NOTTINGHAM TRENT UNIVERSITY

School of Science and Technology

SOFT20111 - Software Engineering

Portfolio 5 - Merging : Theory and Practice

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5.1 Version Control

A Version Control System, also known as a Revision Control System, is a system that tracks and records changes made to a file or a directory. These recorded changes can be accessed at a later time for reference purposes.

Through the version control system, all changes made by any users which has access to the repository will be recorded, along with the reasons with the modification. This way, there will not be any arguments between who has the latest copy of a certain project as version control system only shows the latest version of a file.

If you are doing a project in a team, a good version control system, in this case, GitHub, which is a web based version control system that hosts repositories online, is a suitable choice. Some of the functions of a version control system are check out, check in, merging and branching.

Check out

Check out is where after creating a repository (the storage for current and previous file data) and adding files in it, one can download the files from the repository to the local repository. After downloading the files, they can make changes to the files and decide whether to commit the new changes.

Check in

Check in is also known as commit in version control. When a file or directory is modified on the local repository, the owner of the edited file can choose whether they want to commit the changes to the shared repository. Once a person commit the changes, this latest modified version will be available for all collaborators of the project, and the changes made will be kept by the version control system, along with the commit message and the contributor.

Branching

A branch is a duplicated file or files from the parent and can be modified and tested out separately. Branching also allows changes to be made on the branched files and the parent files parallelly. Once the user is certain that the changes made are working, the changes can be merged to the master branch.

Merging

Merging is where two sets of changes made by two different users, that is combined. This happens automatically as the system checks for the changes and the differences between the two file before merging them and update the master branch to the latest version. However, when the two changes applied to the files are similar, the system will not be able to figure out which version should be kept as the master file. This is where a conflict happens.

Conflict

Conflict is a situation where the version control system cannot decide which version of changes to be applied to the file. This usually happens when a commit is requested for a file but there are changes for this said file that the user was not aware of. The system prompts users to check and decide which version to be kept and committed.

5.2 Demonstration

This is an example of using version control with a collaborator, which include adding, check out, check in and merging.

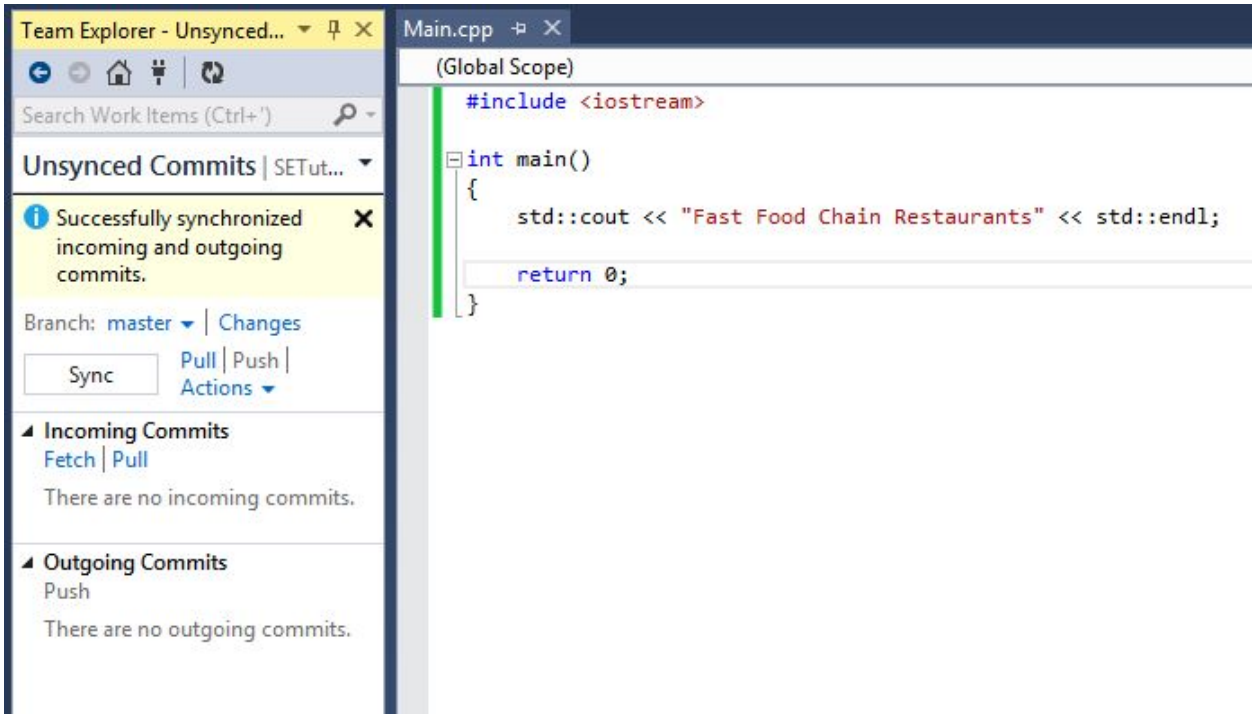

Figure 1

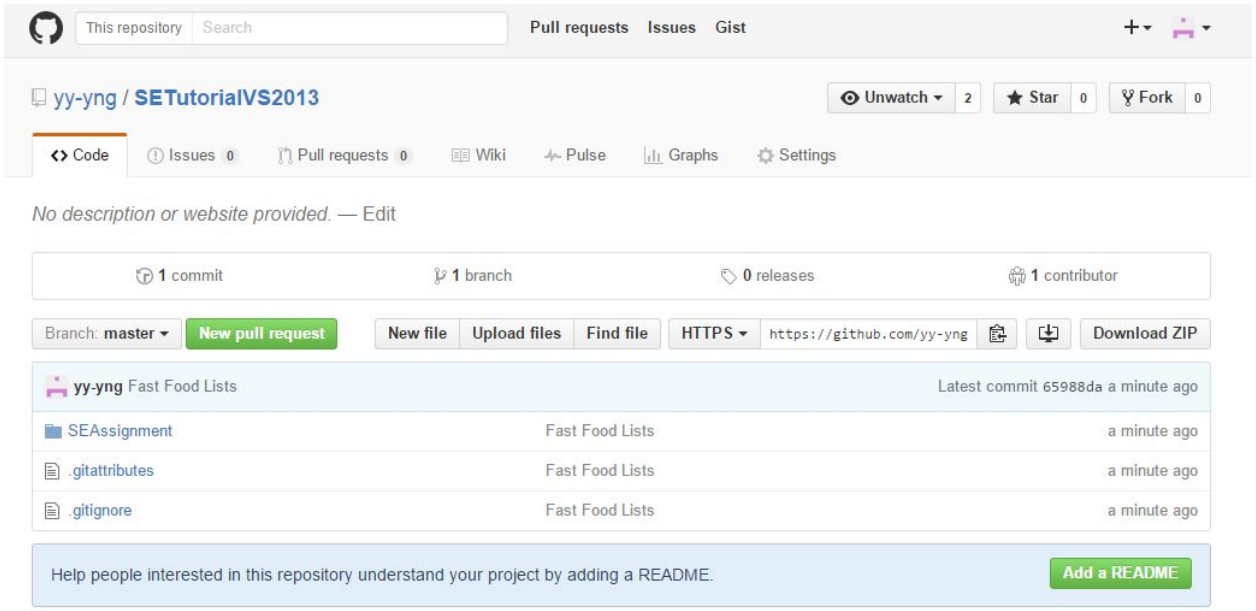

Figure 2

Figure 1 and Figure 2 shows the first commit to the repository.

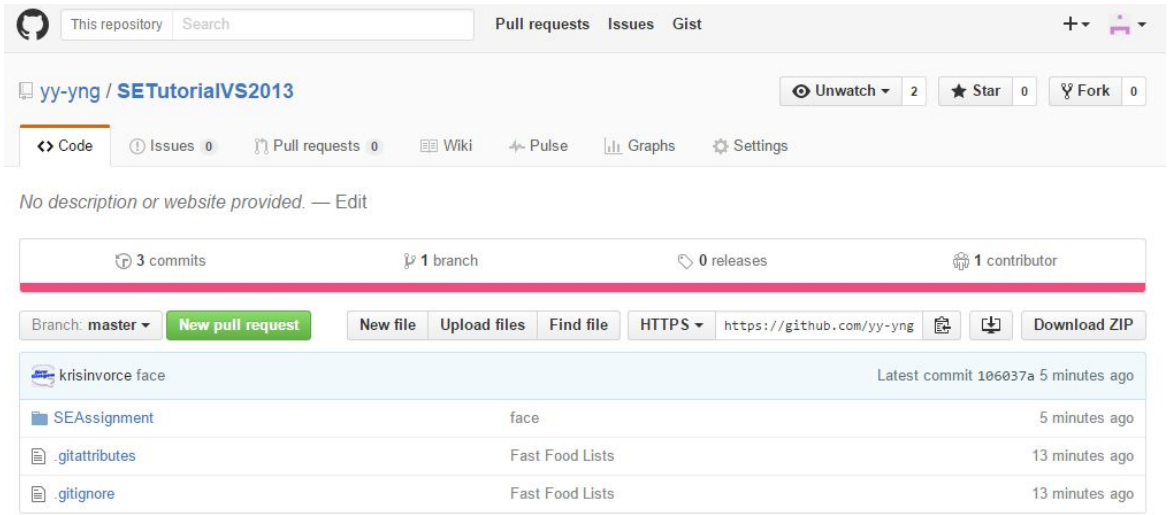

Figure 3 shows latest commit by the collaborator.

When user try to commit another version of the same file before fetching the latest version from GitHub, a message showing conflict has happened will appear and users can choose to keep the current version, the latest version by the collaborator or merge both versions.

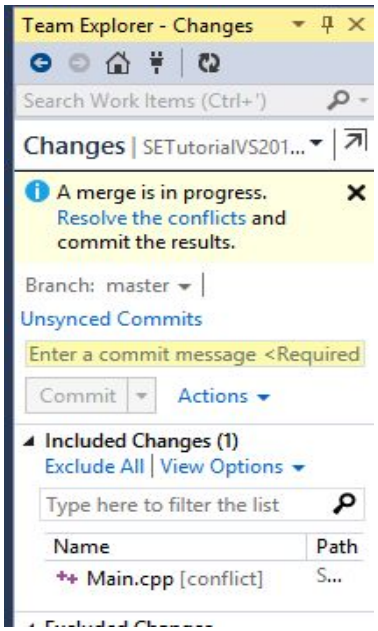

Figure 4 shows that merging is in progress..

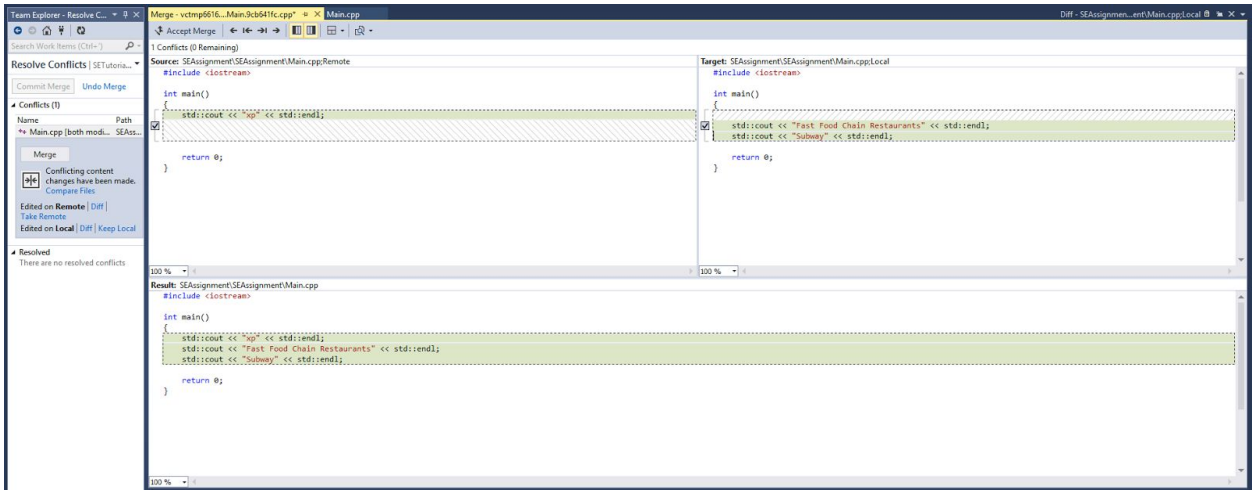

Figure 5

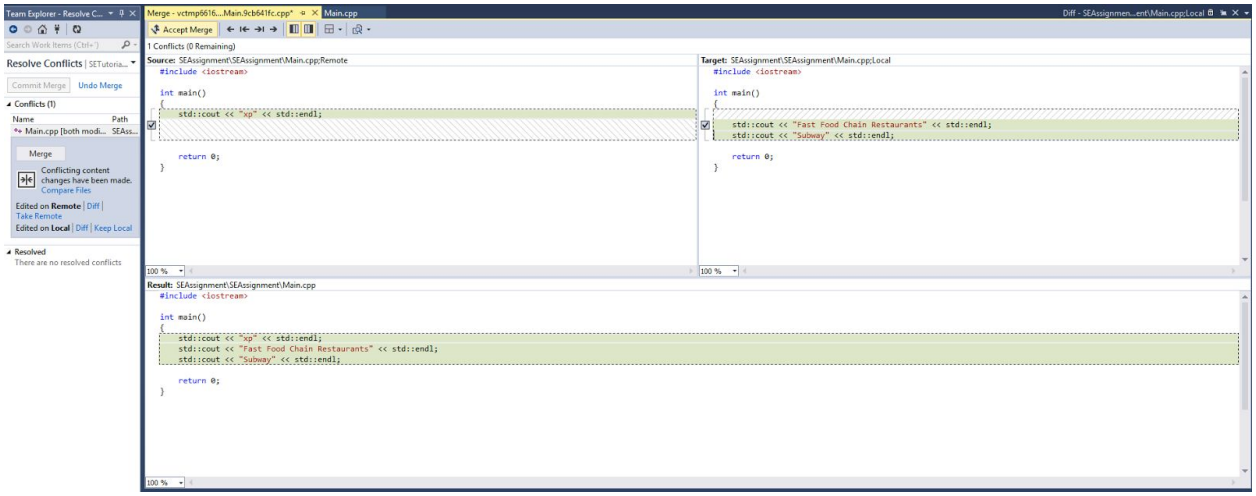

Figure 6

Figure 5 and 6 shows the difference between versions and also the merged version. When the user accepts one of these version, it will appear in the resolved conflicts list.

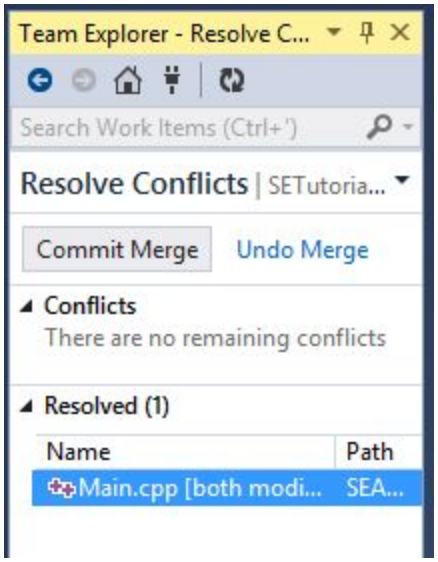

Figure 7 shows the resolved conflict list.

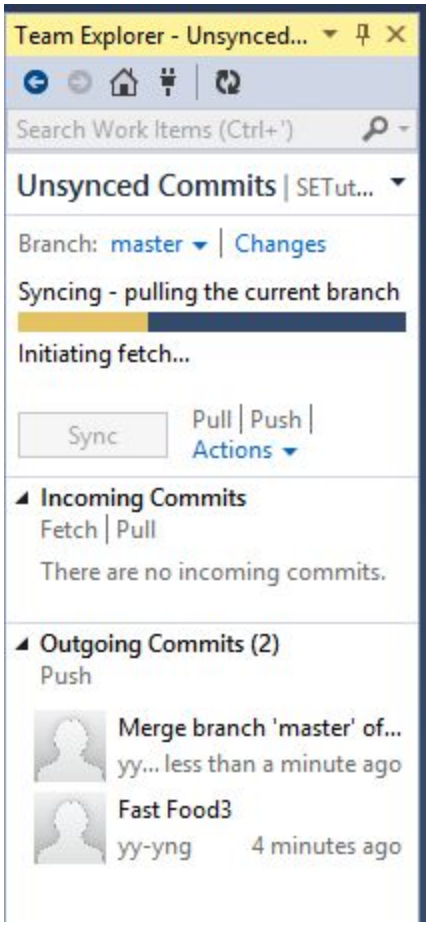

Figure 8 shows the syncing (committing) of the merged version

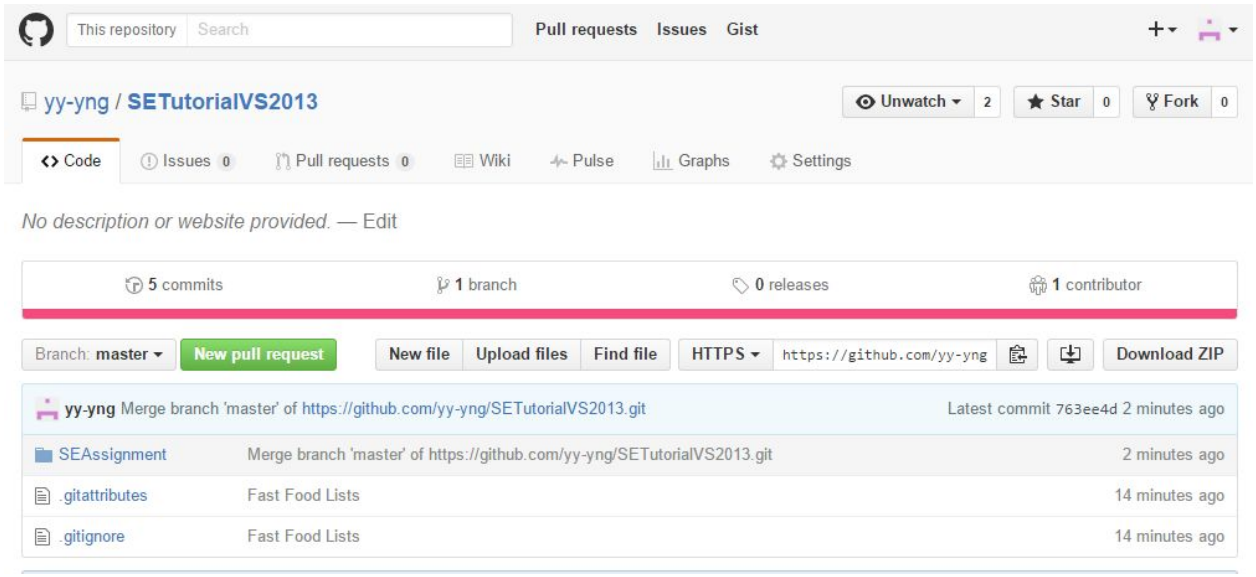

Figure 8

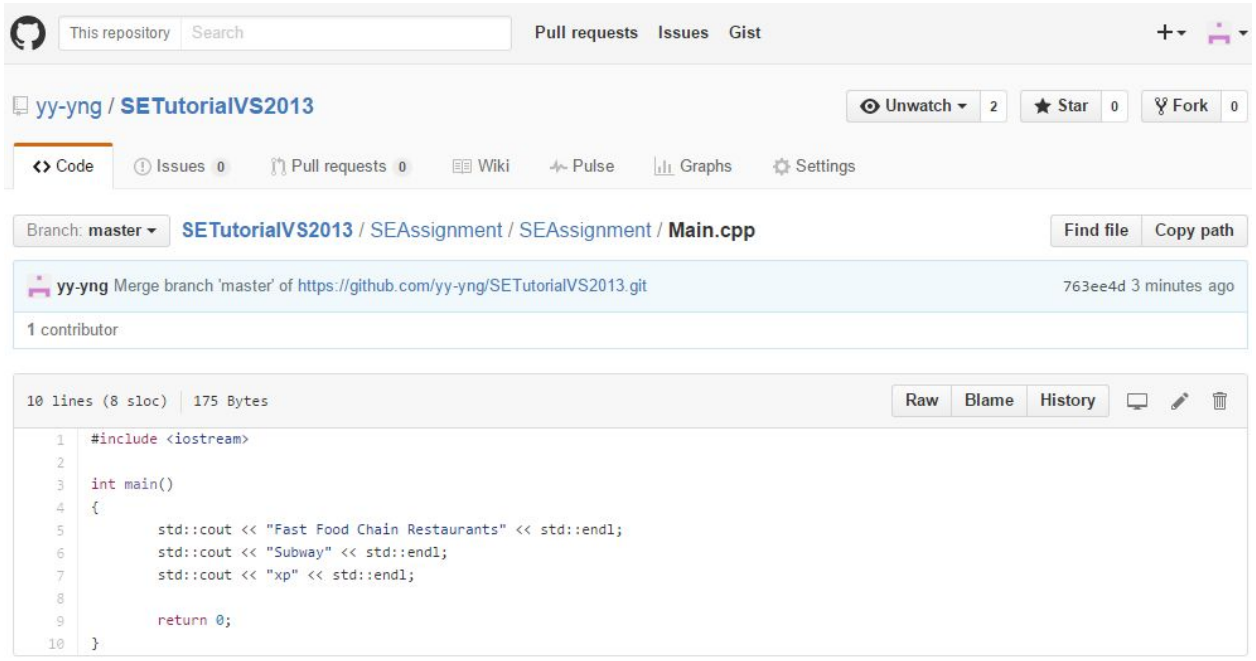

Figure 9

Figure 8 and 9 shows the latest update to the repository, which is the merged version of the main.cpp.