

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];
```

- In the C code segment above what variable references exhibit temporal locality?
- What variable references exhibit spatial locality?

3) Given the following information for a direct-mapped cache design with 32 bit address, 4 byte words and byte addressing:

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

- How many words are in a block/cache line?
- How many blocks/cache lines are in the cache?
- How many bits of data can the cache store?
- How many bits are used per cache line to manage the cache (valid bit plus tag bits)?
- How many bits are used overall to manage the cache (valid bits plus tag bits)?
- 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

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