Lecture 22: Configuration Management

Outline
- Configuration management
  - Motivation
  - Challenges
  - Examples
  - Reality

Resources
- *The Pragmatic Programmer*, by Andrew Hunt and David Thomas
  - Ch. 3 (section 17), p. 271
- *Code Complete*, by Steve McConnell

Configuration Management – What and Why?
- **What**: A technique for simultaneously handling multiple versions (configurations) of a set of documents (code) by multiple people
- **Why**: (List two main reasons that you see.)
  - 
  -

Reasons for Doing Configuration Management (1/3)
- Allows multiple people to collaborate in producing a common piece of work without imposing elaborate or overly strict management rules
  - E.g.: "You can only touch the code between 8am and 10am, then it’s my turn."
- Ability to revert to a previous version of the code
  - Undoing undesirable changes
  - Allowing testers to work independently on a different (not latest) release

Reasons for Doing Configuration Management (2/3)
- Tracking changes and project progress metrics
  - Who makes the largest number of changes?
  - How large/extensive are individual changes?
  - Who changed this line of code?
  - Which modules get changed most often?
  - How much did module X change since the last release?
    - In lines of code (LOC), new methods, etc.
Reasons for Doing Configuration Management (3/3)

- Splitting source tree into multiple versions / branches and later merging (some of) them
  - Motivation: different customers need / pay for different updates; teams working independently on same codebase
  - Challenge: avoid duplication of effort across different branches of the tree; more conflicts to resolve if there has been no recent synching
- Central place / repository that keeps an authoritative version of the work
  - Can be properly protected and managed with fewer human resources
  - Everyone knows where to look for things
  - Enables running (repeatable) automatic builds & regression tests

Recap: High-Level Motivation for Configuration Management

- Maximizing effectiveness of the team
  - Efficient collaboration on a common body of work
  - People can work on snapshots of the system, created at different points in time
- Robustness (against mistakes)
- Accountability (of contributors)
- Managing complexity (and avoiding nightmares)

The Hardest Challenges with Using CMS

- A human has to keep track of all the different configurations and decide which updates to apply to which branches, and when
  - Gets increasingly error-prone with large projects and many branches (many releases, many customers)
- Challenges you’ve experienced (e.g., using CVS, Subversion, etc.)?

Examples of Configuration Management Systems (CMS)

- CVS / RCS
- Perforce
- Subversion
- Visual Source Safe
- Roundtable
- ...

Note: Not all CMS are created equal:
(a) handling of branching
(b) conflict resolutions (before merging)

In Reality...

- Most companies use some CMS
  - Including all companies where I have worked
- There are, surprisingly, also companies that don’t use a CMS
  - This should be a red flag for you if you’re considering working for one of those
  - It is a huge risk for dubious (or none) cost savings
  - Management can easily buy into using a CMS to reduce their risks

Relevance of CMS

- Applicable to all types of valuable documents and artifacts, not just source code
  - “You don’t need to floss all your teeth – just the ones you want to keep.”
Lecture 23: Conflict Management (Part I) (with quotes of wisdom)

"Every problem is also an opportunity."

Outline
- Conflict defined
- Benefits and downsides of conflict
- Sources of conflict: at work, at school
- Ideas for preventing and resolving conflict
  - Internal
  - Inter-personal (covered next time)

Resources
- "Rapid Development", by Steve McConnell
  - Ch. 29: "Principled Negotiation"
- "Speech Acts" (handout)
- "The 7 Habits of Highly Effective People", by Steven Covey
- "When Conflict Helps Learning", by David Socha and Valentin Razmov
- "Freakonomics: A Rogue Economist Explores the Hidden Side of Everything", by Steven Levitt and Stephen Dubner

What Is Conflict?
- Definition (according to Merriam-Webster):
  - 1: fight, battle, war
  - 2a: competitive or opposing action of incompatibles: antagonistic state or action (as of divergent ideas, interests, or persons) b: mental struggle resulting from incompatibility of opposing needs, drives, wishes, or external or internal demands
  - 3: the opposition of persons or forces that gives rise to the dramatic action in a drama or fiction
- Conflict can be:
  - internal (intra-personal; confined within you)
  - inter-personal (involving multiple people)

Potential Consequences of Conflict
- What may be some consequences of conflict?

Positive:

Negative:
Conflict Is Not Always Bad

"A good scare is worth more to a man than good advice." -- Edgar Watson Howe, novelist and editor

If carefully controlled, conflict can be a powerful motivator for positive change.
- But don’t let it grow to become disruptive.
- Without some conflict, people don’t change.
- Humans are used to doing things in specific ways...
- ... and resist changing until those approaches prove clearly inadequate for what they want to achieve.
- Presence of conflict can provide the needed incentive.

Origins of Conflict

- Misaligned incentives
- Ungrounded expectations
  - "Expectations are a premeditated resentment." -- Louis Fox
- Scarce resources
  - Time
  - Money
  - Decision power
  - Information
  - etc.

Experiences of Conflict You Have Had at Work

What sources of conflict have you experienced with your managers / supervisors / advisors?
- Micro-management; not giving people ownership in the tasks they do
- Exercising authority for decisions without first getting a buy-in from everyone
- Penny pinching
- Skewed reward structure and preferential treatment
  - Including being taken for granted
- Setting false expectations; not following through on expectations
- Not devoting proper mindshare to projects of importance to you
  - E.g.: professional development opportunities
- Perception of differing interests ("Win-Lose", Us vs. Them, etc.)
- Others (specify):

Did you let management know that you disagreed?

Ideas for Preventing (Too Much) Internal Conflict

- Don’t take it personally (because it rarely is so)
  - “Whenever anyone has offended me, I try to raise my soul so high that the offense cannot reach it.” -- Rene Descartes, philosopher and mathematician
- Ask questions to clarify, don’t assume you’re under attack
  - “I’ve had many troubles most of which have never happened.”
- Learn to use the multiple possible responses to a request
  - Agreement ("Yes")
  - Disagreement ("No")
  - Counter-offer ("How about we do X instead?")
  - Commit to commit ("I’ll get back to you by tomorrow.")
- Learn to say ‘No’ – it takes practice.
  - If ‘No’ is not a possible answer, then what does ‘Yes’ really mean?
  - "I don’t know the key to success, but the key to failure is trying to please everybody." -- Bill Cosby
  - "It is kindness immediately to refuse what you intend to deny.”
  - "Half the truth is often a great lie." -- Publilius Syrus
- "Half the truth is often a great lie." -- Benjamin Franklin

Sources of Conflict between Students Who Work in Teams

The most frequent sources of conflict we have observed in student teams:
- “free riding”, unequal work distribution
- making commitments but not following through on them
- ignoring the contributions of peers
- power struggles
- ego showing: (over)emphasizing one’s perceived technical superiority

Typical Psychological Reactions to Conflict

- “Fight”
  - People who tend to be critical, vocal, demanding, seeking control...
- “Flight”
  - People who tend to be indecisive, caring, wanting to be right...
- The type of reaction a person has depends on personalities and context, among other factors.