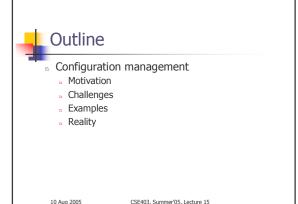
Lecture 15: Configuration Management, Software Maintenance, and Code Reviews (Part I)

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Resources

- The Pragmatic Programmer, by Andrew Hunt and David Thomas
- ⁿ Code Complete, by Steve McConnell
- n Rapid Development, by Steve McConnell

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Configuration Management – What and Why?

- **What:** A technique for simultaneously handling multiple versions (configurations) of a set of documents (code) by multiple people
- Mhy: (List the two main reasons that you see.)

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Reasons for Doing Configuration Management

- 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."
- n Reverting to a previous version of the code
 - undoing undesirable changes
 - Allowing testers to work independently on a different (not latest) release

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Reasons for Doing Configuration Management (cont.)

- n Tracking changes and project progress metrics
 - Mho makes the largest number of changes?
 - How large/extensive are individual changes?
 - _n Who changes 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.

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Reasons for Doing Configuration Management (cont.)

- Splitting source tree into multiple versions / branches and later merging (some of) them
 - Motivation: different customers need / pay for different updates
 - $_{\rm n}$ Challenge: avoid duplication of effort across different branches of the tree
- 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
 - Can run (repeatable) automatic builds & regression tests

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High-level Motivation for Configuration Management

- Maximizing effectiveness of the team
 - _n Efficient collaboration on a common body of work
 - $_{\scriptscriptstyle \rm L}$ People can work on snapshots of the system, created at different points in time
- n Robustness (against mistakes)
- Accountability (of contributors)
- Managing complexity (and avoiding nightmares)

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The Hardest Challenges with Using CMS

- A human has to keep "in mind" 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 (releases, customers)
- n Challenges you've experienced?

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Examples of Configuration Management Systems (CMS)

- n CVS / RCS
- n Perforce
- _n Subversion
- _n Visual Source Safe
- _n Roundtable
- $_{\rm n}$ others

Note: Not all CMS are created equal.

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In Reality...

- n Most companies use some CMS
 - n Including all companies where I have worked
- $_{\rm n}\,$ I have heard of companies that don't use a CMS
 - n It is a huge risk for none / dubious cost savings
 - $_{\rm n}$ Management can easily buy into using a CMS to reduce risks

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Relevance of CMS

- Applicable to all types of valuable documents, not just source code
 - "You don't need to floss all your teeth just the ones you want to keep."

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