

Monday, March 9

## Overview

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- Last Class
  - Testing
- This Class
  - Case Studies
- Next Class
  - Design Examples

## Space Shuttle Flight Software

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- 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

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Week 10, Slide 3

## Code Reviews

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- 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

Karl E. Wieggers, Peer Reviews in Software: A Practical Guide, Addison-Wesley, 2002.

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## Agile Case Study: Easy Retirement

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- 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

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- 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

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- Last Class
  - Industry Case Studies
- This Class
  - Design examples
- Next Class
  - Review?

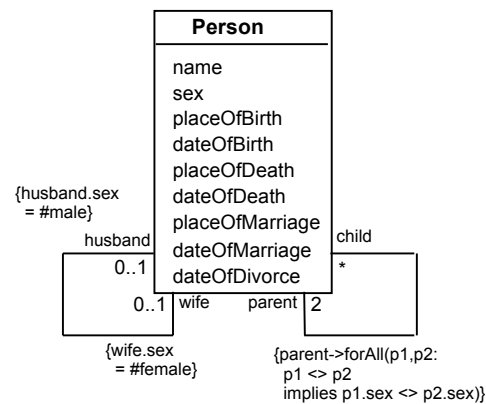
## Design Example: Genealogy

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

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## Class Diagram for Genealogy



### – Problems

- A person must have two parents
- Marriages not properly accounted for

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# The Cartwright Family

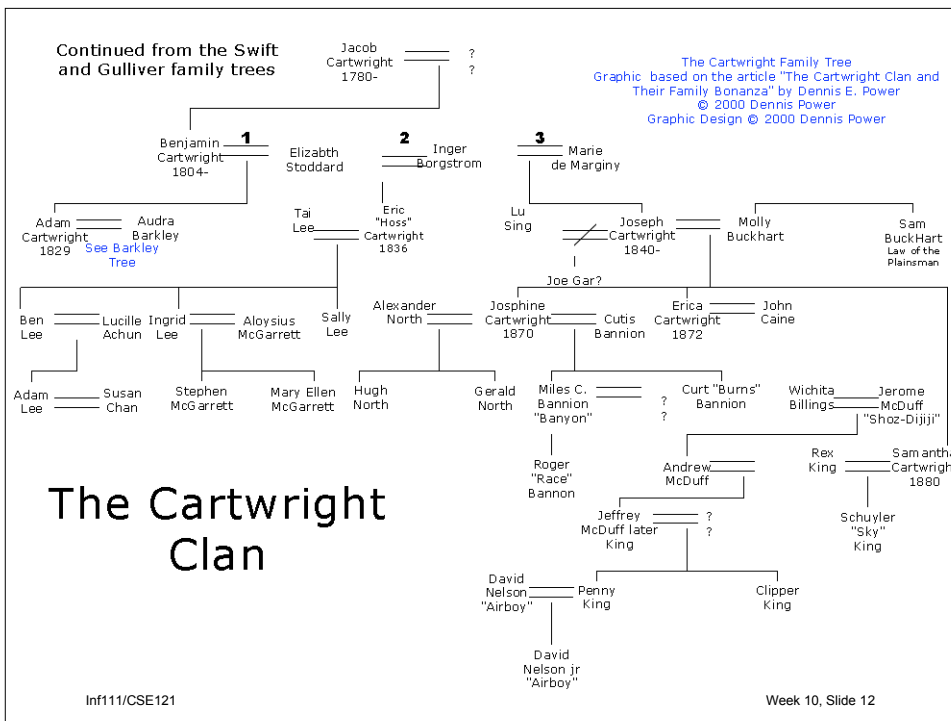


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Continued from the Swift and Gulliver family trees

The Cartwright Family Tree  
 Graphic based on the article "The Cartwright Clan and Their Family Bonanza" by Dennis E. Power  
 © 2000 Dennis Power  
 Graphic Design © 2000 Dennis Power

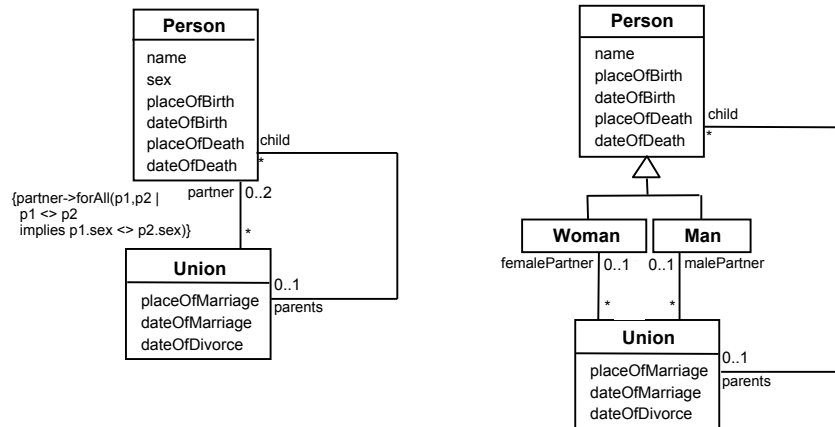


## The Cartwright Clan

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## Possible Refinements



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Week 10, Slide 13

## 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

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## Announcements

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- 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)

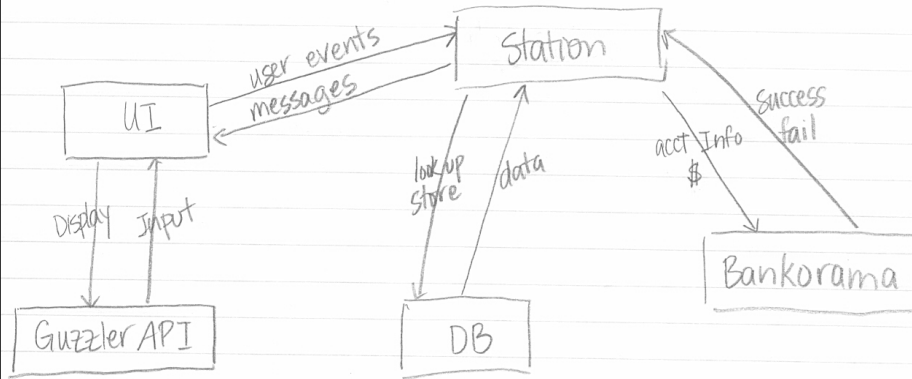
## What classes do we need?

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- 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



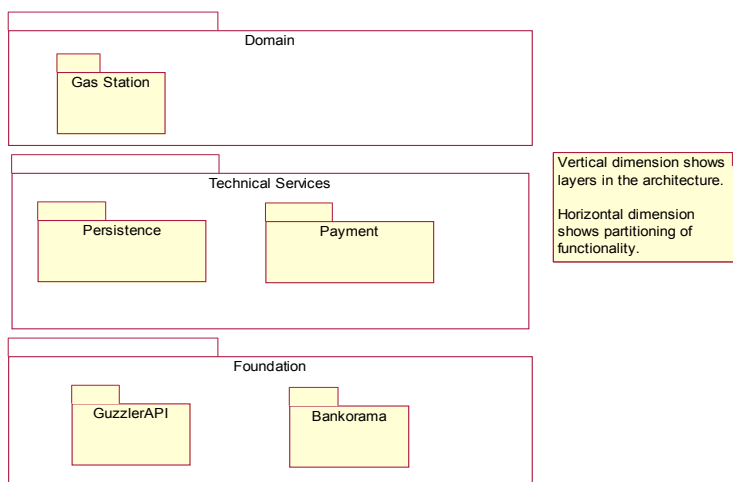
# Gas Station Package



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# Pumping Gasoline



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Week 10, Slide 18

