Chapter 7 outline:

- Recursively-defined sets (week-before Monday)
- Structural induction (last week Monday)
- Mathematical induction (last week Wednesday)
- Non-recursive programs—loops (last week Friday)
- Loop invariant proofs (**Today**)
- ~~A language processor~~ The Huffman encoding (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)