Exercise 1

1. Run Insertion-Sort on the following inputs and write down a trace of the execution in the style of CLRS Figure 2.2 (page 20 in 4th edition).
   - (7, 2, 1, 4)
   - (8, 5, 3, 1)
   - ('a', 'm', 'f', 'b')
     - NB: How do you compare characters?

Exercise 2

Consider the pseudo-code for $\text{SUM}(A, n)$:

```
SUM(A, n)
1  i = 0
2  sum = 0
3  while i < n
4        sum = sum + A[i]
5        i = i + 1
6  return sum
```

1. Prove with a loop invariant that the algorithm correctly sums the elements in the array passed to it. Note that:
   - A is an array of real numbers (index starting from 0)
   - n is the size of A (so n is an integer such that $n \geq 0$)

Exercise 3

1. Rewrite the Insertion-Sort procedure to sort into monotonically decreasing order instead of monotonically increasing order (this is exercise 2.1-3 from CLRS).