

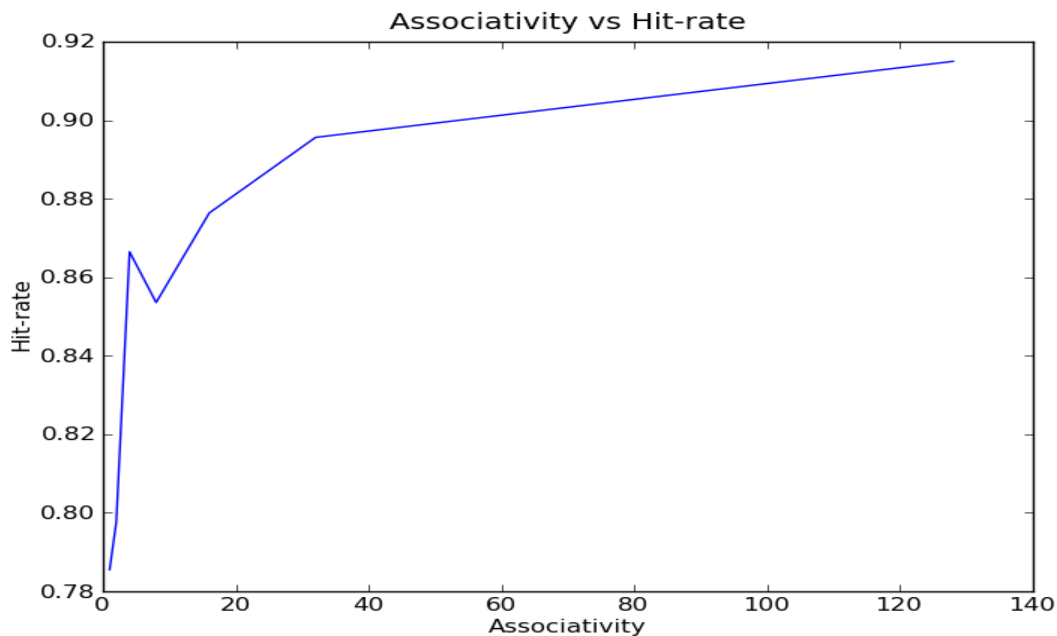
Inference from the results of Cache Simulation for Naive Matrix Multiplication Algorithm

Default Parameters are:

Cache Size : 2048 B
Block Size : 16 B
Data Element Size : 4 B
Associativity : 4
Matrix Size : 100 x 100

In each of the experiment below, one of these parameters is varied while keeping all others fixed.

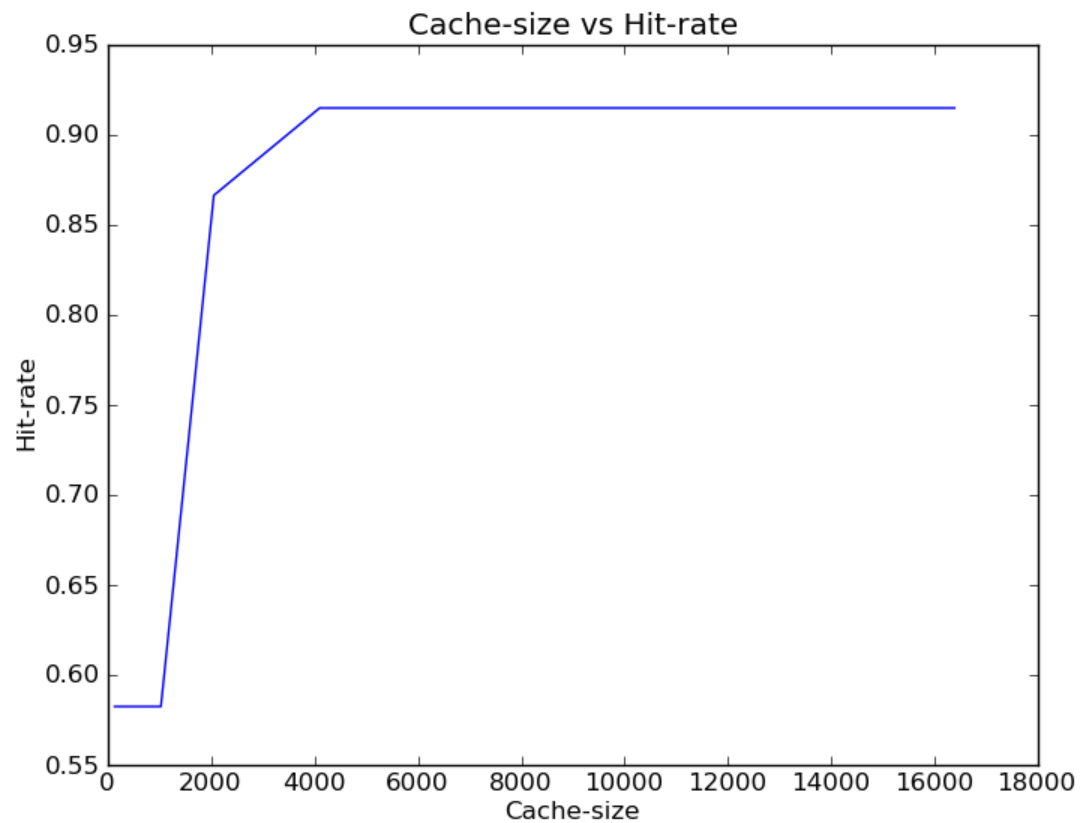
Experiment 1:



Hit rate is evaluated for different values of associativity : 1, 2, 4, 8, 16, 32 and for fully associative cache for given parameters.

As expected, hit rate increases on increasing associativity.

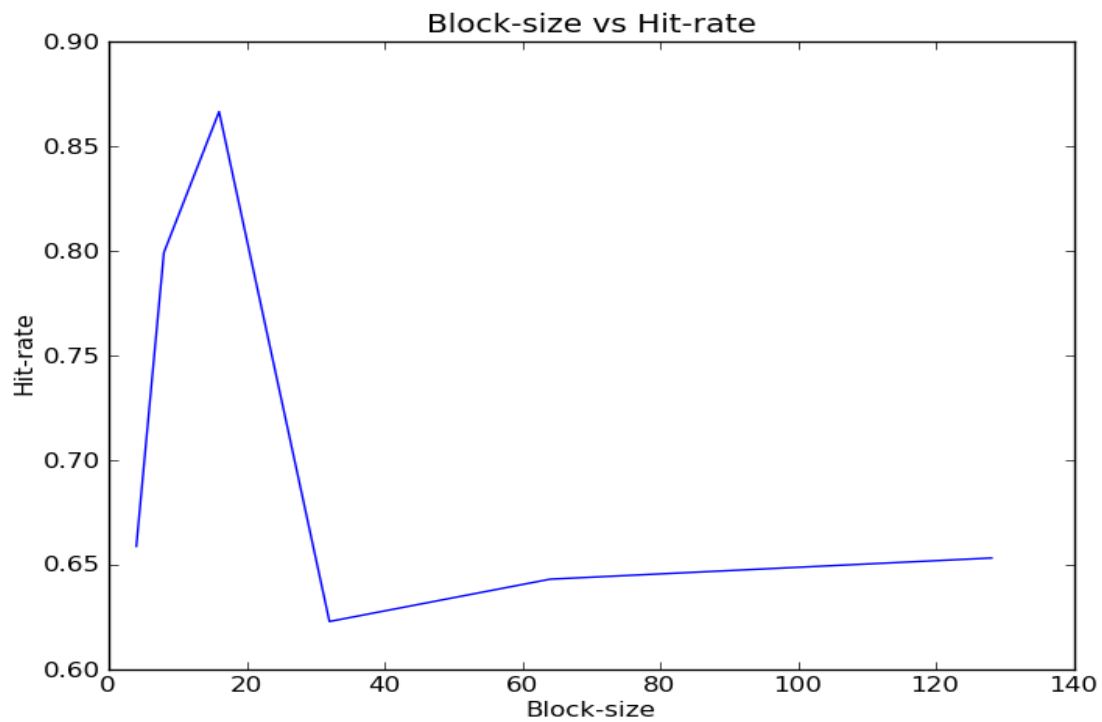
Experiment 2:



Hit rate is evaluated for different cache sizes : 128, 256, 512, 1024, 2048, 4096, 8192, 16384 B.

Initially hit rate almost remains constant but once cache size increases, then almost all the data will be present in cache, so hit rate increases steeply and then remains the same.

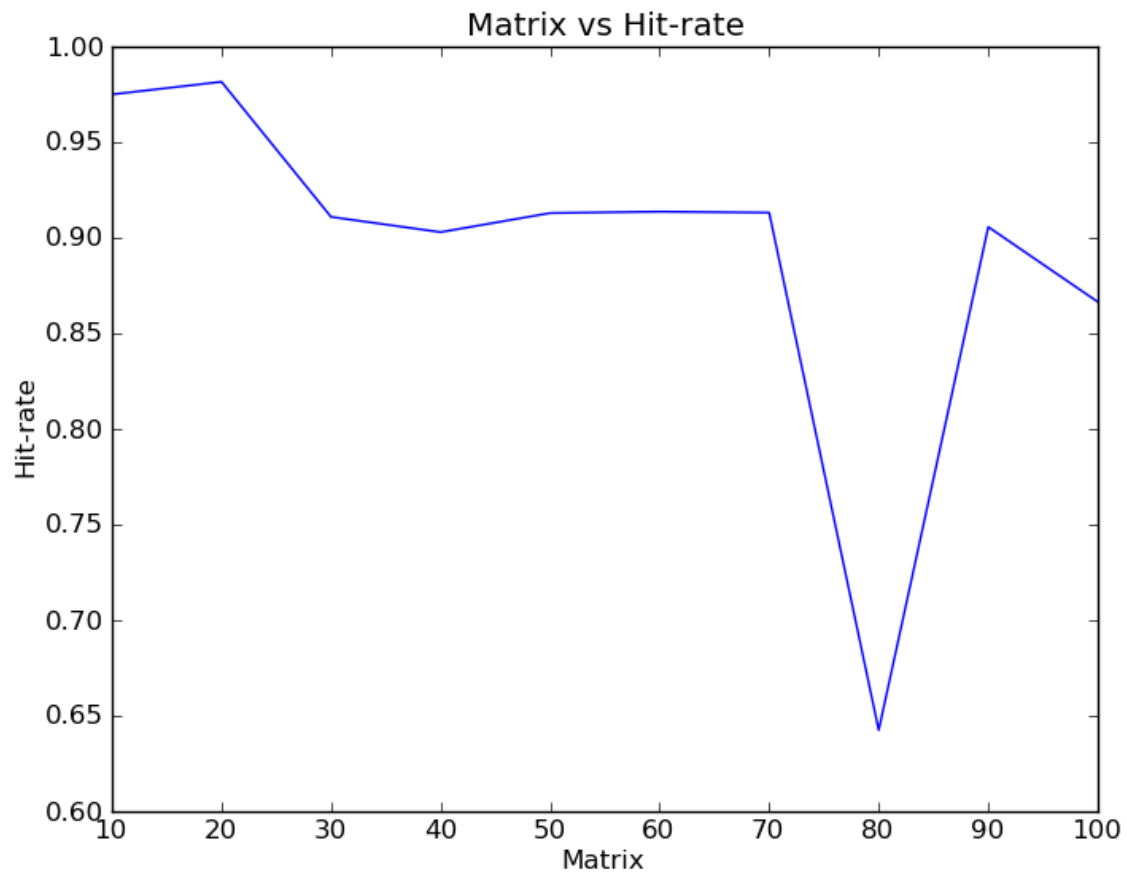
Experiment 3:



Hit rate is evaluated for different block sizes : 4, 8, 16, 32, 64, 128 B.

For smaller block sizes, locality of reference is not being considered, so hit rate remains low. But increases on increasing block size. But once block size increases more than a threshold value (here 16B), unnecessary data is being brought in the cache that results in low hit rate.

Experiment 4:



Hit rate is evaluated for different matrix size : 10, 20, ..., 100

For smaller matrix sizes, all the data elements can reside in cache, so hit rate is pretty high. As the matrix size increases, a dip in hit rate is observed.