Techniques for Improving Software Productivity

‘19 Spring Semester

Homework Assignment 3: KLEE vs. CBMC

1. (70%) Write a small C program – a sorting procedure which reads the number of elements n and then reads n elements into an array. Finally, the procedure sorts the elements, e.g. using bubble sort.
    a. You should check your program using both CBMC and KLEE. Here are the properties that you should check for:
        i. Absence of buffer overruns
        ii. That the array at the end is sorted
        iii. That the array at the end is a permutation of the original array

       You can check all these properties using special pure functions and either using these functions in ASSERT or in if conditions.
    b. Insert different bugs in your code which violate each of the above properties and check them using KLEE and CBMC for a reasonable loop unfolding.
2. (30%) Write a C program with a bug that KLEE finds and cannot be found by CBMC even for a large unfolding say 10.