CS314 Software Engineering Configuration Management

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Configuration Management

- Management of an evolving system in a **controlled** way.
  - **Version control** tracks component changes as they happen.
  - **System Building** assembles components for testing and release. Frequently is better.
  - **Change Management** addresses stakeholder proposals.
  - **Release Management** plans and prepares for distribution.

Version Management

- Two models
  - **Centralized** – master repository maintains all versions (SVN)
  - **Distributed** – multiple copies exist at the same time (Git)
- Features of both
  - Version and release identification
  - Change history recording
  - Independent Development
  - Project Support
  - Storage Management

Distributed Model Benefits

- A backup mechanism for the master repository.
- Allows developers to work offline
  - commit changes without a network connection
  - Developers can compile and test locally.

System Building

- Build script generation (configuration file)
- Build system integration with version control system
- Minimal recompilation (what changed or affected)
- Executable system creation
- Test automation (check build not broken by changes)
- Report success or failure of build and test
- Documentation (release notes) automatically generated

Change Management

- Ensure changes are applied in a controlled way.
  - requirements, bugs, …
- Consider factors in decisions to changes
  - Consequences
  - Benefits
  - Number of users affected
  - Cost
  - Product release cycle

Release Management

- Plan the release
- Prepare the system for release
  - Configuration files
  - Data files
  - Installation program
  - Electronic and paper documentation
  - Packaging and associated publicity
- Document the release

GitHub / Git

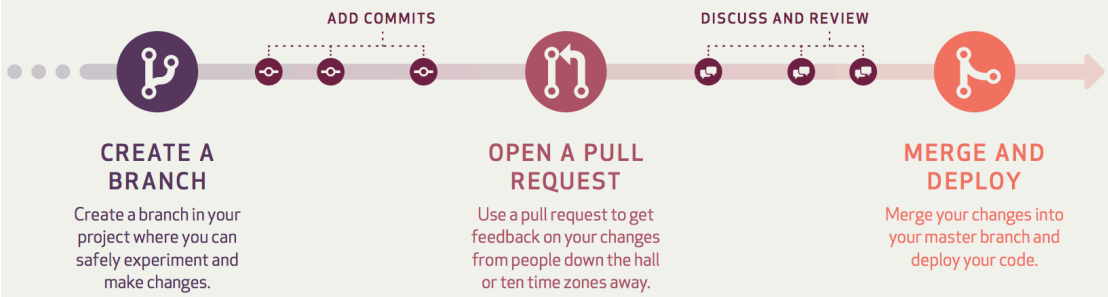
https://github.com

https://help.github.com/

GitHub/ Git

- GitHub (server)
  - On the internet, holds the master repo, issues, releases, …
  - Code on master should always build/test/run with no problems
  - No changes are made directly in master
  - Proposed changes are reviewed, approved, then merged
- Git (client)
  - On a remote/local machine
  - Holds a clone of the master
  - Changes made in branches pushed back to the GitHub master and merged via a pull request

Using GitHub and Git



GitHub	Git	Git	Git	GitHub	GitHub
Select, estimate, and assign a pending issue issue.	Refresh (pull) or clone repo if needed. Create and checkout a new local branch in your repo clone.	Modify and add files and directories in the repo. Build and test before you commit.	Add your changes to the branch. Commit the branch with the #issue. Push branch to master.	Open a pull request for the commit for review by others.	Address any merge conflicts or comments. Merge the pull request and confirm.

Git Commands - local setup

 # install git on your local system

 # configure git username, email

```
git config --global user.name "[firstname lastname]"
git config --global user.email "[valid-email]"
```

 # clone your team repo or the class repo

```
git clone [masterURL]
```


https://education.github.com/git-cheat-sheet-education.pdf

Git Commands - start a new branch

```
# update your local copy before you start
git pull origin master
# start a new branch
git branch [newbranchname]
git checkout [newbranchname] # never master!
# on a single line
git checkout –b [newbranchname]
# verify the branch just to be sure, never master
git branch
```


https://education.github.com/git-cheat-sheet-education.pdf

Git Commands - commit and push

```
# create, edit, rename, move, or delete files under “.”.
# build and test to verify changes work
git add .  # add all changes to branch
git status # verify proposed changes are listed
git commit –m “closes #999” # associate with task 999
git push origin [branchname]
```


https://education.github.com/git-cheat-sheet-education.pdf

Git Commands - merge conflicts

```
# find files with merge conflicts on your local repo
git status
# edit files to resolve the conflicts between
# <<<<<<< HEAD and >>>>>>> BRANCH-NAME
# re build and test
git add .
git commit –m “resolved merge conflict”
git push origin [branchname]
```


https://education.github.com/git-cheat-sheet-education.pdf

GitHub Etiquette

- No changes made directly to master branch, never checkout master.
- All changes made in local/separate branches and merged via pull requests.
- All pull requests associated with an issue.
- Never break master.
  It should always build/test/run successfully.

https://guides.github.com/activities/contributing-to-open-source/

Canvas - Brews

- README.md
  - Update team page in repo
- team/eID/README.md
  - Add your individual page to the repo
- Brews
  - Add a brewery to the tour
  - Use proper GitHub etiquette
  - When done correctly 1 addition and 0 deletions
  - May need to merge conflicts