Chapter 7 outline:

- Recursively-defined sets (last week Monday)
- Structural induction (last week Wednesday)
- Mathematical induction (Monday)
- Non-recursive programs—loops (Wednesday)
- Program correctness and loop invariants (**Today**)
- Recursively-defined sets application: The Huffman encoding (next week Monday)
- Leftover topic: Arrays, vectors, and intervals (next week Wednesday)

Today:

- What we mean by *program correctness*
- Loop invariants
- Proving a loop invariant

A **statement** is a command that has a side effect, modifying the state of the computation—for example, updating the values stored in the variables.

A program is **correct** if it aways produces its specified result.

We can show that a program is *incorrect* by writing tests for it. We can show that a program is *correct* by formal reasoning about the change of state caused by its statements.

A **precondition** is a proposition that is [or that we suppose to be] true before a statement is executed. A **postcondition** is a proposition that we prove to be true after a statement is executed, if the supposed preconditions are true.

For next time:

Do Exercises 7.5.(2,3,4,6)

(No reading or quiz)