Git

Σέργιος - Ανέστης Κεφαλίδης
Κωνσταντίνος Νικολέτος
Κώστας Πλας

Git & Github

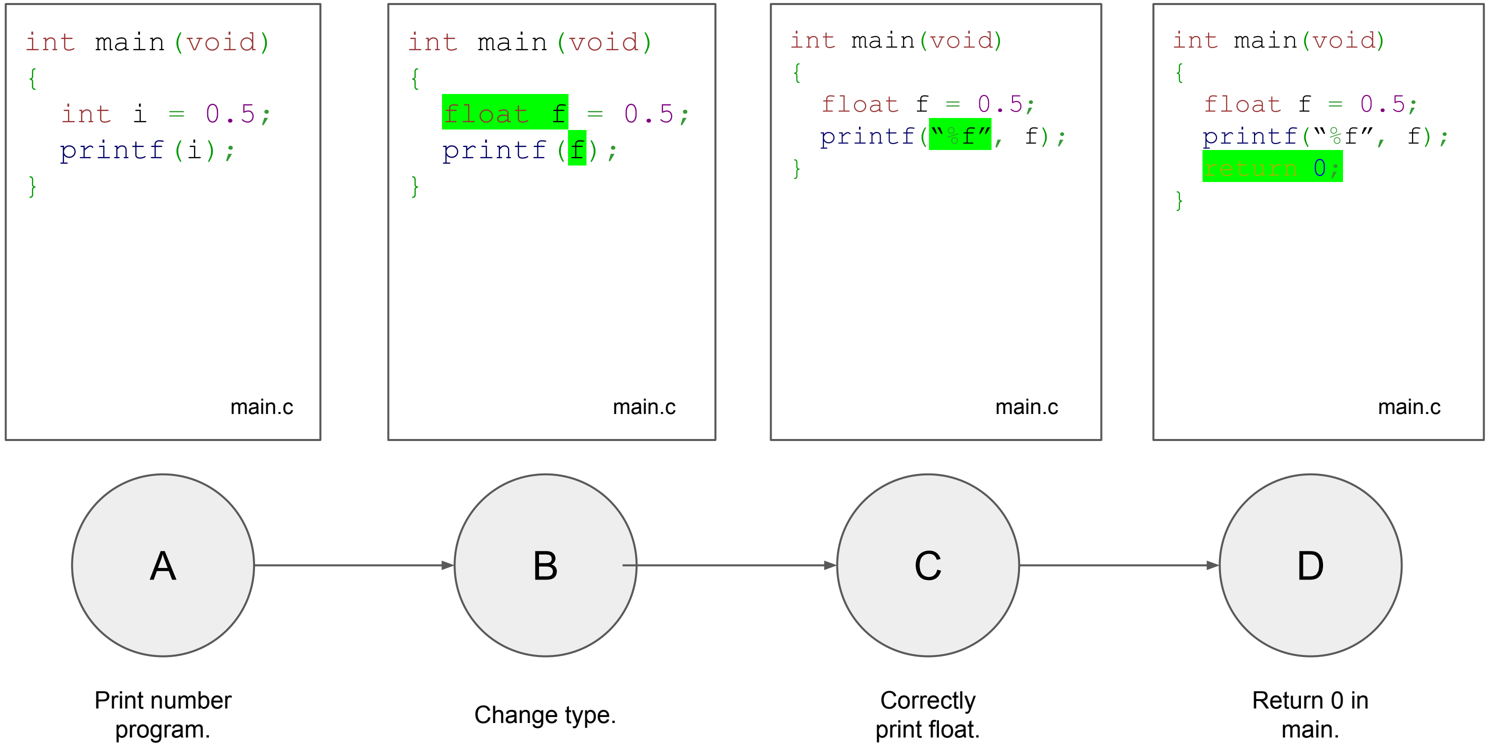
- Git
  - A distributed version control system for tracking changes in computer files.
    - We will use it to track changes in source code.
  - Useful for collaboration between developers working on the same project.
  - Useful for solo-developers who want to maintain their sanity.
- Github
  - Internet hosting service for Git repositories.
  - All assignment and lab exercises will be delivered through Github.

Terminology

- Repository: A structure that keeps track of the history of a Git project.
    - Local repository: A repository that exists in your computer.
    - Remote repository: A repository that exists on some server, in our case on Github.
- Branch: An independent line of development.
    - Every project has at least one branch, usually named *main* or *master*.
- Commit: A snapshot/milestone of a Git project.
    - Important moment in the history of development.
    - Should be based around logical units of change.

Commits

- Commits are snapshots of the project.
- At any time we can revert to a previous commit, i.e., a previous state of the project. This is useful for finding changes that introduced bugs.
- Each commit has a unique ID.



```
int main(void)
{
  int i = 0.5;
  printf(i);
}
```

main.c

```
int main(void)
{
  float f = 0.5;
  printf(f);
}
```

main.c

```
int main(void)
{
  float f = 0.5;
  printf("%f", f);
}
```

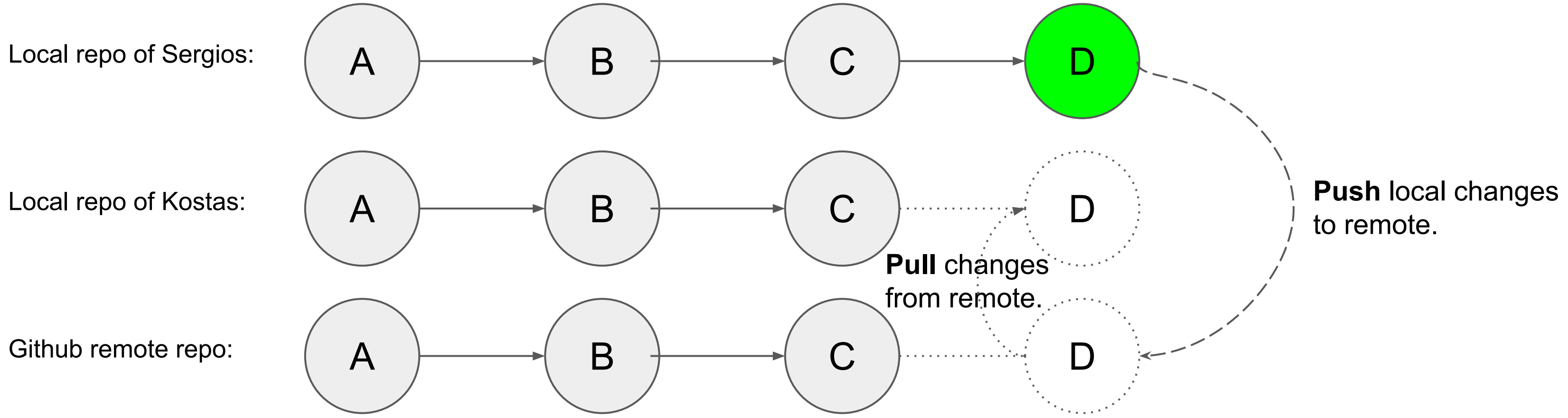
main.c

```
int main(void)
{
  float f = 0.5;
  printf("%f", f);
  return 0;
}
```

main.c

Repositories

- A git repository (repo for brevity) holds the history of the project.
- Git is a distributed version control system, meaning that multiple repositories for the same project can exist at different locations.
    - Local and remote repositories. Usually, each developer work in his local repo and **pushes** his changes to the remote repo. Other developers **pull** from the remote to get the changed code.
    - These different repositories need to be synchronized (**push** & **pull**).



Let’s git going… Prerequisites

1. Install git in your system.
    a. For Linux, install it through your package manager (e.g. `sudo apt install git`)
    b. For Window & Mac… idk :-)
2. Configure git.
    a. `git config --global user.email “your@email.com”`
    b. `git config --global user.name “Your Name”` (a decent anime btw…)
3. Create a GitHub account.
4. (?) Setup your credentials as described in:
    a. Generating a new SSH key
    b. Adding a new SSH key to your GitHub account

Creating your repos

- Create a new repo on github.com named \`toast-repo\`. This is your **remote**.
  - Check \`Initialize this repository with a README\`.
  - Its URL will be \`https://github.com/<your_username>/toast-repo.
- To create a **local** copy of the **remote** repo you need to **clone** it.
  - Run \`git clone git@github.com:<your_username>/toast-repo.git\`.
  - A new folder named \`toast-repo\` containing a README file a hidden folder named \`.git\` will be created. The README file is the same file that was created on the remote repository and the \`.git\` folder is the data structure used to keep track of development history.
- Running *git remote* will show you that your local repository is connected to a single remote repository, named *origin*. *git remote show origin* will present you with more information about that specific remote.

Updating your repositories, **Push** & **Pull**

- As we discussed previously, the repositories are not synchronized automatically. If you visit your remote repo you will see that the README.md file has not been updated.
- To update the remote repository run:
  - *git push*
- If the opposite situation arises, for example you update the README.md file via the GitHub interface you will need to update your local repository.
- To update the local repository run:
  - *git pull*

Adding and Committing

- Modify the README.md file locally.
- Run *git status*
    - README.md appears as **modified**.
- To commit the changes run:
    - *git add README.md*
        - to add the file to the **staging** area, in other words to put it in the list of files to be committed in the next commit.
    - *git commit -m "Modify README.md"*
        - to actually commit the file.
        - the *-m* option allows you to add the commit message without needing to enter a text editor.
- Run *git status* again
- Run *git log* to see your git history