Installing and Configuring the Git client

The following sections list the steps required to properly install and configure the Git clients - Git Bash and Git GUI - on a Windows 7 computer. Git is also available for Linux and Mac. The remaining instructions here, however, are specific to the Windows installation.

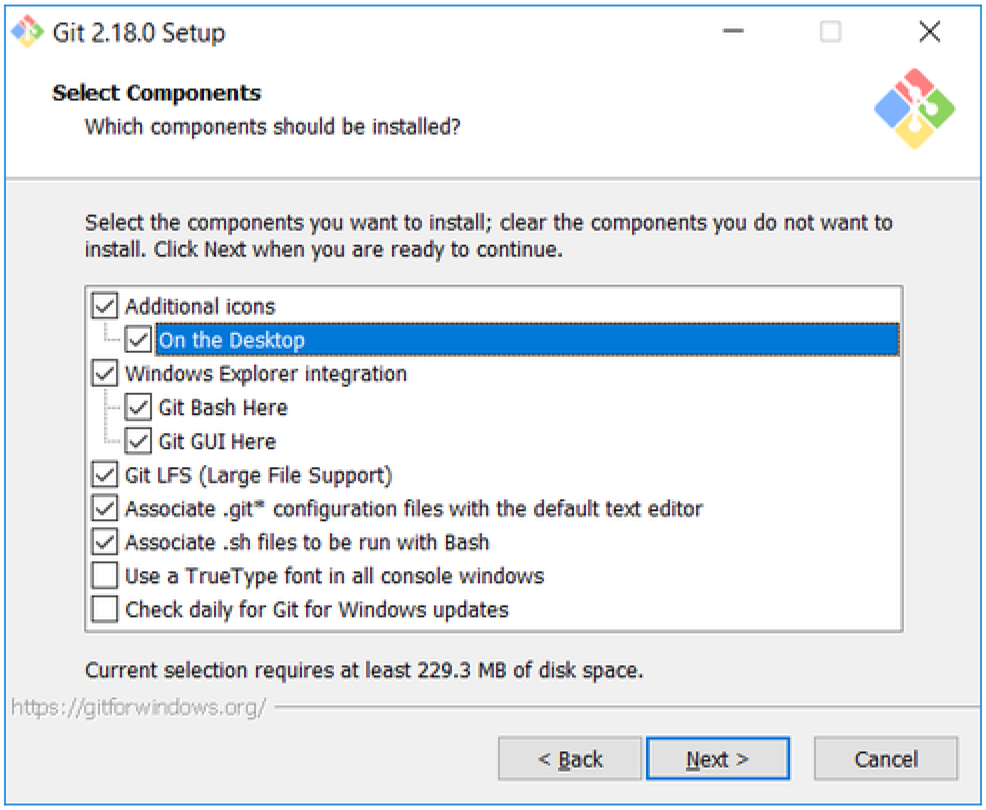
Be sure to carefully follow all of the steps in the first five sections. The last section, 6, is optional.

1. Git installation

Download the Git installation program (Windows, Mac, or Linux) from http://git-scm.com/downloads.

When running the installer, various screens appear (Windows screens shown). Generally, you can accept the default selections, ***except in the screens below where you do NOT want the default selections:***

In the **Select Components** screen, make sure **Windows Explorer Integration** is selected as shown:


Git 2.18.0 Setup

Select Components
Which components should be installed?

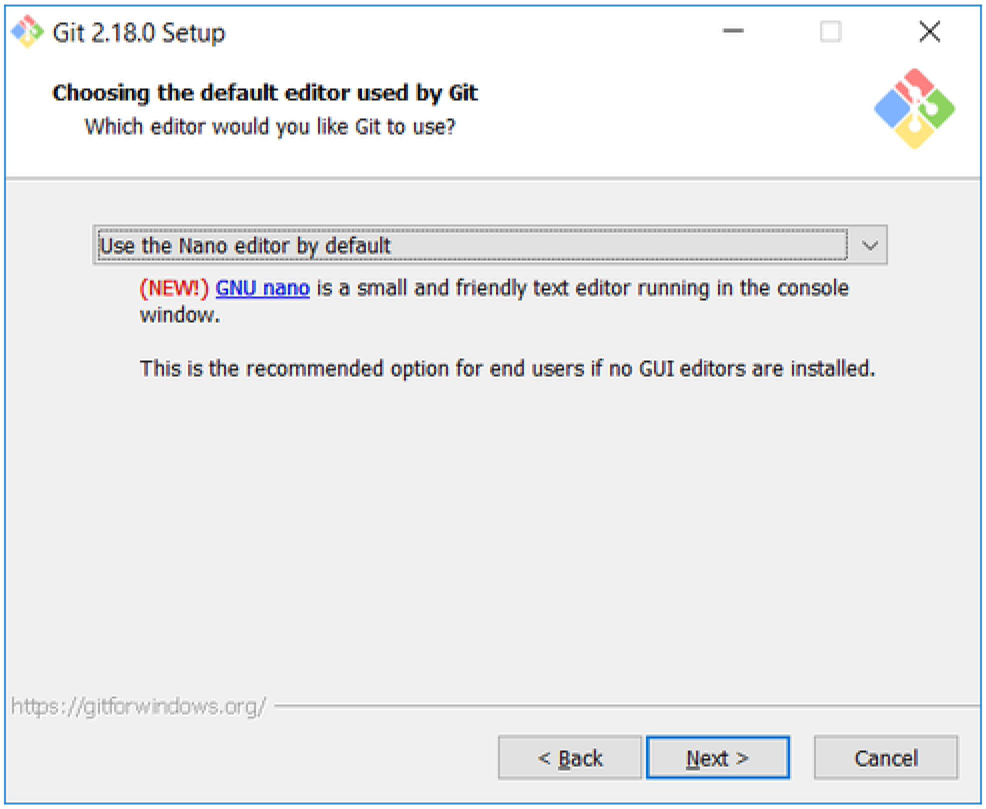
Select the components you want to install; clear the components you do not want to install. Click Next when you are ready to continue.

- [✓] Additional icons
  - [✓] On the Desktop
- [✓] Windows Explorer integration
  - [✓] Git Bash Here
  - [✓] Git GUI Here
- [✓] Git LFS (Large File Support)
- [✓] Associate .git* configuration files with the default text editor
- [✓] Associate .sh files to be run with Bash
- [ ] Use a TrueType font in all console windows
- [ ] Check daily for Git for Windows updates

Current selection requires at least 229.3 MB of disk space.

https://gitforwindows.org/

In the **Choosing the default editor used by Git** dialog, it is strongly recommended that you DO NOT select the default VIM editor - it is challenging to learn how to use it, and there are better modern editors available. Instead, choose **Notepad++ or Nano** - either of those is much easier to use. It is strongly recommended that you select Notepad++, BUT YOU MUST INSTALL NOTEPAD++ first! Find the installation with Google.


Git 2.18.0 Setup

Choosing the default editor used by Git

Which editor would you like Git to use?

Use the Nano editor by default

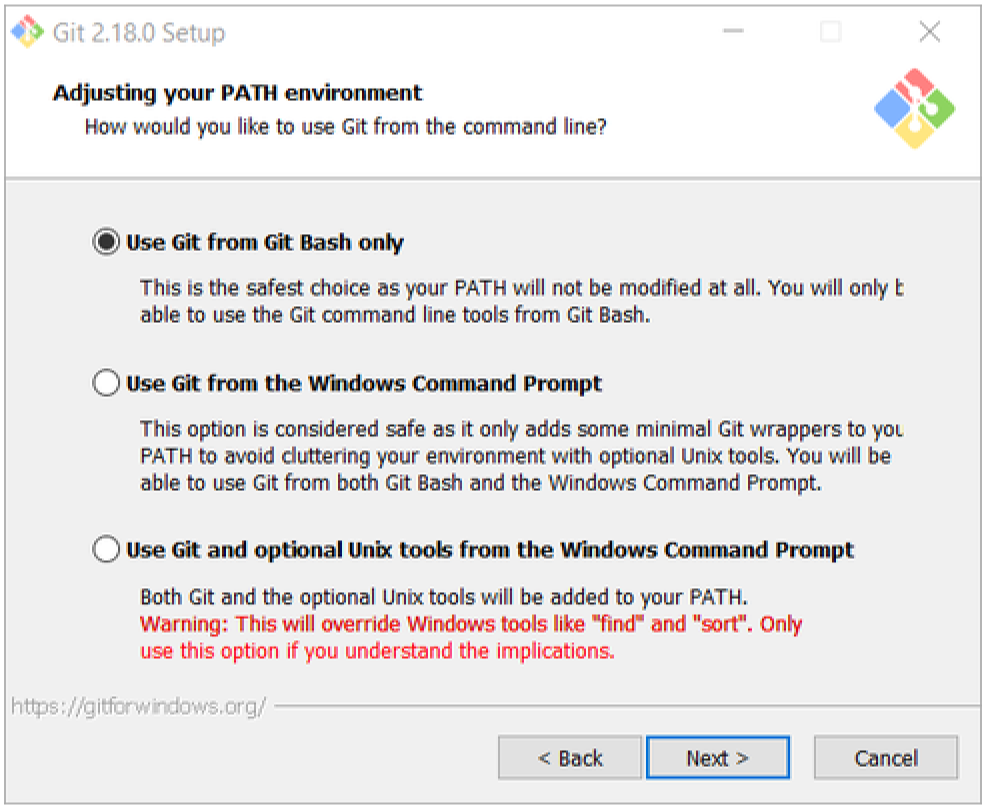
(NEW!) GNU nano is a small and friendly text editor running in the console window.

This is the recommended option for end users if no GUI editors are installed.

https://gitforwindows.org/

In the **Adjusting your PATH** screen, all three options are acceptable:

- **Use Git from Git Bash only**: no integration, and no extra commands in your command path
- **Use Git from the Windows Command Prompt**: adds flexibility - you can simply run git from a Windows command prompt, and is often the setting for people in industry - but this does add some extra commands.
- **Use Git and optional Unix tools from the Windows Command Prompt**: this is also a robust choice and useful if you like to use Unix commands like grep.



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Adjusting your PATH environment

How would you like to use Git from the command line?

(●) **Use Git from Git Bash only**

This is the safest choice as your PATH will not be modified at all. You will only b
able to use the Git command line tools from Git Bash.

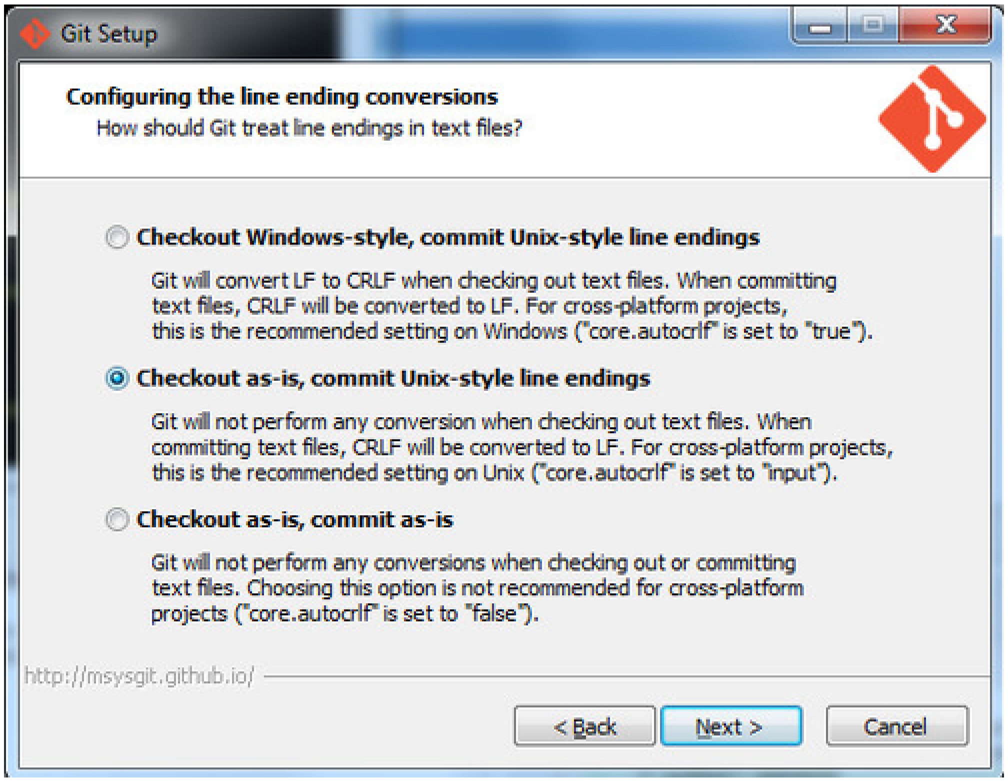
( ) **Use Git from the Windows Command Prompt**

This option is considered safe as it only adds some minimal Git wrappers to you
PATH to avoid cluttering your environment with optional Unix tools. You will be
able to use Git from both Git Bash and the Windows Command Prompt.

( ) **Use Git and optional Unix tools from the Windows Command Prompt**

Both Git and the optional Unix tools will be added to your PATH.
Warning: This will override Windows tools like "find" and "sort". Only
use this option if you understand the implications.

In the **Configuring the line ending** screen, select the middle option (**Checkout as-is, commit Unix-style line endings**) as shown. This helps migrate files towards the Unix-style (LF) terminators that most modern IDE's and editors support.The Windows convention (CR-LF line termination) is only important for Notepad (as opposed to Notepad++), but if you are using Notepad to edit your code you may need to ask your instructor for help.



Git Setup

Configuring the line ending conversions

How should Git treat line endings in text files?

( ) **Checkout Windows-style, commit Unix-style line endings**

Git will convert LF to CRLF when checking out text files. When committing
text files, CRLF will be converted to LF. For cross-platform projects,
this is the recommended setting on Windows ("core.autocrlf" is set to "true").

(●) **Checkout as-is, commit Unix-style line endings**

Git will not perform any conversion when checking out text files. When
committing text files, CRLF will be converted to LF. For cross-platform projects,
this is the recommended setting on Unix ("core.autocrlf" is set to "input").

( ) **Checkout as-is, commit as-is**

Git will not perform any conversions when checking out or committing
text files. Choosing this option is not recommended for cross-platform
projects ("core.autocrlf" is set to "false").

2. Configuring Git to ignore certain files

This part is extra important and required so that your repository does not get cluttered with garbage files.

By default, Git tracks **all** files in a project. Typically, this is **NOT** what you want; rather, you want Git to ignore certain files such as .**bak** files created by an editor or .**class** files created by the Java compiler. To have Git automatically ignore particular files, create a file named **.gitignore** (note that the filename begins with a dot) in the **C:\users\name** folder (where name is your MSOE login name).

NOTE: The .gitignore file must NOT have any file extension (e.g. .txt). Windows normally tries to place a file extension (.txt) on a file you create from File Explorer - and then it (by default) HIDES the file extension. To avoid this, create the file from within a useful editor (e.g. Notepad++ or UltraEdit) and save the file without a file extension).

Edit this file and add the lines below (just copy/paste them from this screen); these are patterns for files to be ignored (taken from examples provided at https://github.com/github/gitignore.)

```
#Lines (like this one) that begin with # are comments; all other lines are rules

# common build products to be ignored at MSOE
*.o
*.obj
*.class
*.exe

# common IDE-generated files and folders to ignore
workspace.xml
bin/
out/
.classpath
# uncomment following for courses in which Eclipse .project files are not checked in
# .project

#ignore automatically generated files created by some common applications, operating
systems
*.bak
*.log
*.ldb
~*
.DS_Store*
._*
Thumbs.db

# Any files you do want not to ignore must be specified starting with !
# For example, if you didn't want to ignore .classpath, you'd uncomment the following rule:
# !.classpath
```

Note: You can always edit this file and add additional patterns for other types of files you might want to ignore. Note that you can also have a .gitignore file in any folder naming additional files to ignore. This is useful for project-specific build products.

3. Configuring Git default parameters

Once Git is installed, there is some remaining custom configuration you must do. Follow the steps below:

a. From within File Explorer, right-click on any folder. A context menu appears containing the commands "**Git Bash here**" and "**Git GUI here**". These commands permit you to launch either Git client. For now, select **Git Bash here**.

b. Enter the command (replacing name as appropriate) `git config --global core.excludesfile c:/users/name/.gitignore`
   - This tells Git to use the .**gitignore** file you created in step 2
   - NOTE: TO avoid typing errors, copy and paste the commands shown here into the Git Bash window, using the arrow keys to edit the red text to match your information.

c. Enter the command `git config --global user.email "name@msoe.edu"`
   - This links your Git activity to your email address. Without this, your commits will often show up as "unknown login". Replace name with your own MSOE email name.

d. Enter the command `git config --global user.name "Your Name"`
   - Git uses this to log your activity. Replace "Your Name" by your actual first and last name.

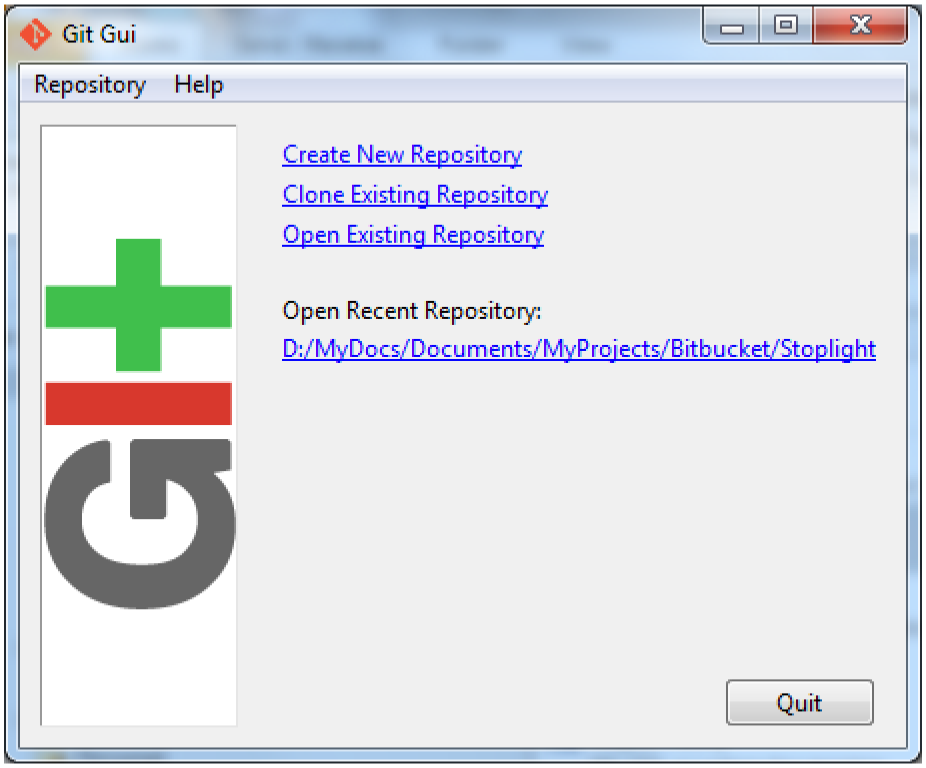
e. Enter the command `git config --global push.default simple`
   - This ensures that all pushes go back to the branch from which they were pulled. Otherwise pushes will go to the master branch, forcing a merge.

4. Generating public/private key pairs for authentication

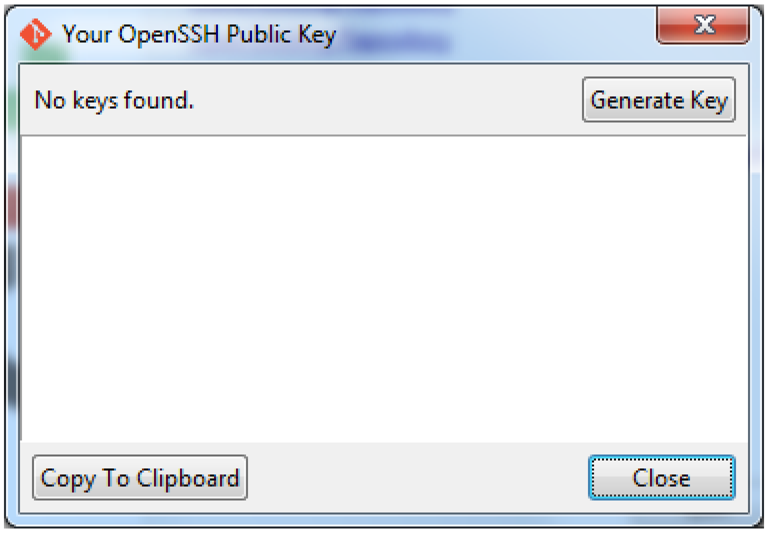
This part is critical and used to authenticate your access to the repository.

You will eventually be storing your project files on a remote Bitbucket or other server using a secure network connection. The remote server requires you to authenticate yourself whenever you communicate with it so that it can be sure it is you, and not someone else trying to steal or corrupt your files. Bitbucket and Git together user public key authentication; thus you have to generate a pair of keys: a public key that you (or your instructor) put on Bitbucket, and a private key you keep to yourself (and guard with your life).

Generating the key pair is easy: From within File Explorer, right-click on any folder. From the context menu, select **Git GUI Here**. The following appears:

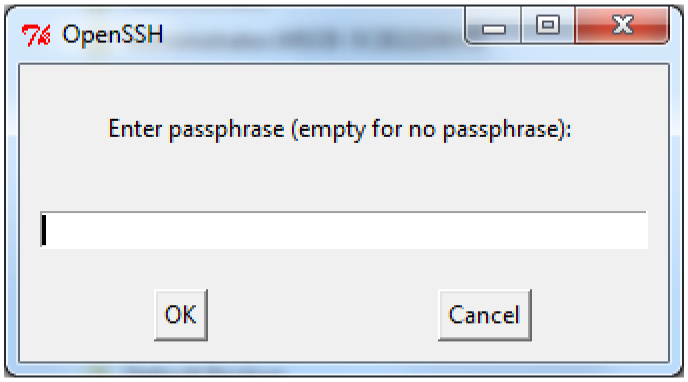


From the **Help** menu, select the **Show SSH Key** command. The following pup-up dialog appears:



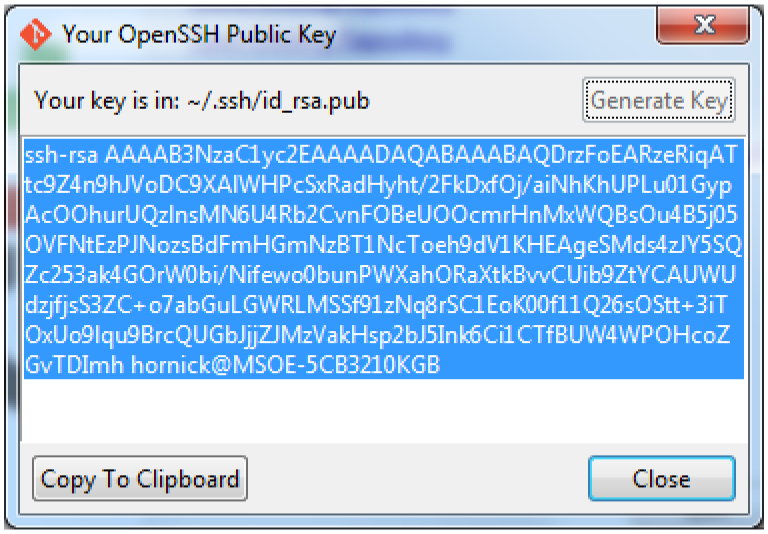
No keys found.

Initially, you have no public/private key pair; thus the message "**No keys found**" appears withing the dialog. Press the **Generate Key** button. The following dialog appears:



Enter passphrase (empty for no passphrase):

Do **NOT** enter a passphrase - just press **OK** twice. When you do, the dialog disappears and you should see something like the following - but your generated key will be different:



Your key is in: ~/.ssh/id_rsa.pub

```
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQDrzFoEARzeRiqAT
tc9Z4n9hJVoDC9XAIWHPcSxRadHyht/2FkDxfOj/aiNhKhUPLu01Gyp
AcOOhurUQzInsMN6U4Rb2CvnFOBeUOOcmrHnMxWQBsOu4B5j05
OVFNtEzPJNozsBdFmHGmNzBT1NcToeh9dV1KHEAgeSMds4zJY5SQ
Zc253ak4GOrW0bi/Nifewo0bunPWXahORaXtkBvvCUib9ZtYCAUWU
dzjfjsS3ZC+o7abGuLGWRLMSSf91zNq8rSC1EoK00f11Q26sOStt+3iT
OxUo9Iqu9BrcQUGbJjjZJMzVakHsp2bJ5Ink6Ci1CTfBUW4WPOHcoZ
GvTDImh hornick@MSOE-5CB3210KGB
```

The keys have been written into two files named **id_rsa** and **id_rsa.pub** in your **c:/Users/*username*/.ssh** folder (where ***username*** is your MSOE user name). Don't ever delete these files! To configure Bitbucket to use this key:

1. Click on the **Copy to Clipboard** button in the Git GUI Public Key dialog.
2. Log in to BItbucket
3. Click on your picture or the 👤 icon in the left pane and select **Settings**.

4. Select **SSH keys** under **Security**.
5. Click on the **Add key** button.
6. Enter a name for your key in the **Label** box in the Bitbucket window. If your key is ever compromised (such as someone gets a copy off of your laptop), having a clear name will help you know which key to delete. A good pattern to follow is to name the computer used to generate the key followed by the date you generated it; for instance: "MSOE laptop key 2012-02-28".
7. Paste the key from the Clipboard into the **Key** text box in the Bitbucket window, and add it.

You should now be able to access your repository from your laptop using the ssh protocol without having to enter a password. Protect the key files - other people can use them to access your repository as well! If you have another computer you use, you can copy the id_rsa.pub file to the .ssh folder on that computer or (better yet) you can generate another public/private key pair specific to that computer.

Configuring other repositories (such as GitLab) is very similar.

5. Authenticating with private keys

Linux, Mac users:

1. Open a terminal prompt.
2. Type the commands

```
eval `ssh-agent`
ssh-add
```

> This assumes your key is in the default location, ~/.ssh/id_dsa. If it is somewhere else, type ssh-add *path-to-private-key-file.* Note that the path cannot be readable or writeable by others.

Windows users:

1. Install Pageant if it is not installed. It is usually installed with PuTTY and PuTTYgen.
2. Start Pageant and select **Add Key**.
3. Browse to your .ppk file, open it, and enter the passphrase if prompted.

If git pull or get push cannot connect, you might need to add a system variable `GIT_SSH` set to the path to the `plink.exe` executable. Go to Windows Settings, enter "system environment" in the search box, open the "Edit the system environment variables" item, click on Environment Variables..., then New... in the System Variables section (the bottom half), enter `GIT_SSH` for the name, and browse to `plink.exe` for the value. Save the setting, then reboot your computer.

6. Optional: Configure Git to use a custom application (WinMerge) for comparing file differences

It is recommended that you skip this step unless you really are attached to using WinMerge for file comparison tasks.

a. Enter the command `git config --global merge.tool winmerge`
   - This configures Git to use the application WinMerge to resolve merging conflicts. You must have WinMerge installed on your computer first. Get WinMerge at http://winmerge.org/downloads/.

b. Enter the following commands to complete the WinMerge configuration:
   i. `git config --global mergetool.winmerge.name WinMerge`
   ii. git config --global mergetool.winmerge.trustExitCode true
   iii. If you install WinMerge to the default location (that is, C:\Program Files (x86)\WinMerge), enter git config --global mergetool.winmerge.cmd "\"C:\Program Files (x86)\WinMerge\WinMergeU.exe\" -u -e -dl \"Local\" -dr \"Remote\" \$LOCAL \$REMOTE \$MERGED"
   iv. If you install WinMerge to an alternate location (for example, D:\WinMerge), enter git config --global mergetool.winmerge.cmd "/d/WinMerge/WinMergeU.exe -u -e -dl \"Local\" -dr \"Remote\" \$LOCAL \$REMOTE \$MERGED"

c. Enter the command `git config --global diff.tool winmerge`
   - This configures Git to use the application WinMerge to differences between versions of files.

d. Enter the commands to complete the WinMerge diff configuration:
   i. `git config --global difftool.winmerge.name WinMerge`
   ii. `git config --global difftool.winmerge.trustExitCode true`
   iii. If you install WinMerge to the default location (that is, C:\Program Files (x86)\WinMerge), enter `git config --global difftool.winmerge.cmd "\"C:\Program Files (x86)\WinMerge\WinMergeU.exe\" -u -e \$LOCAL \$REMOTE"`

iv. If you install WinMerge to an alternate location (for example, D:\WinMerge), enter
```
git config --global difftool.winmerge.cmd "/d/WinMerge/WinMergeU.exe
-u -e \$LOCAL \$REMOTE"
```