

1) How many 64 bit floating point numbers can be stored in a 16 byte cache block? 64 byte cache block?

2)

```
for(i = 0; i < 8; i++)
  for(j = 0; j < 1000; j++)
    A[i][j] = B[i][0] + A[i][j];
```

a. In the C code segment above what variable references exhibit temporal locality?

b. What variable references exhibit spatial locality?

3) Given the following information for a direct-mapped cache design with 32 bit address:

Tag	Index	Offset
31-13	12-6	5-0

a) How many words are in a block/cache line?

b) How many blocks/cache lines are in the cache?

c) How many bits of data can the cache store?

d) How many bits are used per cache line to manage the cache (valid bit plus tag bits)?

e) How many bits are used overall to manage the cache (valid bits plus tag bits)?

f) What is the total number of bits the cache requires for storage and management?

4) Given the following information calculate the average memory access time (AMAT).

$$\text{AMAT} = \text{HitTime} + \text{MissRatio} * \text{MissPenalty}$$

- L1 miss rate 5%.
- L1 access time 5 cycles
- Memory access time 150 cycles

5) What would the L1 miss rate need to be to achieve a AMAT of 6 cycles?