Chapter 7 outline:

- ▶ Recursively-defined sets (week0before Monday)
- ▶ Trees (last week Monday)
- ▶ Structural induction (last week Wednesday)
- ▶ Mathematical induction (last week Friday)
- ▶ Loops (**Today**)
- ▶ Loop invariants (next week Wednesday)
- ▶ Review for final exam (next week Friday)

- ▶ Final exam (Tues, Dec 16, 1:30pm)

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)