

Techniques for Improving Software Productivity

16/17 Fall 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 read 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 arrayYou 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 large unfolding say 10.