Overview

• Last Class
  – Testing
• This Class
  – Case Studies
• Next Class
  – Design Examples
Space Shuttle Flight Software

- As of 1996, current version was 420,000 LOC
  - 1 error in each of last 3 versions
  - 11 errors total over 17 versions
  - Comparable commercial code would have 5000 errors
- Highly managed, disciplined software development
  - Few surprises and non-chaotic
  - No cowboy coding
  - Relatively high number of women (12 out of 22 in one meeting)
- Extensive comments
  - Every change to the software has an accompanying comment
  - Complete database of change requests plus the details in code

Code Reviews

- Relative cost of finding defects in Space Shuttle Onboard Software
  - Inspection $1
  - System Test $13
  - After delivery $92
- Code reviews are performed on a regular basis
  - Planned and scheduled in advance
  - Cover approximately 300 lines per hour
  - When defects are found, they perform root cause analysis

Agile Case Study: Easy Retirement

- Small company using a software as service model
- 1 manager, 1 Scrum Master, 1 Product Owner, 6 developers, 2 testers, 1 system administrator, 1 database analyst
  - 3 executives
  - 7 sales and marketing
  - Plus a few others

Easy Retirement

- Scrum
  - Release planning
  - Sprint planning
  - Daily stand up meetings
  - Retrospectives
- User stories
  - Story points
  - Scrum board
- Burn down charts
- Test driven development
- Daily build and regression test
Wednesday, March 11

Overview

• Last Class
  – Industry Case Studies
• This Class
  – Design examples
• Next Class
  – Review?
Design Example: Genealogy

- Shows relationships between family members
  - Often depicted as a family tree
    - A family tree is a visual language

Class Diagram for Genealogy

- Problems
  - A person must have two parents
  - Marriages not properly accounted for
The Cartwright Family

Continued from the Swift and Gulliver family trees

The Cartwright Clan
Possible Refinements

Thoughts on These Solutions

• Can’t represent same-sex marriage (or same-sex unions)
• A person is only allowed to have two parents
  – Step-parents
  – Fostering
  – Biotechnology-enabled parenting: sperm donor, egg donor (with or without DNA), surrogate mother
• Sex is an M/F attribute
• Modeling is always political
Announcements

• No discussion next week

• Course evaluations
  – If we have 75% participation by Friday, I will do review
  – Otherwise, we will do course evaluations in class
    • And possibly cover new material
  – So far, we have 38% (26/68)

What classes do we need?

• Class to capture business logic
  – Station
• Class to represent data state of current transaction
  – Transaction
• Class to return data about fuel
  – FuelPrice
• Class to represent user interface
  – Really a set of classes, but only need master class for establishing Listener pattern
• Class to talk to DB
• Class to use BankAPI
Gas Station Package

Pumping Gasoline

Vertical dimension shows layers in the architecture. Horizontal dimension shows partitioning of functionality.