Object-Oriented Software Design **and Software Processes**

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Overview

1. Software Processes
2. The Process influences Productivity
3. The Rational Unified Process (RUP)
4. Extreme Programming (XP)

Software Processes

“The Software Engineering **process** is the total set of Software Engineering **activities** needed to transform requirements into software”.

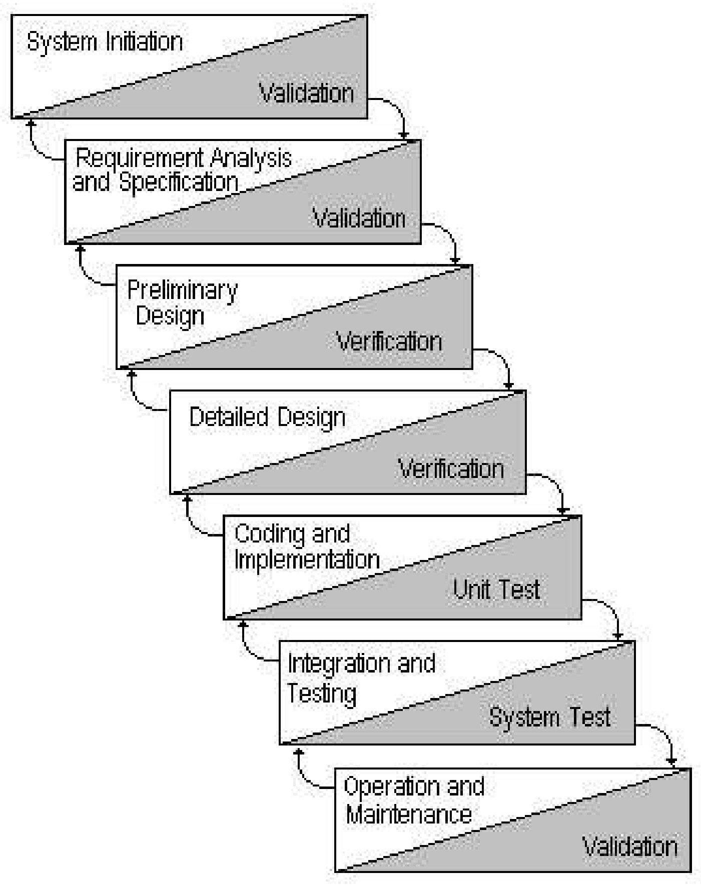
Watts S. Humphrey. Software Engineering Institute, CMU.

http://portal.acm.org/citation.cfm?id=75122

Some Software Processes:

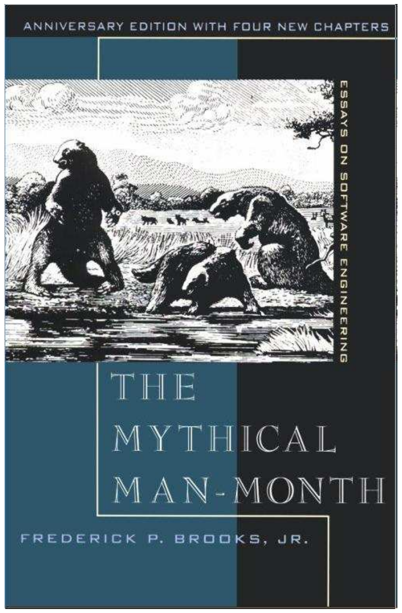
- Waterfall model
- Spiral model
- Throwaway/Evolutionary prototyping model
- Incremental/iterative development
- Automated software synthesis
- . . .

The Waterfall Model (W. Royce. 1970)



http://www.informatik.uni-bremen.de/gdpa/def/def_w/WATERFALL.htm

The Process influences Productivity

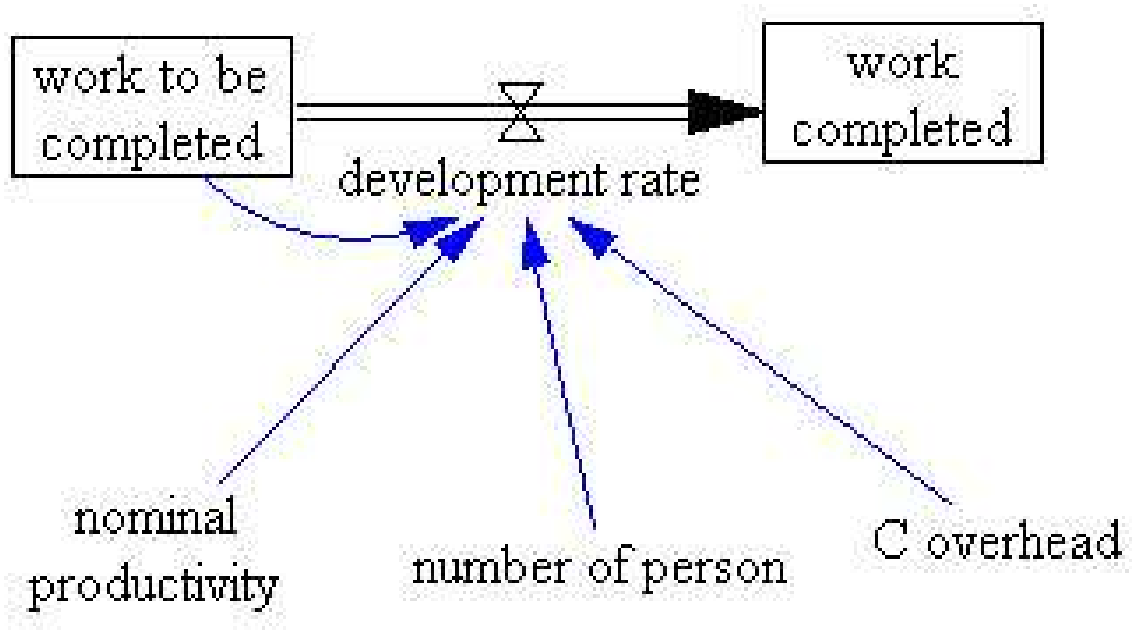

ANNIVERSARY EDITION WITH FOUR NEW CHAPTERS
ESSAYS ON SOFTWARE ENGINEERING
THE MYTHICAL MAN-MONTH
FREDERICK P. BROOKS, JR.

“Adding manpower to a late software project makes it later”.

Fred Brooks. The Mythical Man-Month.

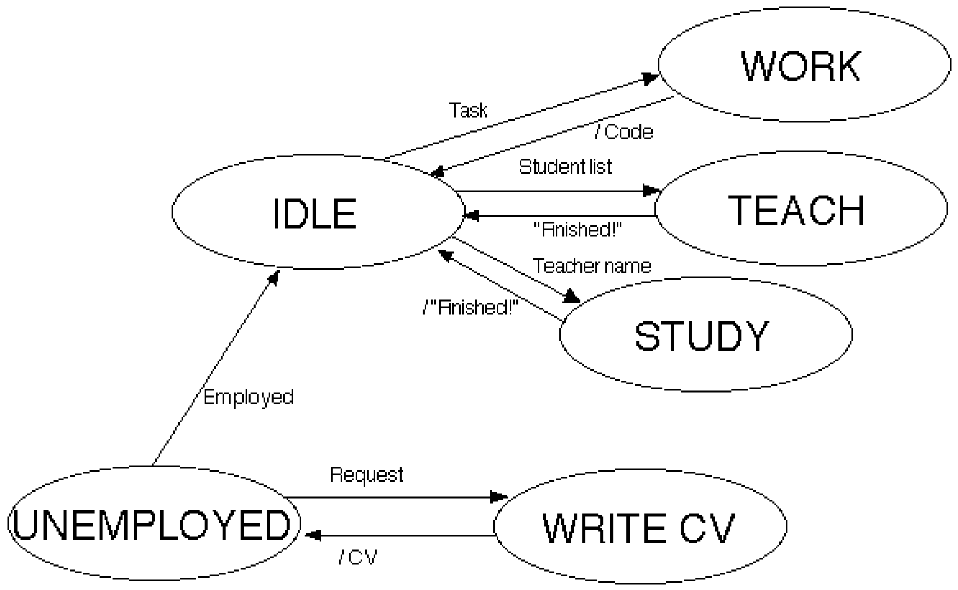
http://www.erdb.com/featu re/f eatu re.0 001 .htm l

Why Brooks' Law ? Team Size.



development rate =
 nominal_productivity*(1-C_overhead *N^2) *N

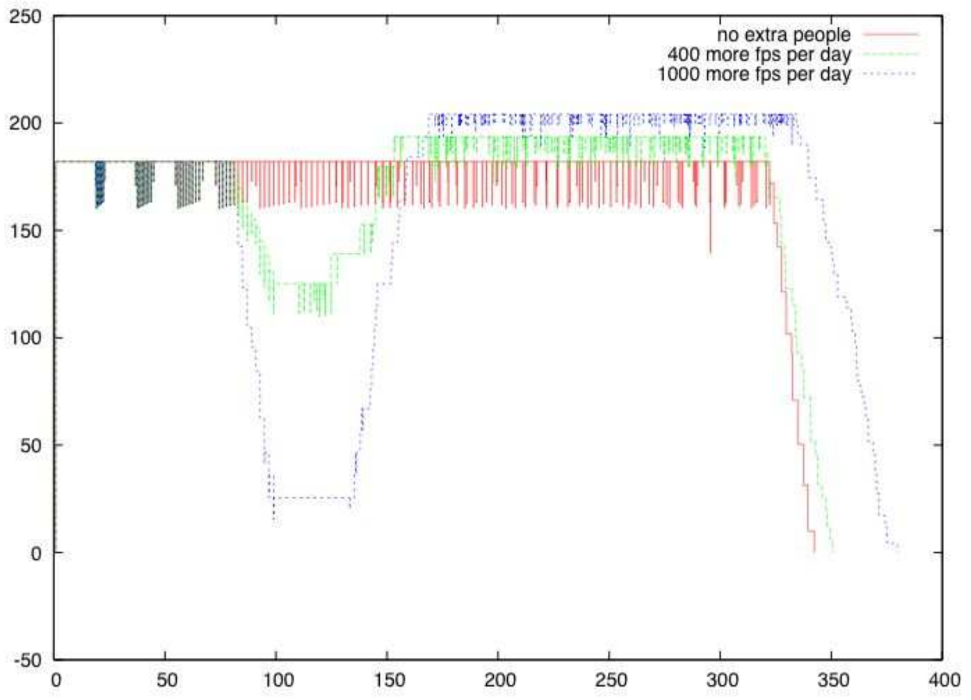
Why Brooks' Law ? Programmer Behaviour.



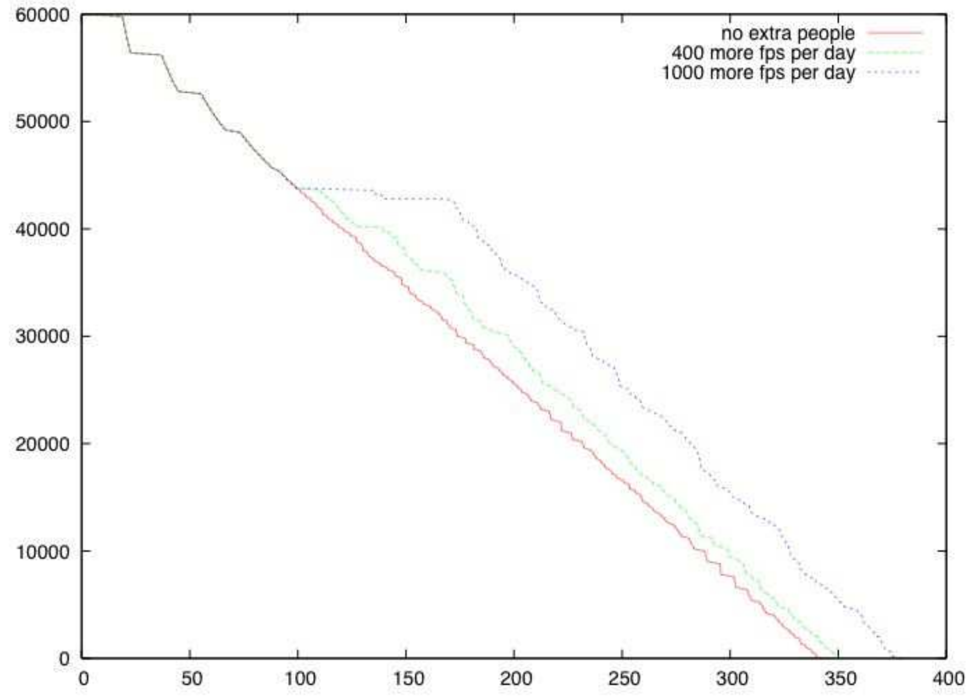
Eystein Fredrik Esbensen's COMP 522 project.

http://www.stud.ntnu.no/~ eysteinf/final.html

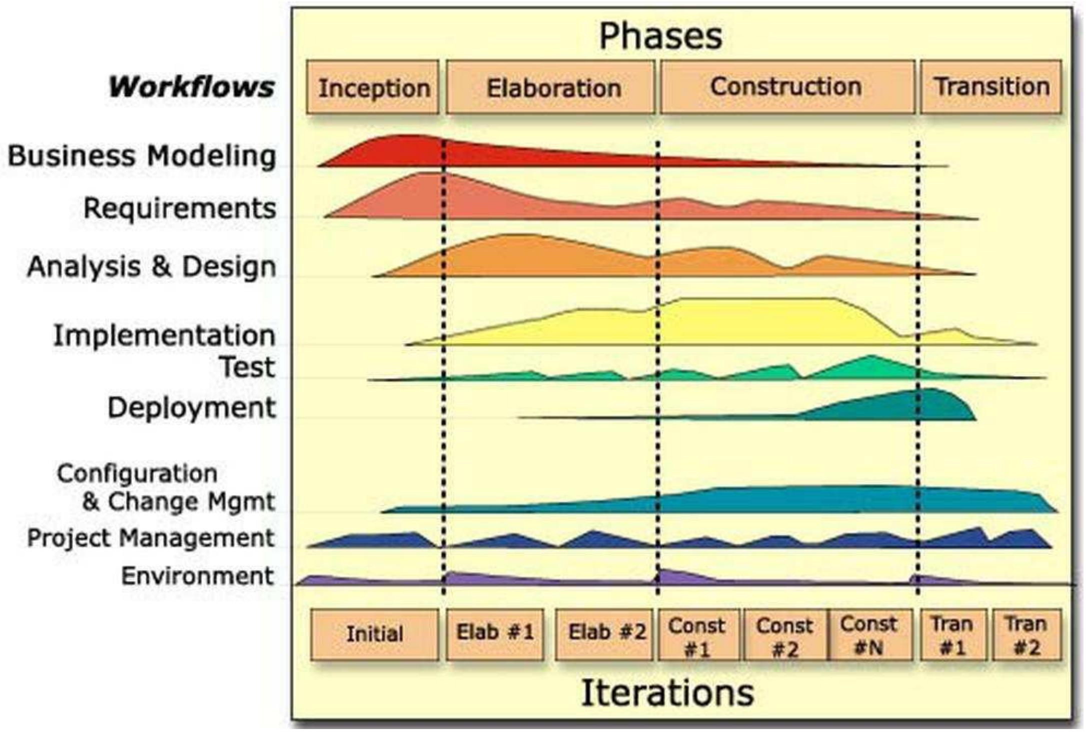
Why Brooks' Law ? Productivity.



Why Brooks' Law ? Remaining work.



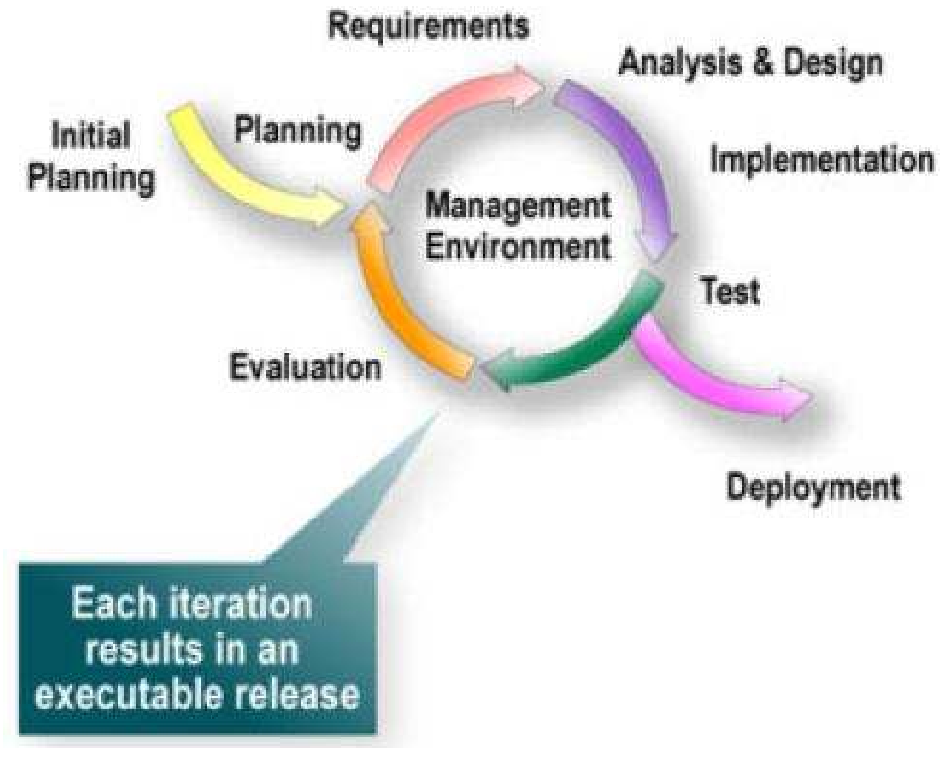
The Rational Unified Process (RUP): Activity Workload as Function of Time



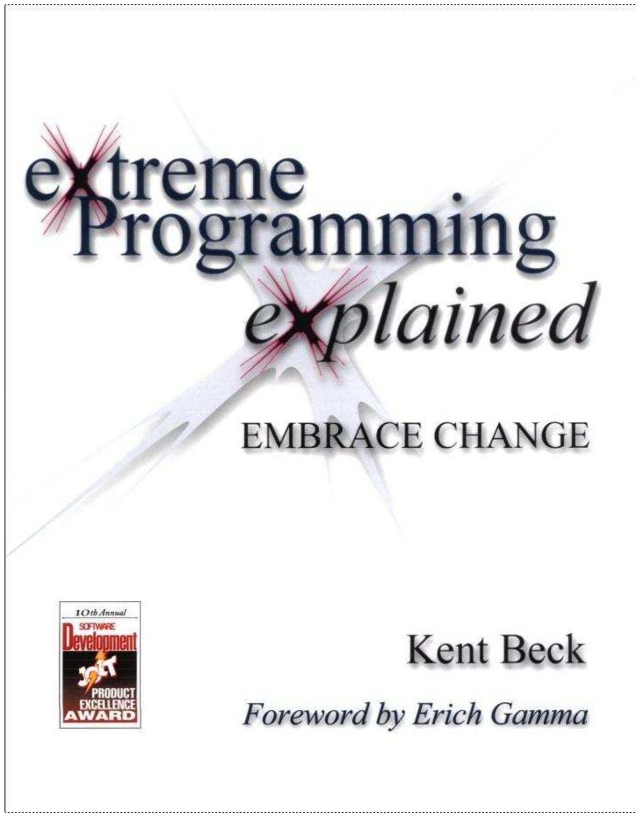
The Rational Unified Process (RUP): Observations

1. Waterfall-like **sequence** of
   Requirements, Design, Implementation, Testing.
2. Not pure waterfall:
   - **Iteration**
   - Overlap (**concurrency**) between activities
3. Testing:
   - **Regression** (test not only newly developed, but also previously developed code)
   - Testing starts **before** design and coding (Extreme Programming)

The Rational Unified Process (RUP)



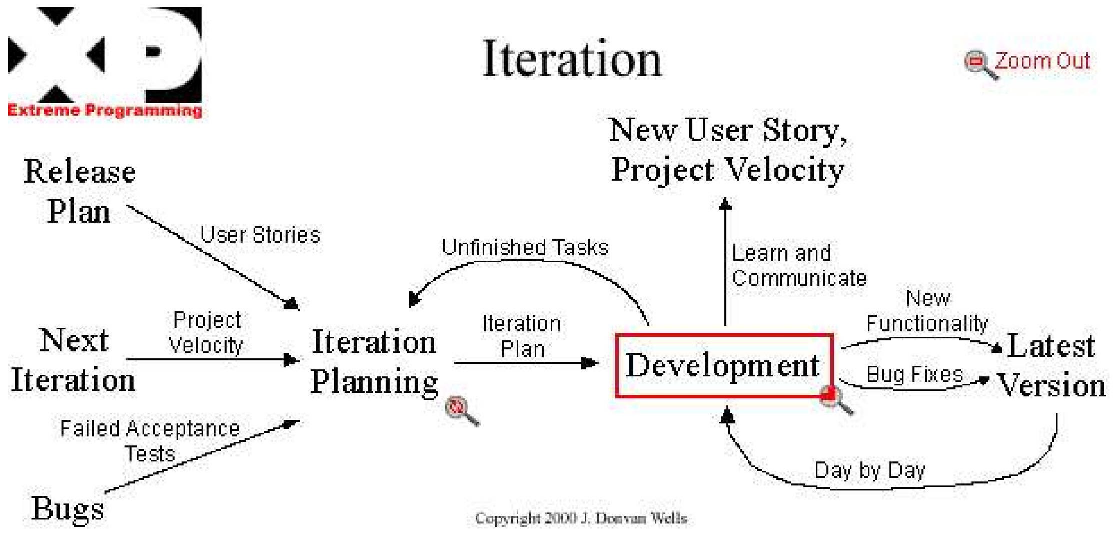
Extreme Programming (XP)



www.extremeprogramming.org

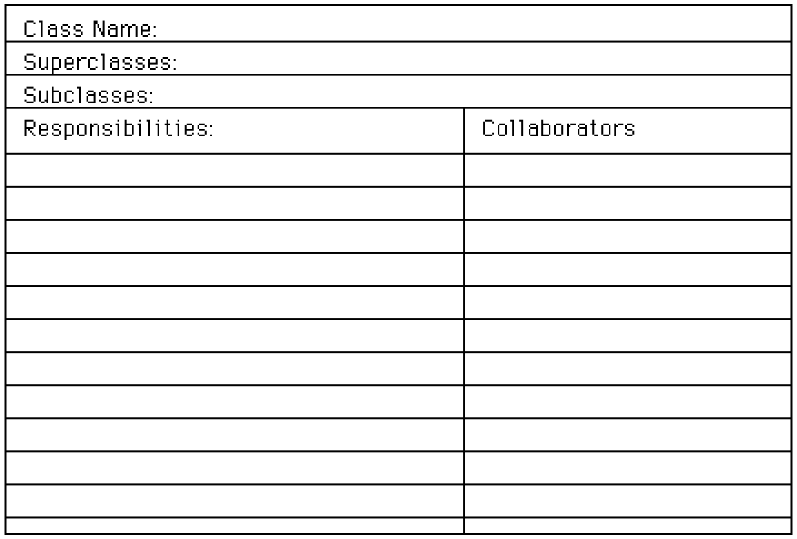
Extreme Programming (XP) highlights

- **User Stories** are written by the customers as things that the system needs to do for them. They drive the creation of acceptance **tests**.
- The project is divided into **Iterations**.



Extreme Programming (XP) highlights

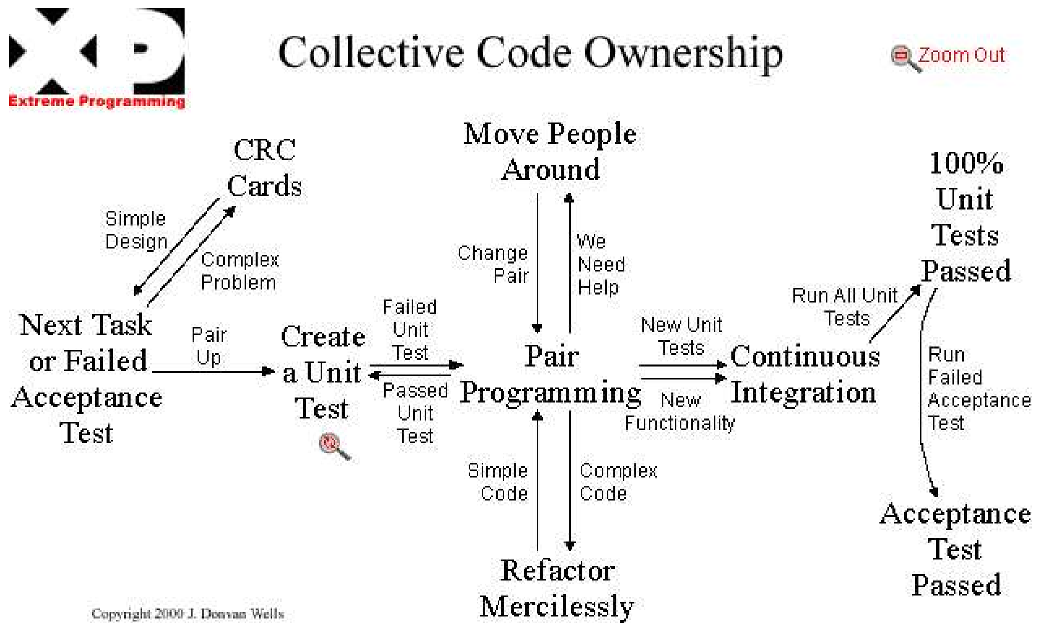
Use Class, Responsibilities, and Collaboration **(CRC) Cards** to **design** the system.



Class Name:	
Superclasses:	
Subclasses:	
Responsibilities:	Collaborators

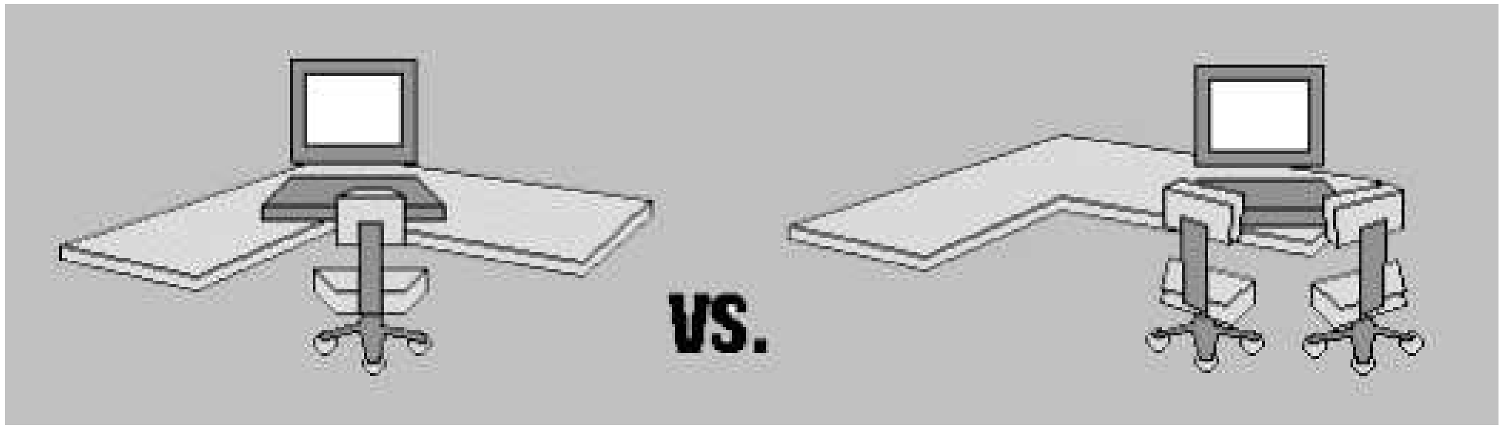
Extreme Programming (XP) highlights

- Code the Unit Test **first**.
- **All code** must have Unit Tests; All code must pass **all** unit tests before it can be released.



- **Refactor** whenever and wherever possible.

Extreme Programming (XP) highlights



Pair Programming