

- 1) An 8Kbyte direct mapped cache w/ 16byte blocks = 512total blocks.
The first access into a block (assuming no prefetching) is a compulsory miss.
Therefore the first 512instructions will be cold-start misses.

Increase in size of blocks means less blocks which in turn yields less cold-start misses.

- 2) Yes, while wider cache blocks improve spatial locality, non-consecutive memory references still require prefetching.

- 3) $AMAT = (\text{hit time}) + (\text{miss rate}) \times (\text{miss penalty})$
 $AMAT(dm) = 1 + 3.7\% \times 100 = 4.7\text{cycles}$

(2way have a 20% slower cycle)

$$AMAT(2w) = 2.4 + 3.0\% \times 120 = 8.64\text{cycles}$$

(20% slower, hit in L1, hit in L2, miss)

$$AMAT(2w\text{-pred}) = 1 + 3.7\% \times (2\text{cycles} + 3.0\% \times 100\text{cycles}) = 1.185\text{cycles}$$