

Implementing Green Screen Algorithm

Finding Bugs in Code

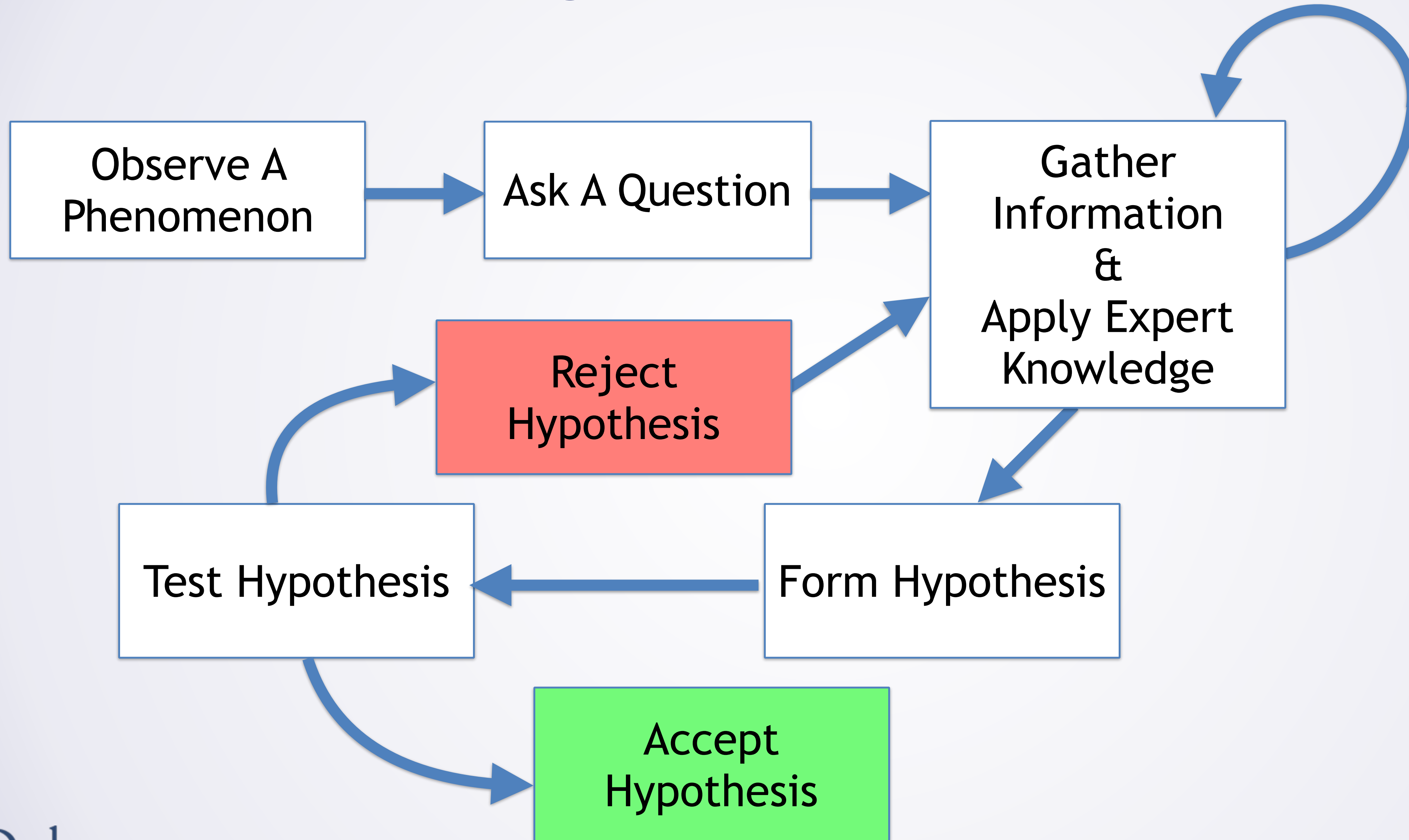
Finding and Fixing Bugs

7

Debug Failed
Test Cases

- Step 7: Debug Failed Test Cases
 - How do you do this?
 - Use scientific method

Scientific Method



Gathering Information

- How do we gather info?
 - Print statements
 - Debugging tools
 - Execute code by hand
- Expert Knowledge
 - Comes with experience

Hypotheses

- Good hypotheses are
 - Testable
 - Prediction about behavior
 - Actionable
 - Can fix program if true
- Being specific helps with both

Hypotheses

Example (no useful information):

“My program is broken”

Hypotheses

Example (better):

“The problem is on line 5”

Hypotheses

Example (even better):

“The problem is division by zero on line 5”

Hypotheses

Example (very good):

“The problem is division by zero on line 5, when an input pixel has red < 30 and green > 245 ”

Testable

Actionable

Testing Hypotheses

- Run program
- Behavior matches predictions?
 - **No: reject hypothesis**
 - **Yes: more confident**
 - Confident enough? Accept
- Checking: similar to gather info

Temptation: Ad Hoc Changes

- Temptation: “maybe if I just change...”
 - Just tweak some code—maybe will fix it?
 - Maybe get lucky? Save some time...
 - Tempting, but poor idea.
- Metaphor: medical doctors
 - Suppose you were ill
 - Visit doctor to diagnose you
 - Does the doctor randomly try things?
 - If so, get a new doctor!
 - No! The doctor uses the scientific method

Scientific Method

