Remote Connection
We can connect to a remote server securely.

Connecting with SSH or secure shell
A protocol used to securely connect to a machine over a network connection and initiate an encrypted shell session through which one can work with the remote machine.

We connect to another machine over a network using a secure shell (SSH).

For example, I have set up my mac in my office for this lecture with a user account (this can be done with the Users & Groups selection in System Preferences).

We can (hopefully) login remotely using ssh
```
ssh tong@131.104.74.147
```
The IP address above corresponds to my office computer. The password for tong is hello!! Note this ssh command may not work because my office computer is not configured as a server and because of the university network, but the command does work on computing clusters.

When you login, type
```
ls
```

scp and rsync
To copy files from one machine to another, we use scp and rsync

In your home directory, you may have a Binf6410 directory. In this directory, make a new directory, Temp2 with two files with names you make up.

```
mkdir Temp2
cd Temp2
touch temp.txt temp1.txt
```

The path would then be: ~/Binf6410/Temp2

We can copy a single file between computers using **scp**. The same rules apply with scp as with mv, cp, etc… The order of text is: command, flags, source target

```
scp temp.txt tong@131.104.74.147:
```

This command is copying tempt.txt to the home directory of user "tong" on my machine.

We can define an absolute and relative path to the directory in the remote computer
```
user@host:/Path/To/Directory/
user@host:~/Path/To/Directory/
```

The file you copied will be there in tong's home directory.

You may be able to go the other way- you can use the account on my computer as source and your machine as target. Assuming there is a file called "temp.txt" in the user tong's directory, the command below should copy it into your current directory.

```
scp tong@131.104.74.147:/temp.txt .
```

Like with other commands, we could use wild cards:

```
scp temp.* tong@:131.104.74.147/
```

rsync

rsync can do a remote file copy and copies directories.

* only sends the difference between versions
* archive option that preserves file attributes such as permissions, etc...
* can compress

Format:
rsync flags source destination

The most common flags are
-ave
-avz -e

- e tells which command to use. how we will connect with the remote host. (ssh)
- a is archive mode
- v is verbose
- z enables file compression

```
rsync –ave ssh Temp1/ tong@:131.104.74.147: #just drops
Temp1 files in
```

Alternately, you could use:

```
rsync –ave ssh Temp1/ tong@:131.104.74.147:Transfer
```

copies Temp1 into a folder called Transfer.

#this should copy files from my computer to your computer

```
rsync –ave ssh tong@:131.104.74.147:Transfer .
```

Note that rsync will copy down your directory tree.
On your machine, make a new directory Binf6410/Temp/Temp1. Add some new files. Now transfer.