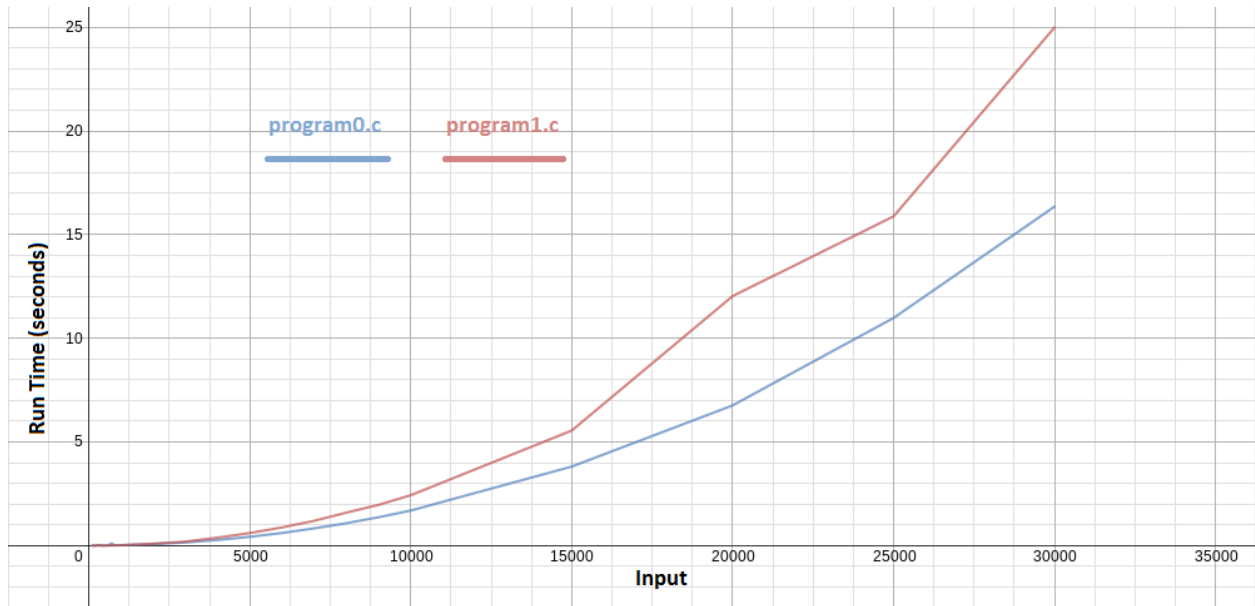# Lab 4 Case Study

From the graph we can see that as the Input get larger the run time difference between program0.c and program1.c grows at a linear pace. Both programs calculate matrix multiplication. program0.c iterates through the matrix vectors through adjacent elements (like it is going row) while program1.c iterates through the matrix vectors by skipping elements (like it is going col). While both have the same complexity, program0.c has better locality and thus will be faster when it iterates through the elements since they are stored next to each other. We see this in the graph. The increase input, causes the locality to become progressively worse in program1.c while the locality in program0.c stays the same. As a result we see the program1.c become slower and slower compared to program0.c