Review

- What is agile development?
- What are frameworks you can use for agile development?
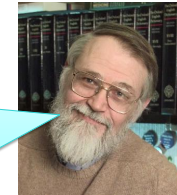
Debugging vs Testing

Debugging is twice as hard as writing the code in the first place.
Therefore, if you write the code as cleverly as possible, you are, by definition, not smart enough to debug it.

Brian Kernighan

Testing can never demonstrate the _absence_ of errors in software, only their _presence_

Edsger Dijkstra

Debugging Sucks!   Testing Rocks!

Testing Granularities

Testing Granularities

- Unit testing
- Integration testing
- System testing
  - How is the whole system working?
- System integration testing

What are the benefits of unit testing?

1

EXTREME PROGRAMMING (XP): BEHAVIOR-DRIVEN DEVELOPMENT

BDD: Behavior-Driven Development

- **It's a behavior**: everyone involved should have the same way of talking about the system and what it *does*.
- **Enough is enough**: do as much planning, analysis, and design as you need, but no more.
- **Deliver stakeholder value**: everything you do should deliver value or increase your ability to do so.
- BDD is about communication and viewing your software as a system with behavior.

Features

- Feature: something that your software should do
  - generally corresponds to a *user story* and a way to tell when it's finished and that it works
- User Story:
  - As a {*type of user*}, I want {*goal*} so that I {*receive benefit*}.

Mockito

- Mocking framework for unit testing in Java

- Scenario: with BDD and XP, may want to create tests, but you haven't implemented the classes yet.
  - ➢ Use Mockito to mock the objects.

Mockito Practice

- Make a new Maven project
  - ➢ Update dependencies
    - mockito-core
    - Junit
- http://cs.wlu.edu/~sprenkle/cs397/examples/ mockito_examples/

Discussion and Analysis

- How would you use this tool?
- How user friendly is the tool?