Cache Basics

5.1.1

1 byte = 8 bits.

The cache size of memory in bits are:
16*8 = 128
= 128/32
= 4

5.1.2

Here the variables i and j are constantly in used so they remain in cache hence exhibit temporal locality
Also B[i][0] is accessed again and again so the array B[i][0] also exist temporal exhibit

5.1.3

A[j][i] and B[j][0] exhibit spatial locality because as j is incremented, nearby values of array are accessed.

5.1.4

Number of elements the array= 8000*8 = 64000 elements
The elements present in the matrix are in 32-bit format it is equivalent to 4 bytes.
Number of bytes = 64000*4 = 256000 Bytes
Number of 16-byte cache blocks required = 256000/16 = 16000 bytes

5.1.5

A (i, j) = B (i, 0) + A (j, i);
During the execution of this code the processor uses variables I and J again and again.
This means, I and J and B(I, 0) are the variables that exhibit temporal locality.

5.1.6

A[j][i], because A[j+1][i] are close.