Critical Reading

"Programming is, among other things, a kind of writing. One way to learn writing is to write, but in all other forms of writing one also reads. We read examples - both good and bad - to facilitate learning."

- Jerry Weinberg, "The Psychology of Computer Programming"

- Reading is important to earlier stages of development than code
  - SADT, 20 years ago, insisted on an author/reader cycle
  - Forms of reading requirements: inspections, walkthroughs, reviews

Constant Questioning

- What kind of description is this?
  - what is it about, what is it for?
- Does it assert that something is TRUE?
  - how might it be proved wrong?
- Does it state that something is REQUIRED?
  - by whom?
  - how can I check that it is really required?
- What are the unstated assumptions?
  - what does it leave out?
  - is there something else I must know to understand it?
- Does it have more than one plausible meaning?
  - how can I check my understanding?
- Does it define new terms to be used elsewhere?
- How does it fit with other descriptions of the development?

Vagueness

- Perhaps the most common defect in software development
  - it can hide lots of other problems
  - often the reason for failures (check the data)
    - the subject of some of my research :-)
- Isn't requirements *supposed to be* "vague"?
  - don't we get more detail as we learn more
  - we become more exact as we move on with design?
- Is a requirements specification a "vague" design?
 - just "add precision" to it?

Some Reasons for Lack of Precision in Requirements

- It is easier to be vague than precise
- Uncritical acceptance of the old "Top Down" paradigm
  - if you don't understand at the top level, just keep refining it to get more precision

St. Augustine had a prayer as a wild young man,

"O Lord, make me virtuous, ... but not yet."

State Machines and Precision

Blue Button

Stop

Go
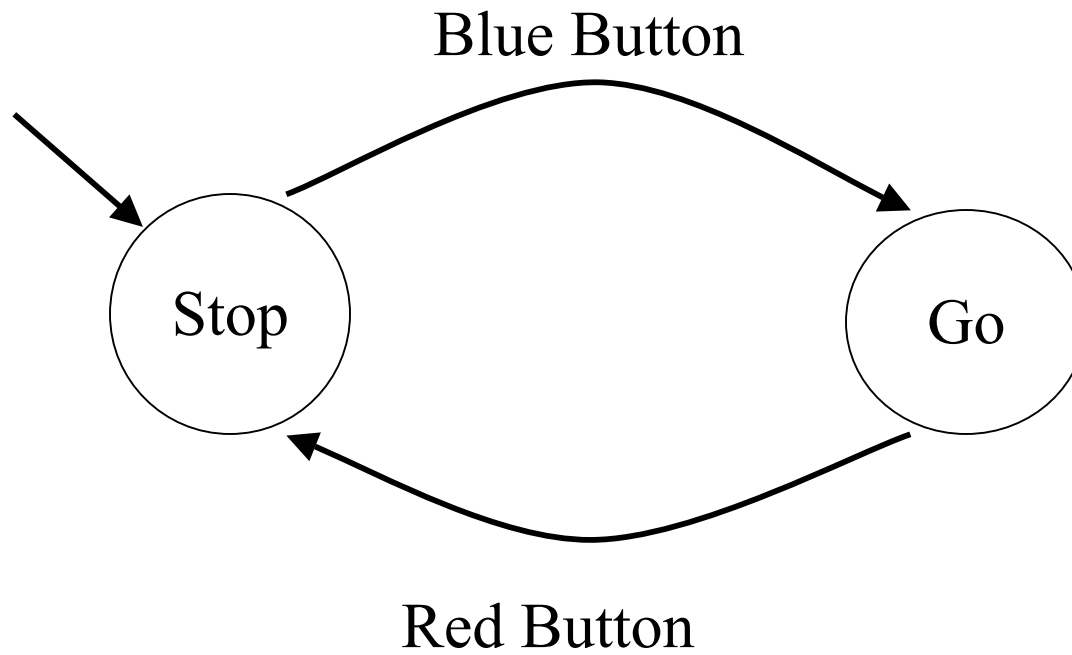
Red Button

- What inferences would you draw from this diagram?
    - In the "stop" state, it is impossible to hit the "red button"?
    - In the "stop" state, you can hit the red button but to no effect?
    - In the "stop" state, you can hit the red button with indeterminate effect?

- Did you assume these buttons were independent?
- Did you assume a single two position lever?

Another State Diagram

Switch Up

OFF   ON
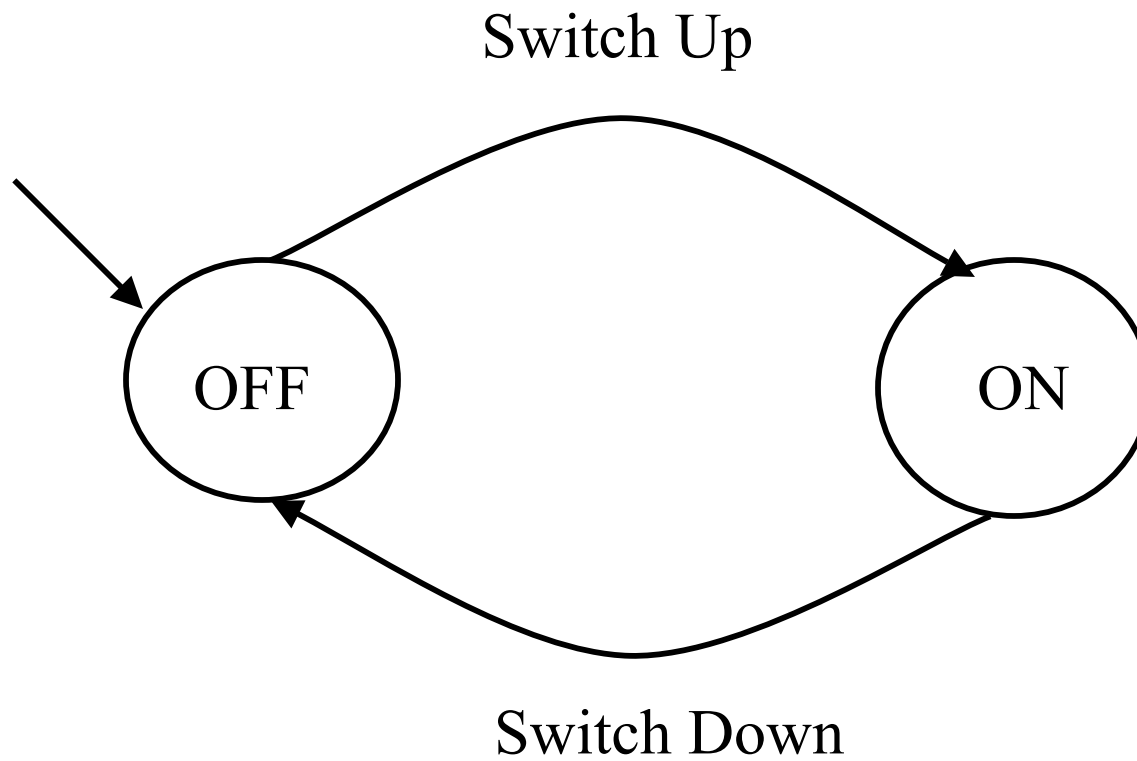
Switch Down

Do "Meaningful" Names Raise Expectations?

- What inferences do you draw now?
  - In the OFF state, can I push the switch down?
  - In the OFF state, can I push the switch down to no effect?
  - In the OFF state, can I push the switch down with indeterminate effect?

- But are your expectations necessarily correct?
  - these switches may be springloaded and return to a central position after operation
  - the switch may be a rocker and the two positions physically dependent

Funny Story

A Theater audience waited for the performance to start. They were soon horrified to see two men rush in, one threatening the other with a knife. The staff overpowered the men and called the police. The police interviewed patrons to find that most said the "large" man had attacked the "small" one.

In fact, the whole thing had been staged. The smaller man had attacked the larger one. The patrons simple assumption of "large" = "threatening" and "attacker" was not correct.

Software developers need to do better.