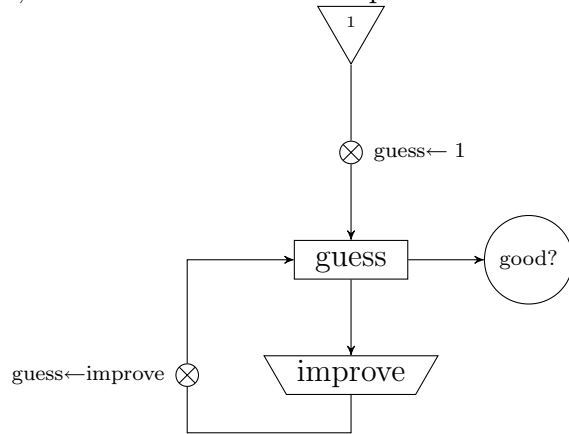
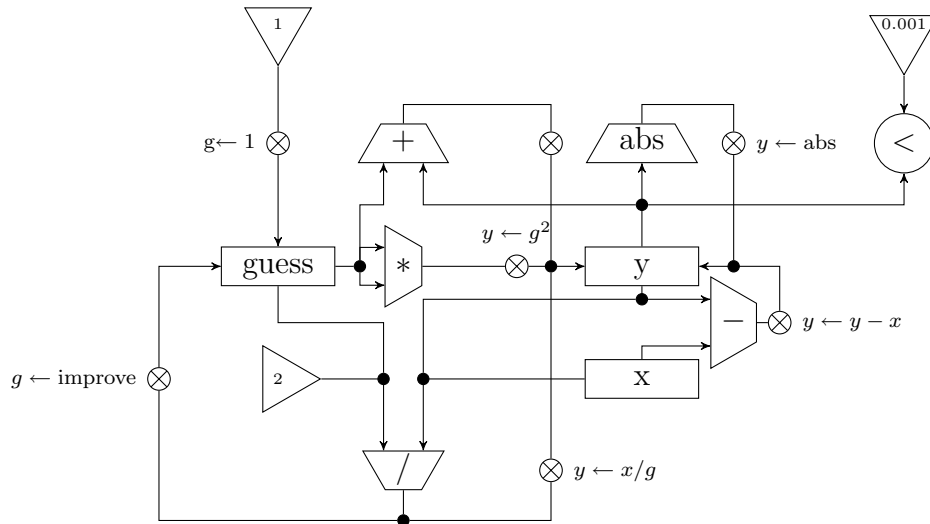


By assuming that `good?` and `improve` operations are available as primitives, here's a version of the `sqrt` machine.



```
(controller
  (assign guess (const 1))
test-guess
  (test (op good?) (reg guess))
  (branch (label sqrt-done))
  (assign guess (op improve) (reg guess))
  (goto (label test-guess))
sqrt-done)
```

Here's the expanded version in terms of arithmetic operations.



```
(controller
  (assign guess (const 1))
test-guess
```

```
(assign y (op *) (reg guess) (reg guess))
(assign y (op -) (reg y) (reg x))
(test (op <) (reg y) (const 0.001))
(branch (label sqrt-done))
(assign y (op /) (reg x) (reg guess))
(assign y (op +) (reg y) (reg guess))
(assign guess (op /) (reg y) (const 2))
(goto (label test-guess))
sqrt-done)
```