According to the results, every 4 accesses, we have 1 miss. Thus, the D\$ line size is 16B. All hits are a consequence of spatial locality exploitation.

- Associativity (*CacheAssociativity* folder):

- *2k1way*

- D\$ Accesses: 8
- D\$ Misses: 8

In each iteration, we are accessing two different blocks that map to the same set. The two blocks are accessed alternatively (i.e. in each iteration, first one block is accessed and then the other). Given that we have a direct-mapped cache, each access brings a block to the D\$ and replaces the other block. Thus, we obtain one miss per access. Among the 8 misses, 2 of them are compulsory misses (assuming that we bring the blocks to the D\$ for the first time) and 6 of them are conflict misses.

- *1k2way*

- D\$ Accesses: 8
- D\$ Misses: 2

Each block can be stored in a different way of the same set. Thus, we avoid all conflict misses, reducing the number of misses to only 2 (compulsory). All hits are a consequence of spatial locality exploitation.

- Cache Size (*CacheSize* folder):

- *2k1way*

- D\$ Accesses: 512
- D\$ Misses: 512

There are 2 loops. The external loop has 2 iterations, and the internal loop has 256 iterations. In each iteration, the internal loop accesses a different sequential block. Thus, it will bring a total of $256 * 16B = 4096B$. Then, the external loop repeats the exact same access pattern. Only $\frac{1}{2}$ of the total data accessed by the program fits in the D\$ (D\$ size of 2048B), thus all accesses miss. Half of the misses can be considered compulsory misses, and the other half are capacity misses.

- *4k1way*
 - D\$ Accesses: 512
 - D\$ Misses: 256

The data accessed by the program (4096B) fits in the D\$ (4096B size), thus the second iteration of the external loop will hit in all its accesses. In this case, the capacity misses are avoided, and we only have compulsory misses. All hits are a consequence of temporal locality exploitation.