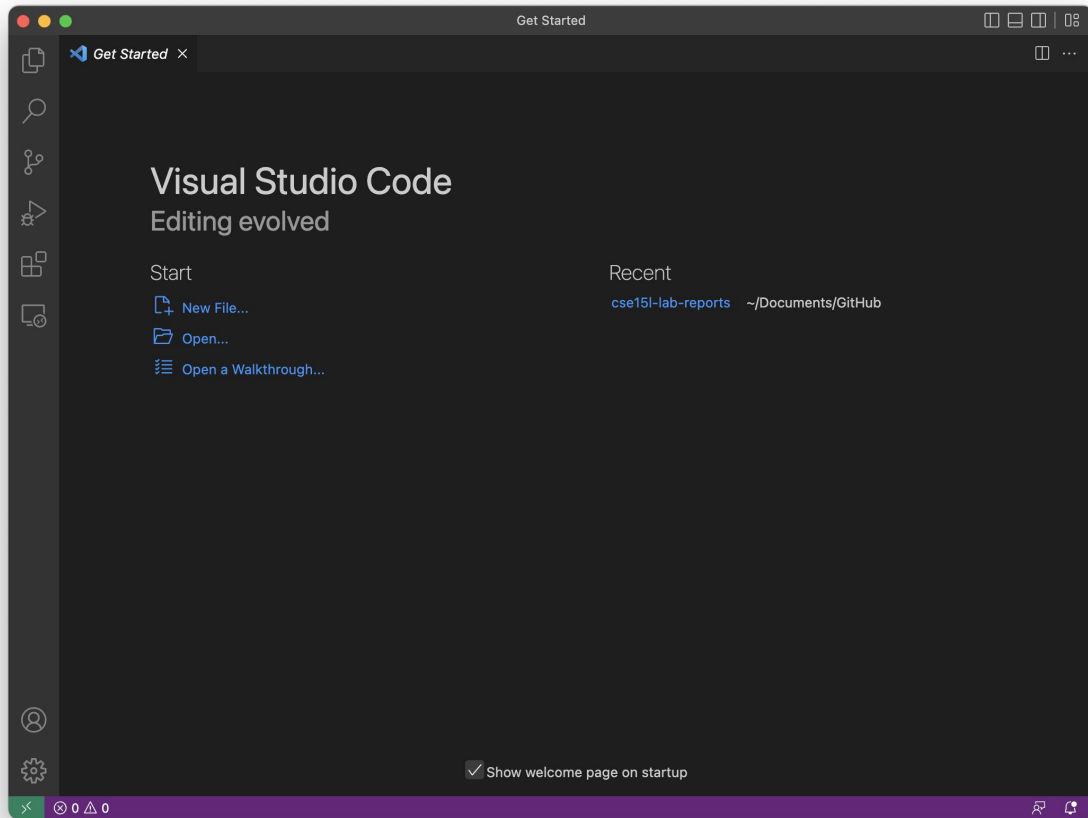


CSE15L - Week 1 Lab Report

Name: Xiaoxiang(Anna) Ma

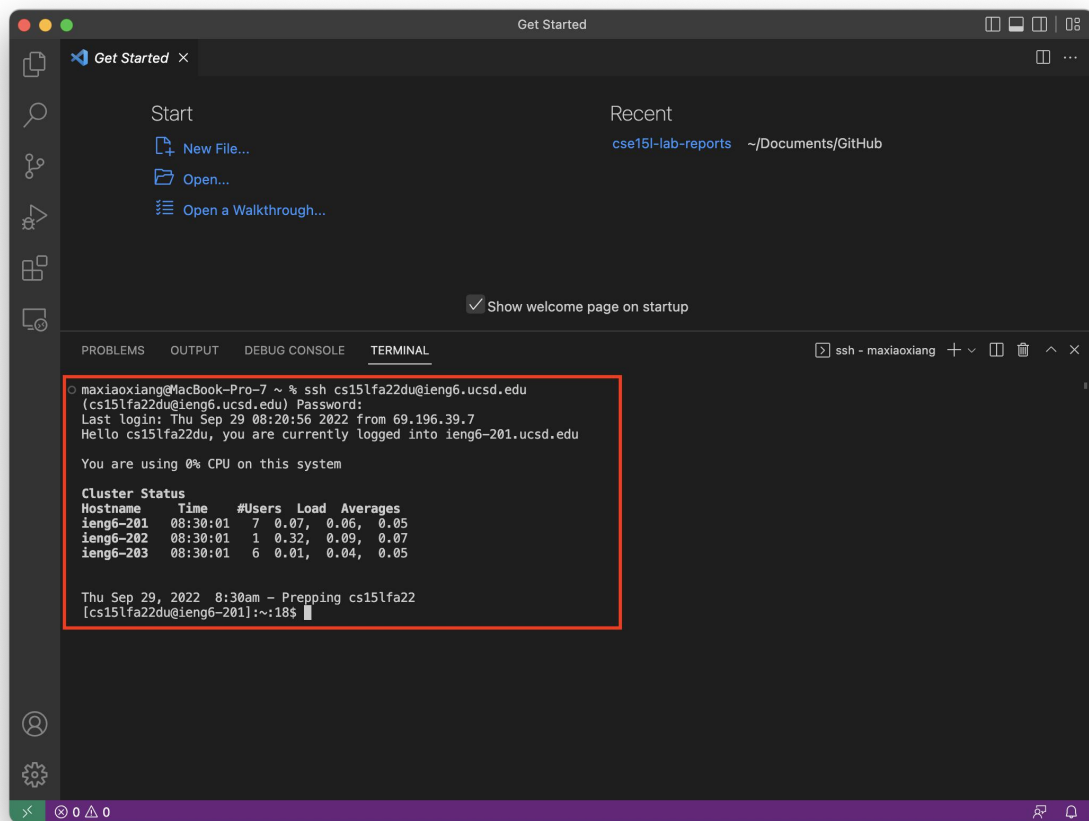
Date: 9/29/2022

- **Step 1: Installing VScode**



Download and install Visual Studio Code (<https://code.visualstudio.com/>) on the computer (or laptop). After opening the software, a window similar to the above screenshot will appear (due to different systems and settings, the window will also be different).

- **Step 2: Remotely Connecting**



```
maxiaoxiang@MacBook-Pro-7 ~ % ssh cs15lfa22du@ieng6.ucsd.edu
(cs15lfa22du@ieng6.ucsd.edu) Password:
Last login: Thu Sep 29 08:20:56 2022 from 69.196.39.7
Hello cs15lfa22du, you are currently logged into ieng6-201.ucsd.edu

You are using 0% CPU on this system

Cluster Status
Hostname Time #Users Load Averages
ieng6-201 08:30:01 7 0.07, 0.06, 0.05
ieng6-202 08:30:01 1 0.32, 0.09, 0.07
ieng6-203 08:30:01 6 0.01, 0.04, 0.05

Thu Sep 29, 2022 8:30am - Prepping cs15lfa22
[cs15lfa22du@ieng6-201]:~:18$
```

Since I am using an iOS system, I do not need to perform the steps of OpenSSH. To allow remote devices to access my laptop, I turned on "Remote Login" (<https://support.apple.com/en-us/guide/mac-help/mchlp1066/mac>). Re-enter VScode, a small green icon appears in the lower left corner, which means the setting is successful.

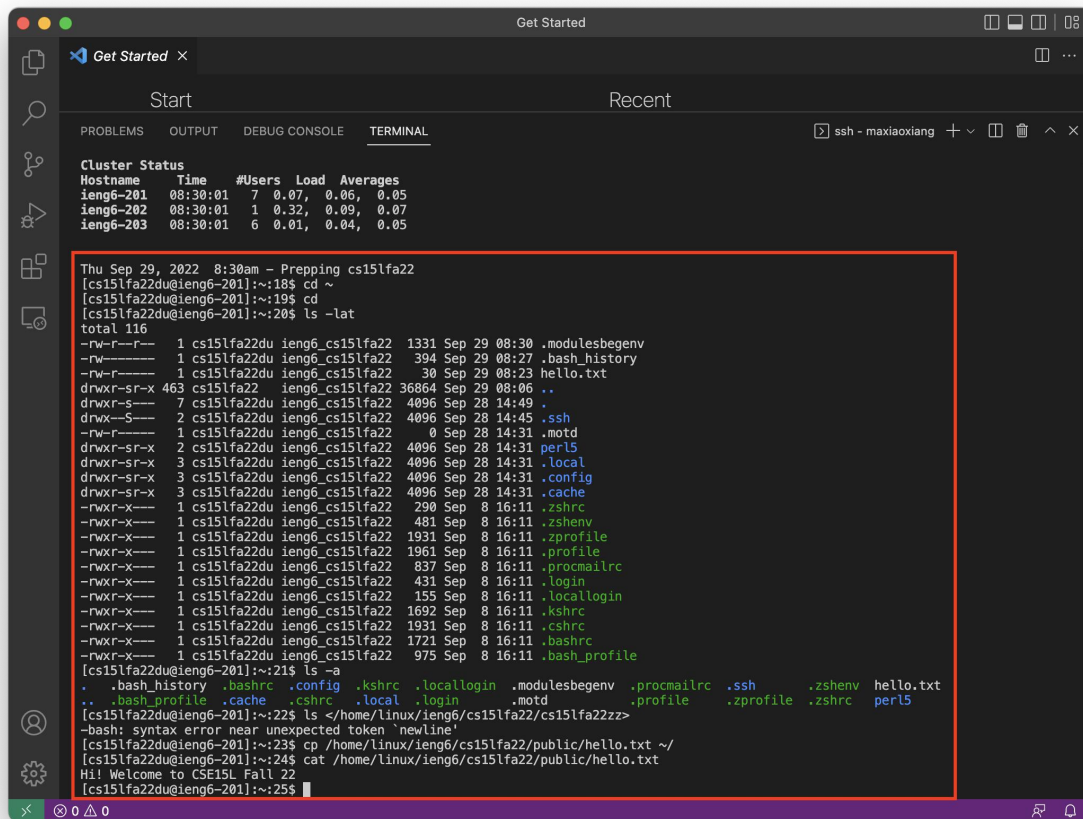
Next, create a new terminal in VScode and enter:

```
ssh cs15lfa22zz@ieng6.ucsd.edu
```

("zz" should be replaced by the letters in course-specific account.)

Press return, and enter the password (The first login will be slightly different). After successful login, an interaction similar to the screenshot above will appear.

● Step 3: Trying Some Commands



The screenshot shows a terminal window with a dark theme. At the top, there's a 'Get Started' window. Below it, the 'Terminal' tab is active, showing a session with a remote host 'ssh - maxliaoqi'. The terminal output includes a 'Cluster Status' table, a timestamp 'Thu Sep 29, 2022 8:30am - Prepping cs15lfa22', and a series of commands and their outputs. The commands are: 'cd ~', 'cd', 'ls -lat', 'ls -a', 'ls <directory>', 'cp /home/linux/ieng6/cs15lfa22/public/hello.txt ~/.', and 'cat /home/linux/ieng6/cs15lfa22/public/hello.txt'. The outputs show the directory structure and the contents of the file 'hello.txt'.

```
Cluster Status
Hostname      Time      #Users  Load  Averages
ieng6-201    08:30:01      7    0.07, 0.06, 0.05
ieng6-202    08:30:01      1    0.32, 0.09, 0.07
ieng6-203    08:30:01      6    0.01, 0.04, 0.05

Thu Sep 29, 2022 8:30am - Prepping cs15lfa22
[cs15lfa22du@ieng6-201]:~:18$ cd ~
[cs15lfa22du@ieng6-201]:~:19$ cd
[cs15lfa22du@ieng6-201]:~:20$ ls -lat
total 116
-rw-r--r-- 1 cs15lfa22du ieng6_cs15lfa22 1331 Sep 29 08:30 .modulesbeginv
-rw-r--r-- 1 cs15lfa22du ieng6_cs15lfa22 394 Sep 29 08:27 .bash_history
-rw-r--r-- 1 cs15lfa22du ieng6_cs15lfa22 30 Sep 29 08:23 hello.txt
drwxr-xr-x 463 cs15lfa22 ieng6_cs15lfa22 36864 Sep 29 08:06 ..
drwxr-xr-x 7 cs15lfa22du ieng6_cs15lfa22 4096 Sep 28 14:49 .
drwxr-xr-x 2 cs15lfa22du ieng6_cs15lfa22 4096 Sep 28 14:45 .ssh
-rw-r--r-- 1 cs15lfa22du ieng6_cs15lfa22 0 Sep 28 14:31 .motd
drwxr-xr-x 2 cs15lfa22du ieng6_cs15lfa22 4096 Sep 28 14:31 perl5
drwxr-xr-x 3 cs15lfa22du ieng6_cs15lfa22 4096 Sep 28 14:31 .local
drwxr-xr-x 3 cs15lfa22du ieng6_cs15lfa22 4096 Sep 28 14:31 .config
drwxr-xr-x 3 cs15lfa22du ieng6_cs15lfa22 4096 Sep 28 14:31 .cache
-rw-r-xr-x 1 cs15lfa22du ieng6_cs15lfa22 290 Sep 8 16:11 .zshrc
-rw-r-xr-x 1 cs15lfa22du ieng6_cs15lfa22 481 Sep 8 16:11 .zshenv
-rw-r-xr-x 1 cs15lfa22du ieng6_cs15lfa22 1931 Sep 8 16:11 .zprofile
-rw-r-xr-x 1 cs15lfa22du ieng6_cs15lfa22 1961 Sep 8 16:11 .profile
-rw-r-xr-x 1 cs15lfa22du ieng6_cs15lfa22 837 Sep 8 16:11 .procmailrc
-rw-r-xr-x 1 cs15lfa22du ieng6_cs15lfa22 431 Sep 8 16:11 .login
-rw-r-xr-x 1 cs15lfa22du ieng6_cs15lfa22 155 Sep 8 16:11 .locallogin
-rw-r-xr-x 1 cs15lfa22du ieng6_cs15lfa22 1602 Sep 8 16:11 .kshrc
-rw-r-xr-x 1 cs15lfa22du ieng6_cs15lfa22 1931 Sep 8 16:11 .cshrc
-rw-r-xr-x 1 cs15lfa22du ieng6_cs15lfa22 1721 Sep 8 16:11 .bashrc
-rw-r-xr-x 1 cs15lfa22du ieng6_cs15lfa22 975 Sep 8 16:11 .bash_profile
[cs15lfa22du@ieng6-201]:~:21$ ls -a
. .bash_history .bashrc .config .kshrc .locallogin .modulesbeginv .procmailrc .ssh .zshenv hello.txt
.. .bash_profile .cache .cshrc .local .login .motd .profile .zprofile .zshrc perl5
[cs15lfa22du@ieng6-201]:~:22$ ls </home/linux/ieng6/cs15lfa22/cs15lfa22zz>
-bash: syntax error near unexpected token `newline'
[cs15lfa22du@ieng6-201]:~:23$ cp /home/linux/ieng6/cs15lfa22/public/hello.txt ~/
[cs15lfa22du@ieng6-201]:~:24$ cat /home/linux/ieng6/cs15lfa22/public/hello.txt
Hi! Welcome to CSE15L Fall 22
[cs15lfa22du@ieng6-201]:~:25$
```

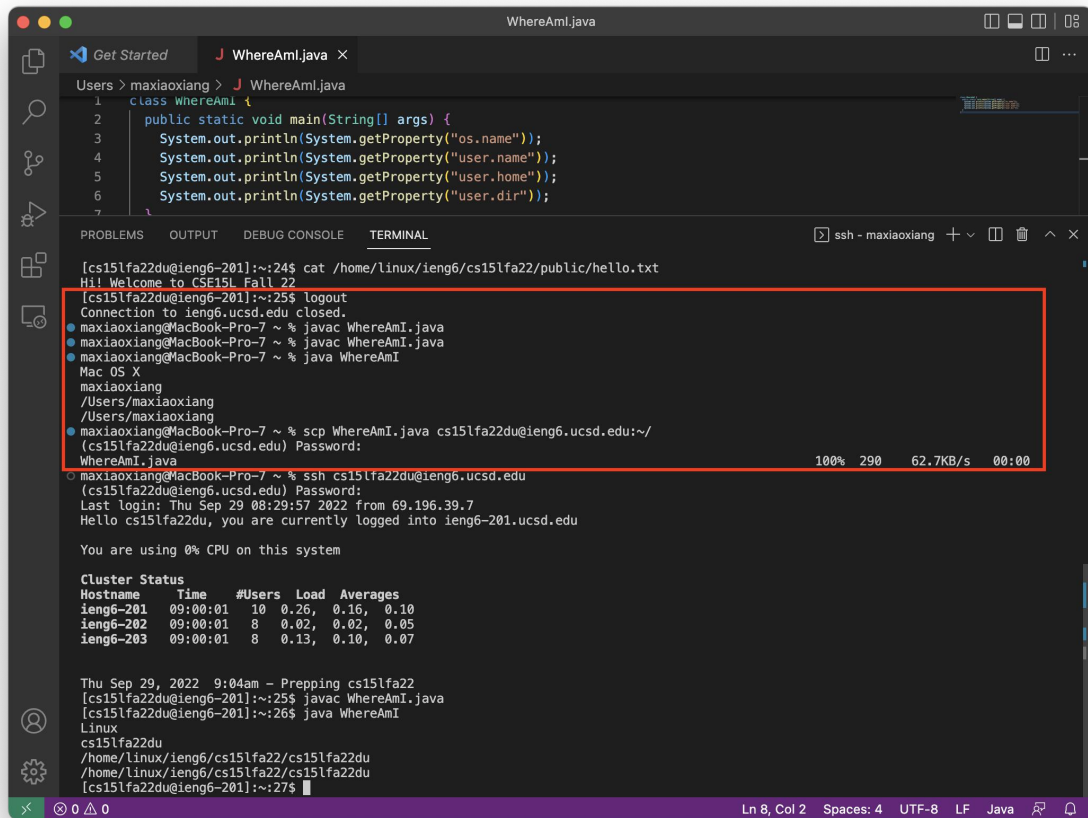
After logging in, I tried these specific commands:

- cd ~
- cd
- ls -lat
- ls -a
- ls <directory>
- cp /home/linux/ieng6/cs15lfa22/public/hello.txt ~/
- cat /home/linux/ieng6/cs15lfa22/public/hello.txt

Then, the interaction shown in the screenshot above appeared.

After testing, I logged out of the remote server in my terminal (Ctrl-D).

● Step 4: Moving Files with scp



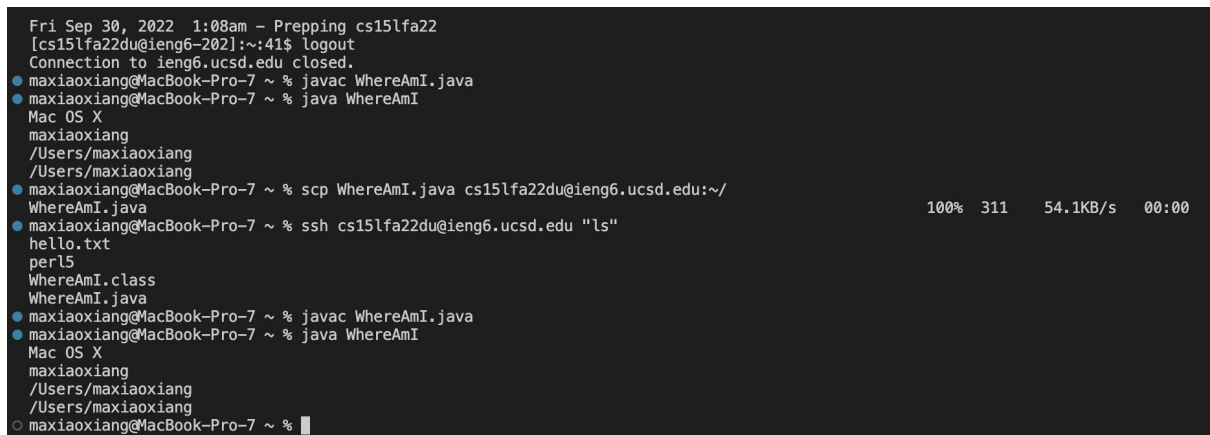
```
WhereAmI.java
1 class WhereAmI {
2     public static void main(String[] args) {
3         System.out.println(System.getProperty("os.name"));
4         System.out.println(System.getProperty("user.name"));
5         System.out.println(System.getProperty("user.home"));
6         System.out.println(System.getProperty("user.dir"));
7     }
8 }

[cs15lfa22du@ieng6-201]~$ cat /home/linux/ieng6/cs15lfa22/public/hello.txt
Hi! Welcome to CSF15L Fall 22
[cs15lfa22du@ieng6-201]~$ logout
Connection to ieng6.ucsd.edu closed.
maxiaoxiang@MacBook-Pro-7 ~ % javac WhereAmI.java
maxiaoxiang@MacBook-Pro-7 ~ % java WhereAmI
Mac OS X
maxiaoxiang
/Users/maxiaoxiang
/Users/maxiaoxiang
maxiaoxiang@MacBook-Pro-7 ~ % scp WhereAmI.java cs15lfa22du@ieng6.ucsd.edu:~/
(cs15lfa22du@ieng6.ucsd.edu) Password:
WhereAmI.java 100% 290 62.7KB/s 00:00
maxiaoxiang@MacBook-Pro-7 ~ % ssh cs15lfa22du@ieng6.ucsd.edu
(cs15lfa22du@ieng6.ucsd.edu) Password:
Last login: Thu Sep 29 08:29:57 2022 from 69.196.39.7
Hello cs15lfa22du, you are currently logged into ieng6-201.ucsd.edu

You are using 0% CPU on this system

Cluster Status
Hostname    Time      #Users  Load  Averages
ieng6-201   09:00:01    10  0.26, 0.16, 0.10
ieng6-202   09:00:01     8  0.02, 0.02, 0.05
ieng6-203   09:00:01     8  0.13, 0.10, 0.07

Thu Sep 29, 2022 9:04am - Prepping cs15lfa22
[cs15lfa22du@ieng6-201]~$ javac WhereAmI.java
[cs15lfa22du@ieng6-201]~$ java WhereAmI
Linux
cs15lfa22du
/home/linux/ieng6/cs15lfa22/cs15lfa22du
/home/linux/ieng6/cs15lfa22/cs15lfa22du
[cs15lfa22du@ieng6-201]~$
```



```
Fri Sep 30, 2022 1:08am - Prepping cs15lfa22
[cs15lfa22du@ieng6-202]~$ logout
Connection to ieng6.ucsd.edu closed.
maxiaoxiang@MacBook-Pro-7 ~ % javac WhereAmI.java
maxiaoxiang@MacBook-Pro-7 ~ % java WhereAmI
Mac OS X
maxiaoxiang
/Users/maxiaoxiang
/Users/maxiaoxiang
maxiaoxiang@MacBook-Pro-7 ~ % scp WhereAmI.java cs15lfa22du@ieng6.ucsd.edu:~/
WhereAmI.java 100% 311 54.1KB/s 00:00
maxiaoxiang@MacBook-Pro-7 ~ % ssh cs15lfa22du@ieng6.ucsd.edu "ls"
hello.txt
perl5
WhereAmI.class
WhereAmI.java
maxiaoxiang@MacBook-Pro-7 ~ % javac WhereAmI.java
maxiaoxiang@MacBook-Pro-7 ~ % java WhereAmI
Mac OS X
maxiaoxiang
/Users/maxiaoxiang
/Users/maxiaoxiang
maxiaoxiang@MacBook-Pro-7 ~ %
```

(This screenshot is in addition to the red boxed part of the previous one. There is no "Password:" because I have set up the SSH Key in advance.)

After testing, I logged out of the remote server in my terminal (Ctrl-D). Then, I create a file on my laptop called `WhereAmI.java` and put the following contents into it:

```
class WhereAmI {  
    public static void main(String[] args) {  
        System.out.println(System.getProperty("os.name"));  
        System.out.println(System.getProperty("user.name"));  
        System.out.println(System.getProperty("user.home"));  
        System.out.println(System.getProperty("user.dir"));  
    }  
}
```

After saving the file, compile and run the WhereAmI program using the commands:

```
javac WhereAmI.java
```

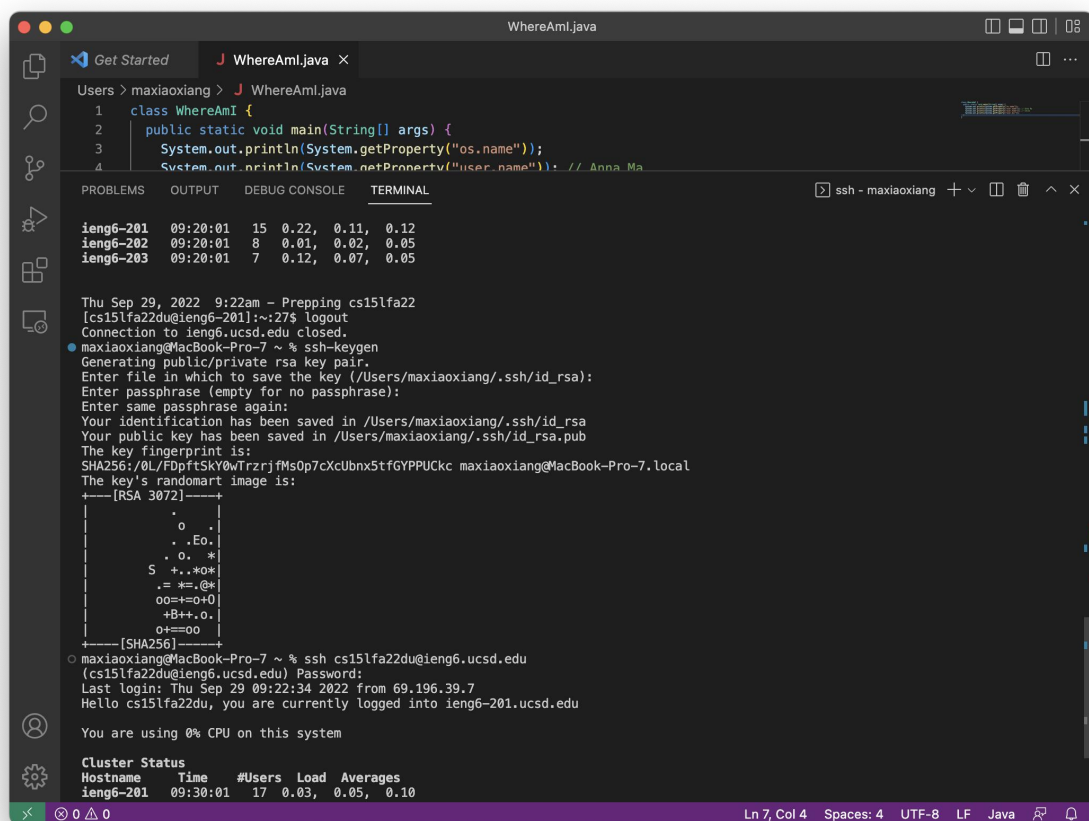
```
java WhereAmI
```

Press return, then in the terminal of the directory where this file was created, run the command:

```
scp WhereAmI.java cs15lfa22zz@ieng6.ucsd.edu:~/
```

Re-enter the password and log into ieng6 with ssh again (using "ls"). Then, I run the program on the ieng6 computer using the same javac and java commands from before.

● Step 5: Setting an SSH Key



```
WhereAmI.java  
Get Started  
J WhereAmI.java X  
Users > maxiaoxiang > J WhereAmI.java  
1 class WhereAmI {  
2     public static void main(String[] args) {  
3         System.out.println(System.getProperty("os.name"));  
4         System.out.println(System.getProperty("user.name"));  
5     }  
6 }  
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL  
ieng6-201 09:20:01 15 0.22, 0.11, 0.12  
ieng6-202 09:20:01 8 0.01, 0.02, 0.05  
ieng6-203 09:20:01 7 0.12, 0.07, 0.05  
Thu Sep 29, 2022 9:22am - Prepping cs15lfa22  
[cs15lfa22du@ieng6-201]:~:27$ logout  
Connection to ieng6.ucsd.edu closed.  
maxiaoxiang@MacBook-Pro-7 ~ % ssh-keygen  
Generating public/private rsa key pair.  
Enter file in which to save the key (/Users/maxiaoxiang/.ssh/id_rsa):  
Enter passphrase (empty for no passphrase):  
Enter same passphrase again:  
Your identification has been saved in /Users/maxiaoxiang/.ssh/id_rsa  
Your public key has been saved in /Users/maxiaoxiang/.ssh/id_rsa.pub  
The key fingerprint is:  
SHA256:/0L/FDpftSkY0wTrzrjfMsOp7cXcUbnx5tFGYPPUckc maxiaoxiang@MacBook-Pro-7.local  
The key's randomart image is:  
+--[RSA 3072]--+  
| .  
| o .  
| .Eo.  
| . o. *  
| S +..*0*  
| . = *+.0*  
| oo=+*o+0  
| +B+++.o.  
| o+=oo  
+--[SHA256]--+  
maxiaoxiang@MacBook-Pro-7 ~ % ssh cs15lfa22du@ieng6.ucsd.edu  
(cs15lfa22du@ieng6.ucsd.edu) Password:  
Last login: Thu Sep 29 09:22:34 2022 from 69.196.39.7  
Hello cs15lfa22du, you are currently logged into ieng6-201.ucsd.edu  
You are using 0% CPU on this system  
Cluster Status  
Hostname Time #Users Load Averages  
ieng6-201 09:30:01 17 0.03, 0.05, 0.10  
Ln 7, Col 4 Spaces: 4 UTF-8 LF Java
```

```
Users > maxiaoxiang > J WhereAml.java
1 class WhereAml {
2     public static void main(String[] args) {
3         System.out.println(System.getProperty("os.name"));
4         System.out.println(System.getProperty("user.name")); // Anna.Ma
    }
}

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
ssh - maxiaoxiang + - - - - -

Hostname    Time    #Users  Load  Averages
ieng6-201   09:30:01  17  0.03, 0.05, 0.10
ieng6-202   09:30:01  10  0.01, 0.02, 0.05
ieng6-203   09:30:01   6  0.02, 0.06, 0.05

Thu Sep 29, 2022 9:31am - Prepping cs15lfa22
[cs15lfa22du@ieng6-201]:~:27$ mkdir .ssh
mkdir: cannot create directory '.ssh': File exists
[cs15lfa22du@ieng6-201]:~:28$ ls
WhereAml.class WhereAml.java hello.txt perl5
[cs15lfa22du@ieng6-201]:~:29$ mkdir .ssh
mkdir: cannot create directory '.ssh': File exists
[cs15lfa22du@ieng6-201]:~:30$ logout
Connection to ieng6.ucsd.edu closed.
maxiaoxiang@MacBook-Pro-7 ~ % scp /Users/maxiaoxiang/.ssh/id_rsa.pub cs15lfa22@ieng6.ucsd.edu:~/.ssh/authorized_keys
(cs15lfa22@ieng6.ucsd.edu) Password:
(cs15lfa22@ieng6.ucsd.edu) Password:
maxiaoxiang@MacBook-Pro-7 ~ % scp /Users/maxiaoxiang/.ssh/id_rsa.pub cs15lfa22du@ieng6.ucsd.edu:~/.ssh/authorized_keys
(cs15lfa22du@ieng6.ucsd.edu) Password:
(cs15lfa22du@ieng6.ucsd.edu) Password:
id_rsa.pub                                100% 585 102.6KB/s 00:00
maxiaoxiang@MacBook-Pro-7 ~ % ssh cs15lfa22du@ieng6.ucsd.edu
Last failed login: Thu Sep 29 09:36:28 PDT 2022 from 69.196.39.7 on ssh:notty
There was 1 failed login attempt since the last successful login.
Last login: Thu Sep 29 09:31:26 2022 from 69.196.39.7
Hello cs15lfa22du, you are currently logged into ieng6-201.ucsd.edu

You are using 0% CPU on this system

Cluster Status
Hostname    Time    #Users  Load  Averages
ieng6-201   09:35:01  18  0.17, 0.08, 0.10
ieng6-202   09:35:01   8  0.01, 0.03, 0.05
ieng6-203   09:35:01   6  0.01, 0.03, 0.05

Thu Sep 29, 2022 9:37am - Prepping cs15lfa22
[cs15lfa22du@ieng6-201]:~:30$
```

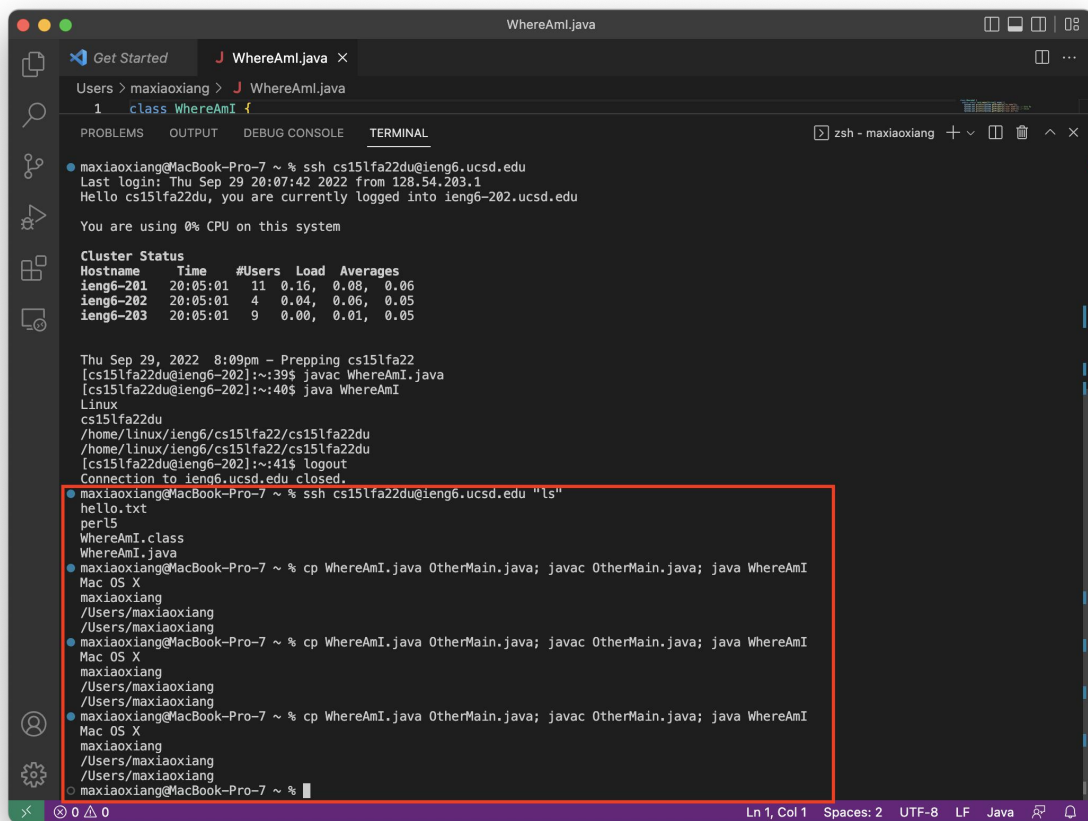
Log out of the remote server and enter:
`ssh-keygen`

Press the Enter key until the interaction as shown in the first screenshot ends, and log in again (see Part 2 for the same operation. Type "`mkdir .ssh`" and log out again. After returning to my device, I run the following command:

`scp /Users/joe/.ssh/id_rsa.pub cs15lfa22@ieng6.ucsd.edu:~/.ssh/authorized_keys`
(need to change username and path)

There is no need to enter a password to log in again (see the content in the red box in the above screenshot), and the SSH Key is set successfully.

● Step 6: Optimizing Remote Running



```
WhereAml.java
Users > maxiaoxiang > J WhereAml.java
1 class WhereAml {

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
zsh - maxiaoxiang

maxiaoxiang@MacBook-Pro-7 ~ % ssh cs15lfa22du@ieng6.ucs.d.edu
Last login: Thu Sep 29 20:07:42 2022 from 128.54.203.1
Hello cs15lfa22du, you are currently logged into ieng6-202.ucs.d.edu

You are using 0% CPU on this system

Cluster Status
Hostname      Time      #Users  Load  Averages
ieng6-201     20:05:01   11    0.16, 0.08, 0.06
ieng6-202     20:05:01    4    0.04, 0.06, 0.05
ieng6-203     20:05:01    9    0.00, 0.01, 0.05

Thu Sep 29, 2022  8:09pm - Prepping cs15lfa22
[cs15lfa22du@ieng6-202]::~39$ javac WhereAml.java
[cs15lfa22du@ieng6-202]::~40$ java WhereAml
Linux
cs15lfa22du
/home/linux/ieng6/cs15lfa22/cs15lfa22du
/home/linux/ieng6/cs15lfa22/cs15lfa22du
[cs15lfa22du@ieng6-202]::~41$ logout
Connection to ieng6.ucs.d.edu closed.

maxiaoxiang@MacBook-Pro-7 ~ % ssh cs15lfa22du@ieng6.ucs.d.edu "ls"
hello.txt
perl5
WhereAml.class
WhereAml.java
maxiaoxiang@MacBook-Pro-7 ~ % cp WhereAml.java OtherMain.java; javac OtherMain.java; java WhereAml
Mac OS X
maxiaoxiang
/Users/maxiaoxiang
maxiaoxiang@MacBook-Pro-7 ~ % cp WhereAml.java OtherMain.java; javac OtherMain.java; java WhereAml
Mac OS X
maxiaoxiang
/Users/maxiaoxiang
maxiaoxiang@MacBook-Pro-7 ~ % cp WhereAml.java OtherMain.java; javac OtherMain.java; java WhereAml
Mac OS X
maxiaoxiang
/Users/maxiaoxiang
maxiaoxiang@MacBook-Pro-7 ~ %
```

Log out of the remote server again and press return, I run the command:

```
ssh cs15lfa22@ieng6.ucs.d.edu "ls"
```

After that, I run multiple commands on the same line in my terminal.

```
cp WhereAml.java OtherMain.java; javac OtherMain.java; java WhereAml
```

I also use the up-arrow on the keyboard to recall the last command. The interaction displayed on the terminal is shown in the screenshot above.

