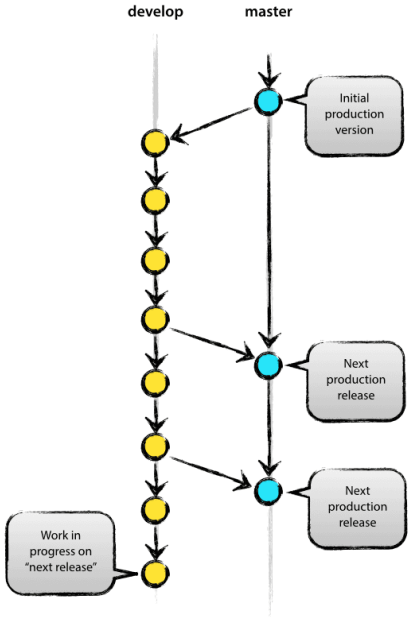
CSC-450, Github Assignment

Introduction

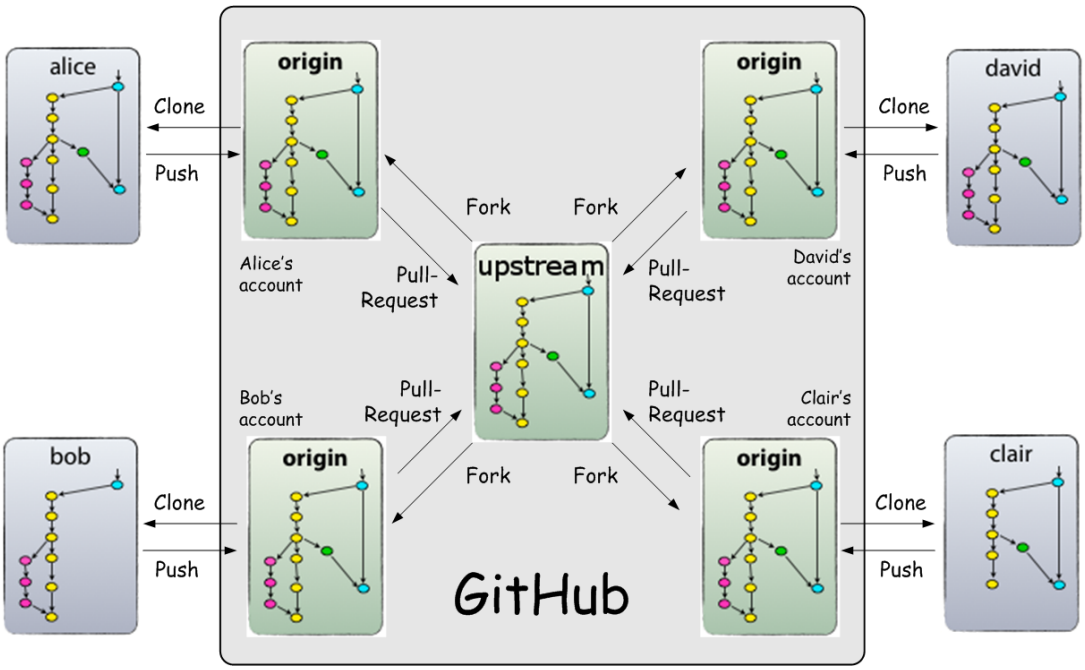
Github (https://github.com) is a web-based file repository that uses *git* for revision control and source code management. In addition, Github implements collaborative features such as bug tracking and feature requests. Github is free to use for public repositories (and requires a monthly charge for private repositories), and is probably the most popular web-based source code management system. Other source code management systems such as BitBucket (https://bitbucket.org) are available as well. Both command line *git* tools and a GUI tool called Github Desktop are available. We will be using the command line git tool in class.

Why use Github?

- you can easily revert to a previous version of code, if needed
- you can easily see how files change from one version to another
- branches can be used to separate major versions of code (e.g., release and development versions; see figure below)
- easy collaboration: a collaborator can (a) *fork* (copy) code from a repository, (b) clone the code (i.e. make a local copy for development), (c) make changes to the code, (d) commit (record) the changes and (e) push (save) the changes to the remote repository (i.e., the respository on github.com). When appropriate, the collaborator can then submit a *pull request*, which is a request to merge his/her code with the version that was originally forked.
- Pull requests can be automatically merged if there are no conflicts; otherwise conflicts are noted and must be manually resolved.



source: http://nvie.com/posts/a-successful-git-branching-model/



source: http://www.dalescott.net/2012/09/14/using-gitflow-with-githubs-fork-pull-model/

Reproducible research

Reproducible research is a fundamental tenet of scientific research where results are published along with their data and computer code so that any claims made can be directly confirmed. By making your software (and data) available, others will be able to reproduce (i.e., validate) your findings, and expand on what you have done, either by asking different questions about your data and/or modifying the tools used for analysis.

As part of the project requirement, you must make your source code and data available. We will use Github for this purpose (other resources for hosting your code/data can be used with permission). In addition to supporting your research project, having a Github account is a great way to promote the work you have done and will look great on your resume!

Some common *git* commands are summarized below:

Command	Description
git clone *url*	Clones a local copy of a repository
git status	Lists modified files and files not staged for commit
git commit –a	Commits all changes
git commit *file*	Commits changes for the specified file
git add *file*	Adds a file to the repository
git push	Pushes commits to the Github server
git log	Displays a log of previous commits
git checkout commit	Checks out files from a previous commit, allowing you to look back at old versions.

Exercise #1

1. Create a Github account if you do not already have one
2. Download Github Desktop from here: http://desktop.github.com
3. Fork my *hello_world* program, available here: https://github.com/gdancik/hello_world
4. Clone the forked repository by copying the 'clone URL and from the command line, typing the following command, where *url* is the clone URL, which will create a folder with the repository:

   git clone url

5. Edit the main program (using a text editor of your choice) to prompt the user to enter his/her name (stored in a string object). The program outputs, "Hello Bob, my name is Alice", where 'Bob' is the name the user entered and 'Alice' is your name.

6. At any point, you may get a list of changed files by typing the following command from within the repository folder:

   git status

7. To see the what changes are made, type the following, where *file* is the name of the file you want to examine:

   git diff file

8. Commit your changes by typing the following to commit *all* changes:

   git commit –a

   A text editor will open and you must leave a comment describing your changes.

9. To save the changes to the github server, type:

   git push

10. Submit a pull request by clicking on the appropriate links from the *hello_world* repository on your Github page.

Exercise #2

As a group, create a *Github* repository for your project, if you have not done so already, and send an e-mail to me with the link to your Github repository or Github page (see below). Your repository must have a README.md file that provides a description of your project. Optionally, create a web page for your project by following the instructions for the “Project site” at the following link: https://pages.github.com/