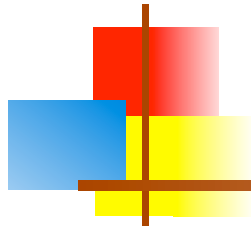


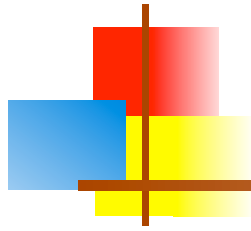
Git

A distributed version control system



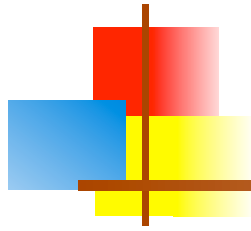
Version Control Systems

- **Version control** (or **revision control**, or **source control**) is all about managing multiple versions of documents, programs, web sites, etc.
 - Almost all “real” projects use some kind of version control
 - Essential for team projects, but also very useful for individual projects
- Some well-known version control systems are CVS, Subversion, Mercurial, and Git
 - CVS and Subversion use a “central” repository; users “check out” files, work on them, and “check them in”
 - Mercurial and Git treat all repositories as equal
- Distributed systems like Mercurial and Git are newer and are gradually replacing centralized systems like CVS and Subversion



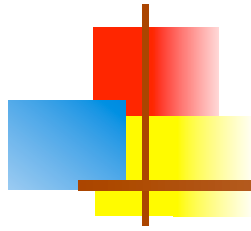
Why Version Control?

- 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
- For getting an internship or job:
 - Any company with a clue uses some kind of version control
 - Companies without a clue are bad places to work



Why Git?

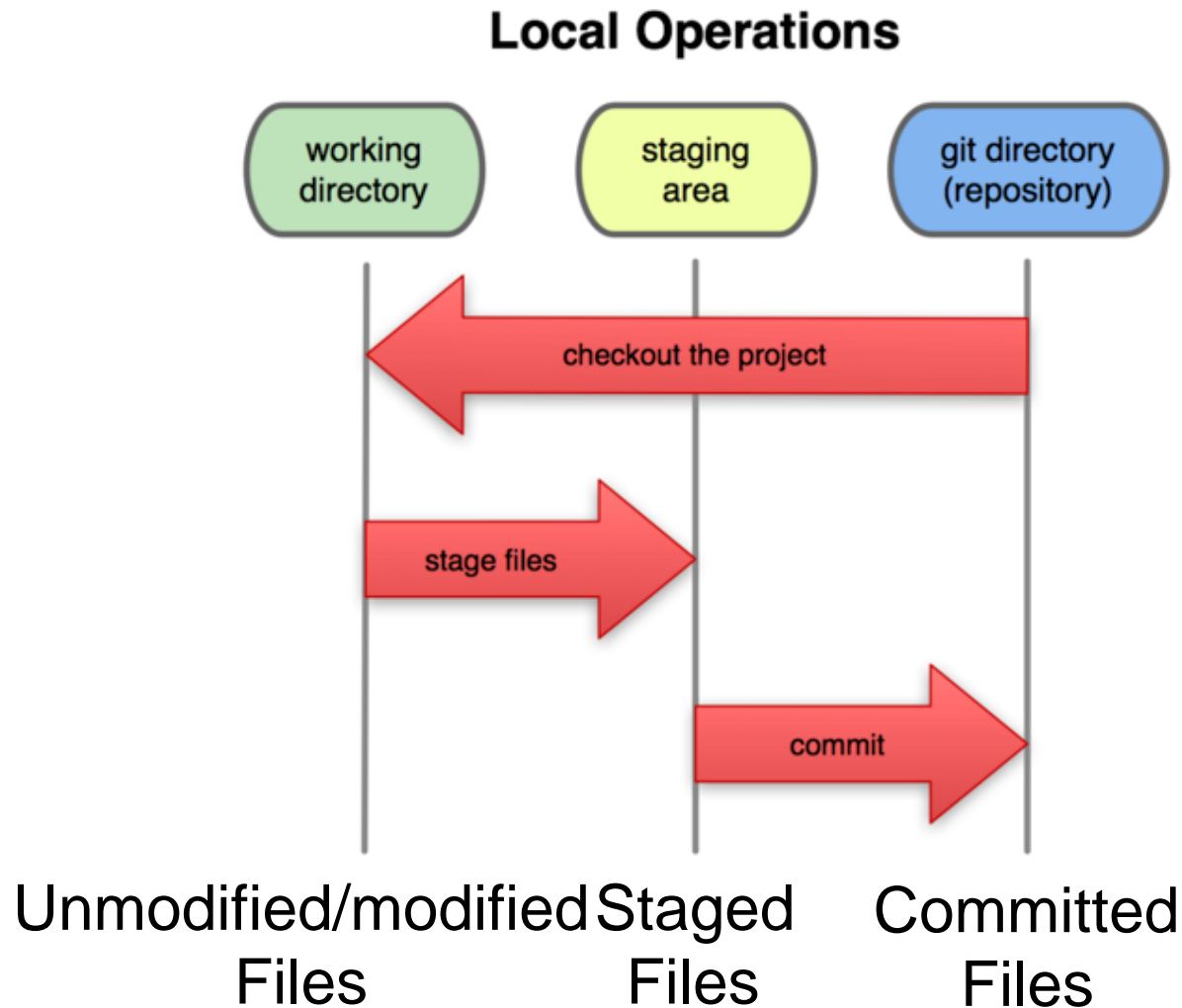
- Git has many advantages over earlier systems such as CVS and Subversion
 - More efficient, better workflow, etc.
 - See the literature for an extensive list of reasons
 - Of course, there are always those who disagree
- Best competitor: Mercurial
 - Same concepts, slightly simpler to use
 - Much less popular than Git



Git History

- Came out of Linux development community
- Linus Torvalds, 2005
- Initial goals:
 - Speed
 - Support for non-linear development (thousands of parallel branches)
 - Fully distributed
 - Able to handle large projects like Linux efficiently

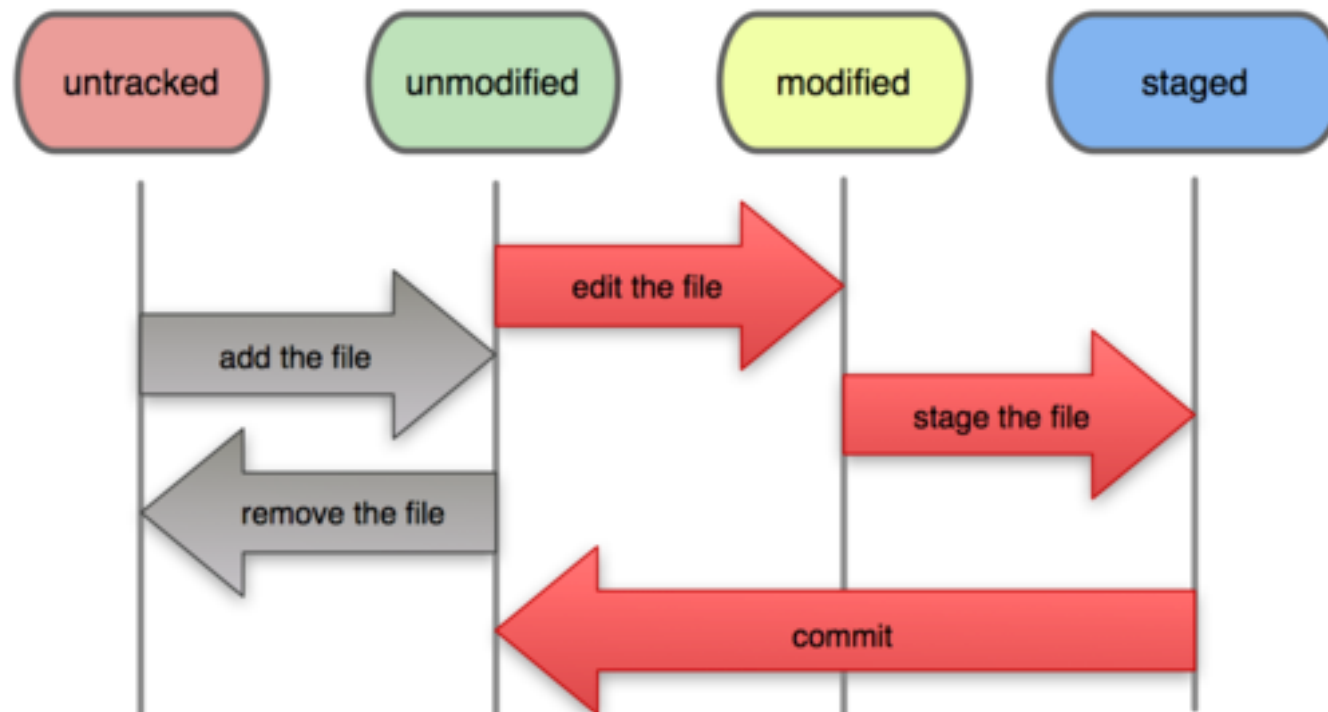
A Local Git Project Has Three Areas

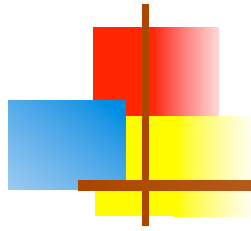


Note: working directory sometimes called the “working tree”, staging area sometimes called the “index”.

Git File Lifecycle

File Status Lifecycle





Basic Workflow

Basic Git workflow:

1. **Modify** files in your working directory.
2. **Stage** files, adding snapshots of them to your staging area.
3. Do a **commit**, which takes the files as they are in the staging area and stores that snapshot permanently to your Git directory.

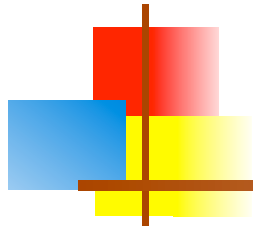
Notes:

- If a particular version of a file is in the **Git directory**, it's considered **committed**.
- If it's modified but has been added to the **staging area**, it is **staged**.
- If it was **changed** since it was checked out but has not been staged, it is **modified**.



Git Commands

command	description
<code>git clone <i>url</i> [<i>dir</i>]</code>	copy a git repository so you can add to it
<code>git add <i>files</i></code>	adds file contents to the staging area
<code>git commit</code>	records a snapshot of the staging area
<code>git status</code>	view the status of your files in the working directory and staging area
<code>git diff</code>	shows diff of what is staged and what is modified but unstaged
<code>git help [<i>command</i>]</code>	get help info about a particular command
<code>git pull</code>	fetch from a remote repository and try to merge into the current branch
<code>git push</code>	push your new branches and data to a remote repository
others: <code>init</code> , <code>reset</code> , <code>branch</code> , <code>checkout</code> , <code>merge</code> , <code>log</code> , <code>tag</code>	



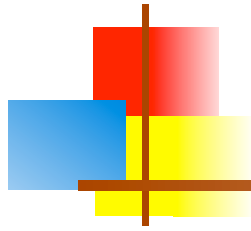
Online Tools

- Github

- Public repository
- Student account can have private account

- Bitbucket

- Private repository
- Only 5 team members
- Student account can have more collaborators



Visual Studio with Bitbucket

Create a team

Team name

e.g., Atlassian Inc.

Team ID*


Your team will be available at
<https://bitbucket.org/<team id>>

What is a team?

Teams foster collaboration by allowing multiple Bitbucket users to share an account plan.

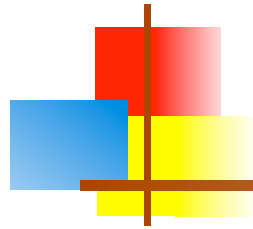
- ✓ Create team-owned repositories
- ✓ Delegate administration
- ✓ Send email invitations
- ✓ Manage repository access via groups

Add team members

 Xie_hkust


☒ Administrator

Create a team in Bitbucket



Visual Studio with Bitbucket

Create a new repository [Import repository](#)

Owner  project_

Project name*

Repository name*

Access level ☒ This is a private repository

Repository type ☒ Git ☐ Mercurial

[Advanced settings](#)

Description

Forking

Project management ☐ Issue tracking ☐ Wiki

Language

Integrations ☐ Enable HipChat notifications

[Create repository](#) [Cancel](#)

Create a repository in Bitbucket



Visual Studio with Bitbucket

Command line

> I'm starting from scratch

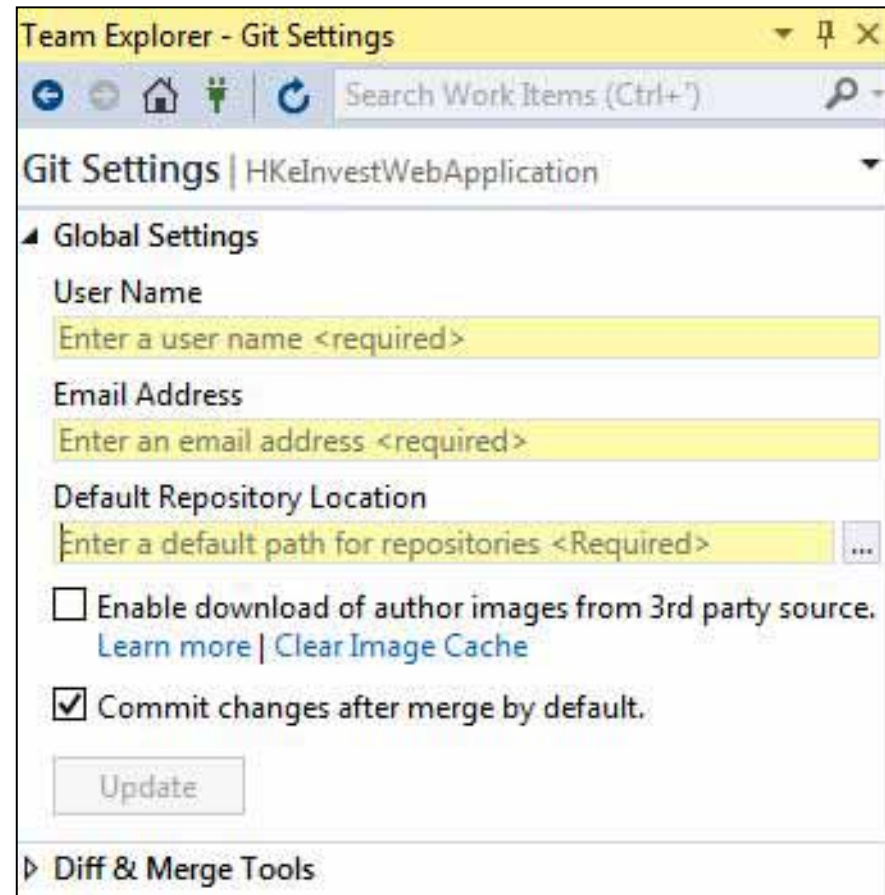
▼ I have an existing project

Already have a Git repository on your computer? Let's push it up to Bitbucket.

```
$ cd /path/to/my/repo
$ git remote add origin https://Xie_hkust@bitbucket.org/Xie_hkust/comp3111project.git
$ git push -u origin --all # pushes up the repo and its refs for the first time
$ git push -u origin --tags # pushes up any tags
```

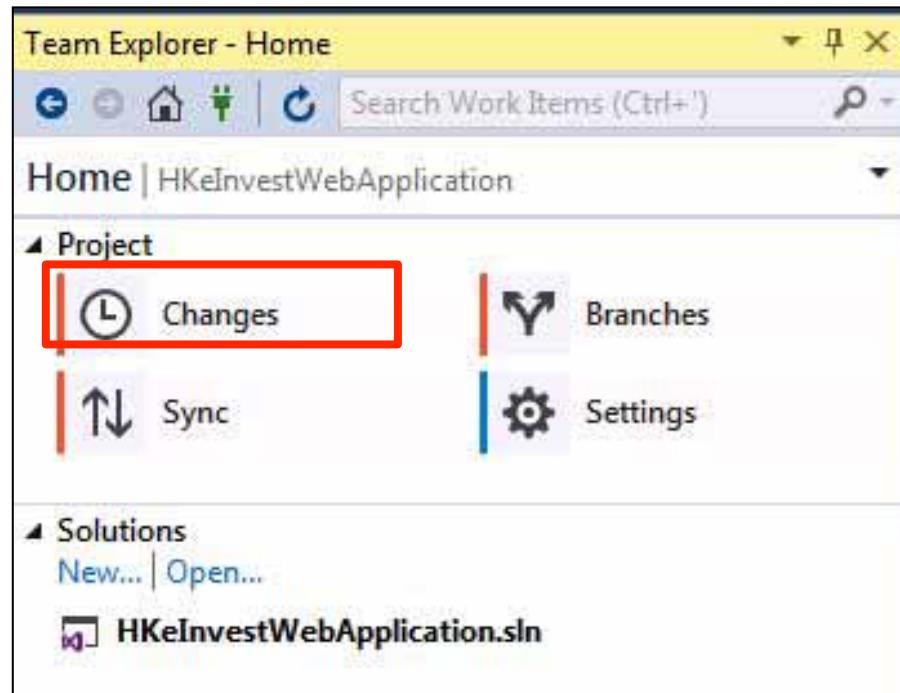
Get the repository address

Visual Studio with Bitbucket



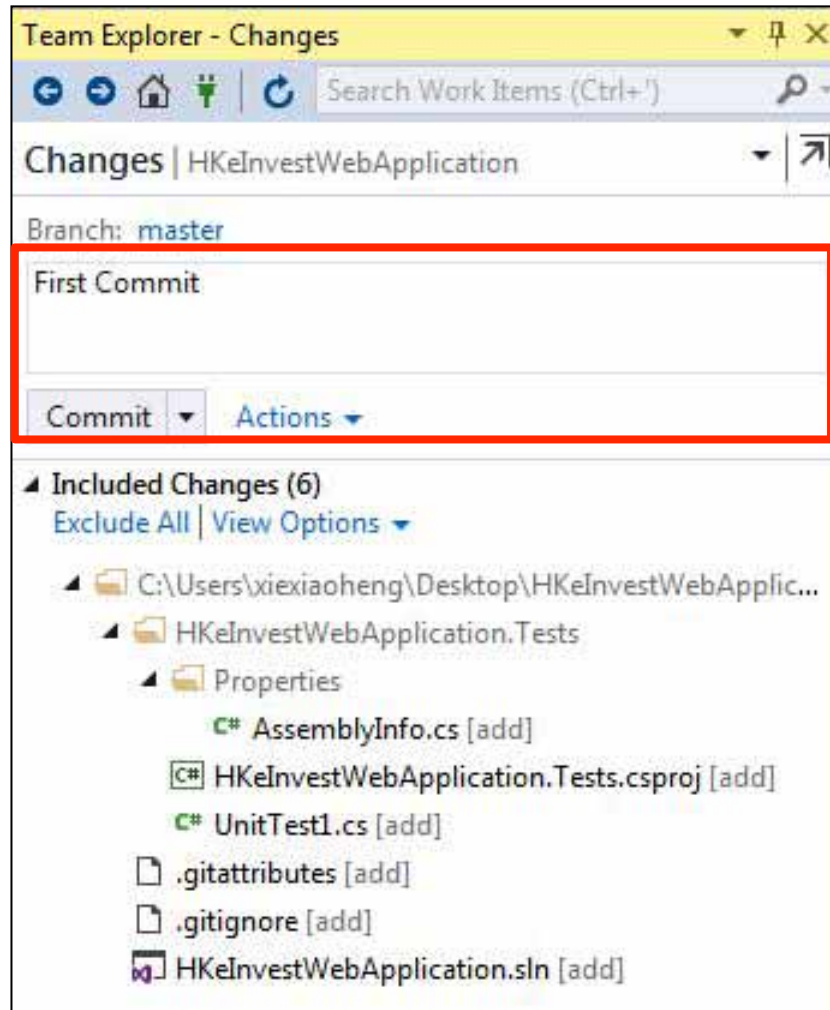
Introduce yourself to Git in Visual studio

Visual Studio with Bitbucket



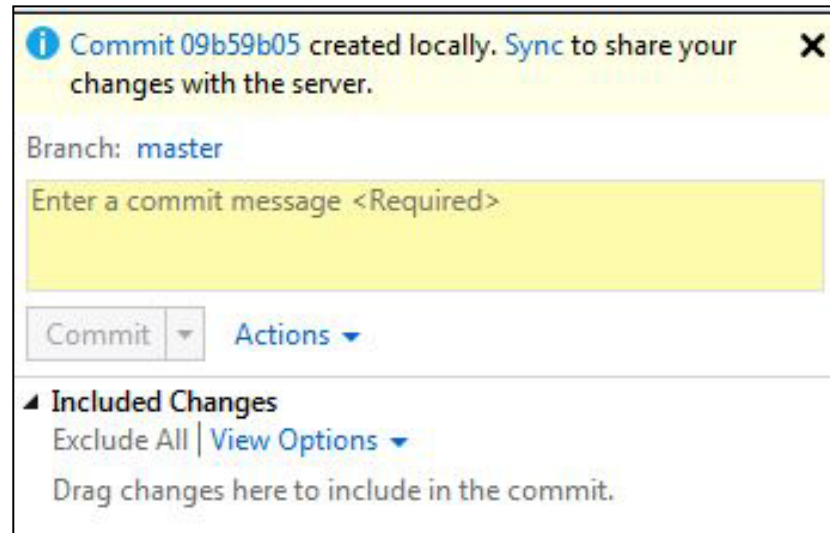
For a solution **without** source control, right-click solution and select Add solution to source control, and select **Git**.
In the Team Explorer window, choose **Changes** to add first commit.

Visual Studio with Bitbucket

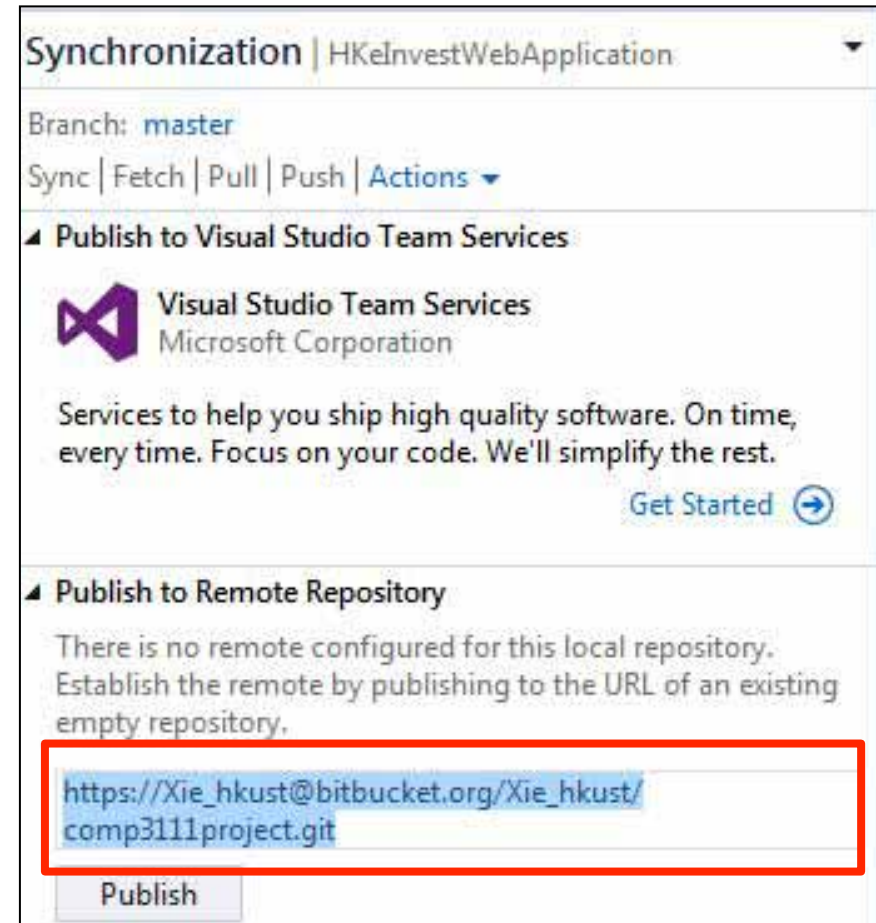


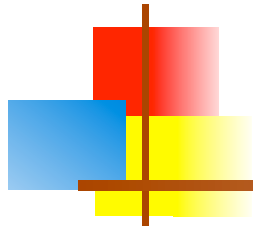
Enter the initial commit message and select **Commit**.

Visual Studio with Bitbucket



Choose **Sync** and on the synchronization window enter the Bitbucket repository URL, click **Publish**





Git Tutorials/Resources

- Using Bitbucket in Visual Studio 2013 for Beginners
<https://www.youtube.com/watch?v=WWh1VrgbQC0>
- Getting started with GIT, Visual Studio, and BitBucket
<http://www.codeproject.com/Tips/900204/Getting-started-with-GIT-Visual-Studio-and-BitBuck>
- Free Git on Bitbucket with Visual Studio
<http://mjsmithdev.com/2015/10/05/free-git-on-bitbucket-with-visual-studio/>