A Tutorial for Git and GitHub

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Agenda

- Why use Version (Source) Control Systems
- What are Git and GitHub
- Basic Git Commands
- Fundamentals of GitHub
- Using GitHub in Project Implementation

Why version control?

- Scenario 1:
  - ☐ Your program is working
  - ☐ You change "just one thing"
  - ☐ Your program breaks
  - ☐ You change it back
  - ☐ Your program is still broken--*why?*

- Has this ever happened to you?

Why version control? (part 2)

- Your program worked well enough yesterday
- You made a lot of improvements last night...
  - ...but you haven't gotten them to work yet
- You need to turn in your program *now*

- Has this ever happened to you?

Version control for teams

- Scenario:
  - You change one part of a program--it works
  - Your co-worker changes another part--it works
  - You put them together--it doesn't work
  - Some change in one part must have broken something in the other part
  - What were all the changes?

Teams (part 2)

- Scenario:
  - You make a number of improvements to a class
  - Your co-worker makes a number of *different* improvements to the *same* class
- How can you merge these changes?

Version control systems

- A version control system (often called a source code control system) does these things:
    - Keeps multiple (older and newer) versions of everything (not just source code)
    - Requests comments regarding every change
    - Allows "check in" and "check out" of files so you know which files someone else is working on
    - Displays differences between versions

Benefits of version control

- **For working by yourself:**
  - ☐ Gives you a "time machine" for going back to earlier versions
  - ☐ Gives you great support for different versions (standalone, web app, etc.) of the same basic project
- **For working with others:**
  - ☐ Greatly simplifies concurrent work, merging changes

What are Git and GitHub

- Git is a free and open source distributed **version control system** designed to handle everything from small to very large projects with speed and efficiency

- GitHub is a **web-based** Git repository **hosting service**, which offers all of the distributed revision control and source code management (SCM) functionality of Git as well as adding its own features.