

Homework 5

Question 4

Due: Thursday, October 26, 2017 23:59

Submit as a team. Make sure to include the names of both teammates in your report.

- A. Assume that a cache block is 16 (sixteen) bytes. In a 32-bit machine, how many integers can be stored in a cache block?
- B. Consider the following code snippet, written in the C programming language. The type of arrays `a` and `b` is `int`.

```
for (i = 0; i < 8; i++)
    for (j = 0; j < 8000; j++)
        a[i][j] = b[i][0] + a[j][i];
```

References to which variables exhibit temporal locality? **Hint:** A variable (in this scenario) exhibits temporal locality, if its current value will be in the cache at the beginning of each iteration of the inner loop.

- C. References to which variables exhibit spatial locality? **Hint:** A variable (in this scenario) exhibits spatial locality if it is part of a block that will be in the cache at the beginning of each iteration of the inner loop.
- D. Answer the previous two questions (under B and C) assuming that the code snippet is written in a language with column major order.