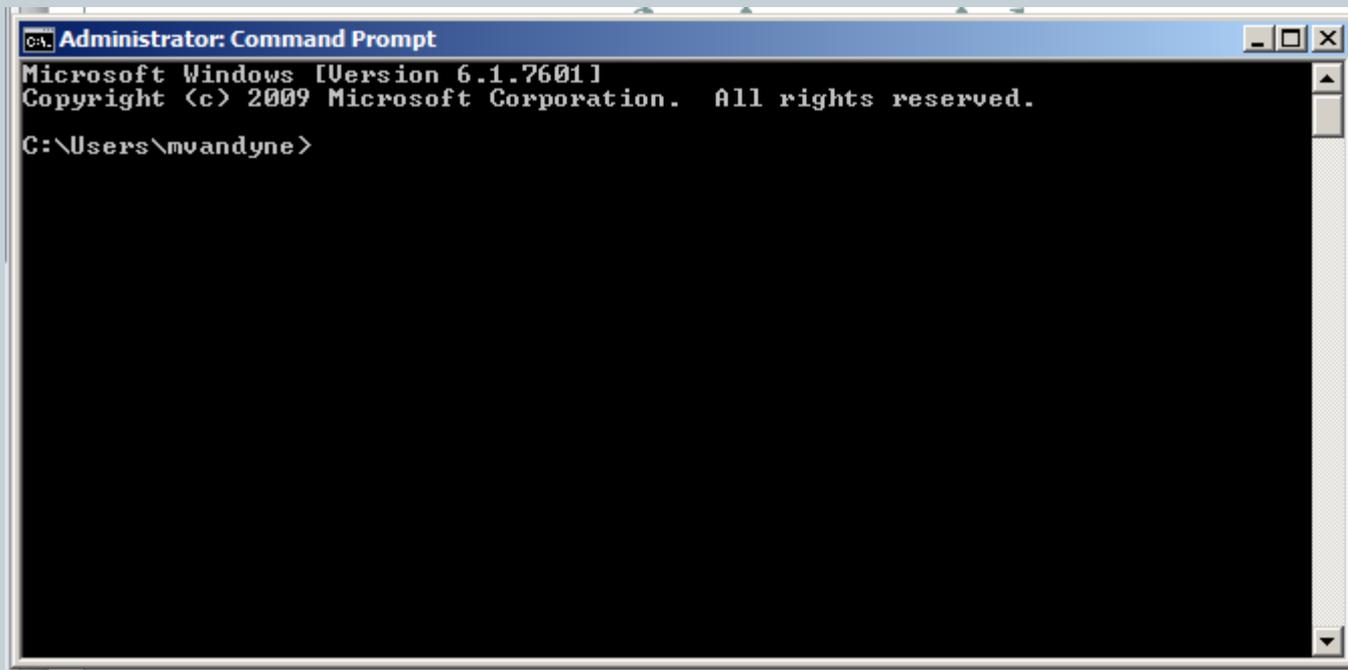


# The Command Shell



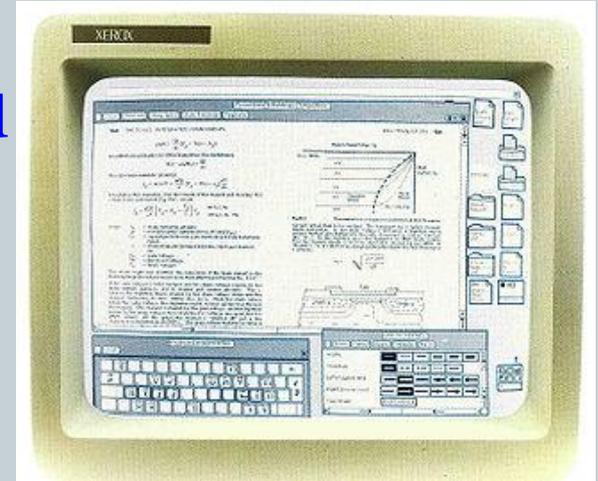
# Outline

---

- Starting the Command Shell
  - Locally
  - Remote Host
- Directory Structure
  - Moving around the directories
- Displaying File Contents
- Compiling and Running a Python Program
- Editing a Text File
- Copying Files between Computers
- File Redirection and Piping
- Command Summary

# Interfacing with your Computer

- **GUI (Graphical User Interfaces)**
  - Today: predominant interaction method
  - Windows, buttons, mouse
  - Advantages
    - ✦ Easier for novices
    - ✦ No commands to remember
    - ✦ Rich input and output capabilities



## Interfacing with your Computer

- **Command Line Interface (CLI)**
  - Originally the only option
  - Input by **typing commands**
  - Advantages:
    - ✦ Can be **faster for experts** than a GUI
    - ✦ Easier to **automate** tasks
    - ✦ Easier to **hook programs together**

```

E~
$ katie
Montana Tech of the University of Montana
Department of Computer Science

Linux katie 2.6.32-5-xen-amd64 #1 SMP Tue Jun 14 12:46:30 UTC 2011
nux

The programs included with the Debian GNU/Linux system are free s
the exact distribution terms for each program are described in th
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the exten
permitted by applicable law.

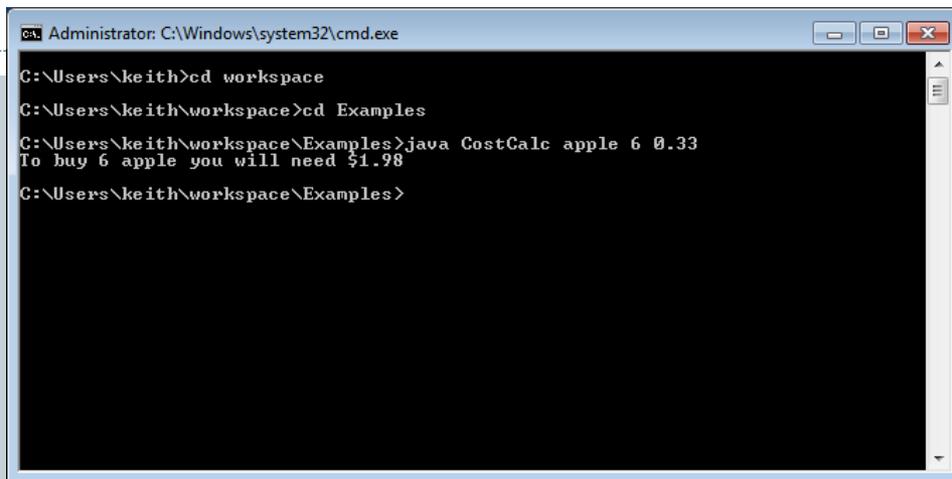
Files that were previously on katie (before this summer) are loca
one/katie/students/username.
To move them back use - "scp -r username@oovyn:/home/katie/studen
HOME"

It appears group permissions have taken a vacation. I'll try to g
s weekend. -Tom
Last login: Sat Aug 27 00:07:34 2011 from 184.166.116.54
vertanen@katie:~$ cd /home/classes/csci135/
vertanen@katie:/home/classes/csci135$
vertanen@katie:/home/classes/csci135$ ls
StdAudio.java      exams.php          slides
StdDraw.java       footer.php         style.css
StdIn.java          header.php         sync.bat
assign              index.php          sync_php.bat
assignments.php     resources.php      sync_slides.bat
cs111_prefs.epf    resources.php.bak
examples            schedule.php
vertanen@katie:/home/classes/csci135$
  
```

```

ca. Administrator: C:\Windows\system32\cmd.exe
C:\Users\keith>cd workspace
C:\Users\keith\workspace>cd Examples
C:\Users\keith\workspace\Examples>java CostCalc apple 6 0.33
To buy 6 apple you will need $1.98
C:\Users\keith\workspace\Examples>
  
```

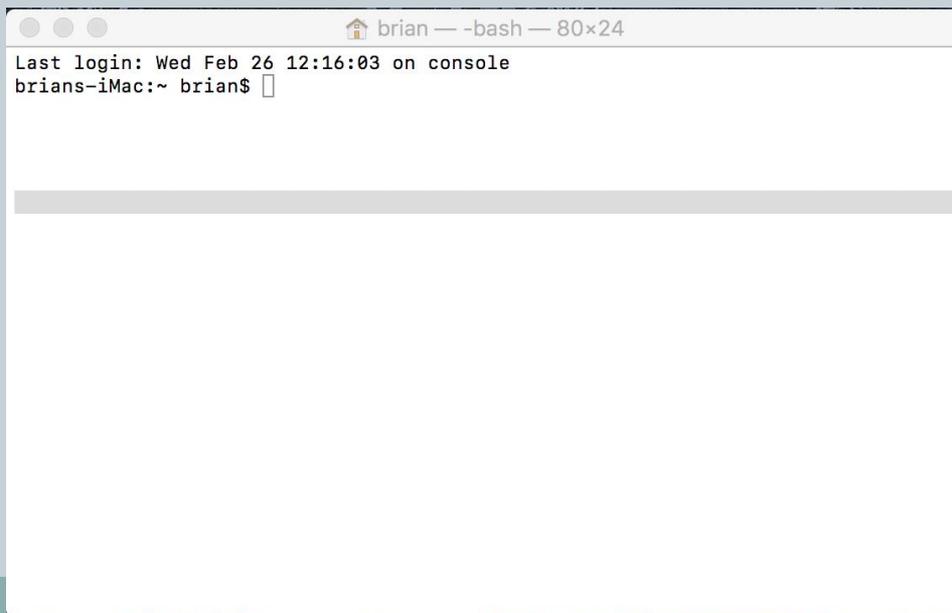
## Starting a (Local) Command Shell



```
Administrator: C:\Windows\system32\cmd.exe
C:\Users\keith>cd workspace
C:\Users\keith\workspace>cd Examples
C:\Users\keith\workspace\Examples>java CostCalc apple 6 0.33
To buy 6 apple you will need $1.98
C:\Users\keith\workspace\Examples>
```

### Windows 10

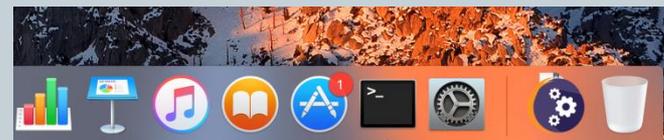
*Command Window → type "cmd"*



```
brian — -bash — 80x24
Last login: Wed Feb 26 12:16:03 on console
brians-iMac:~ brian$
```

### MacOS/Linux

*Toolbar – Select terminal icon*

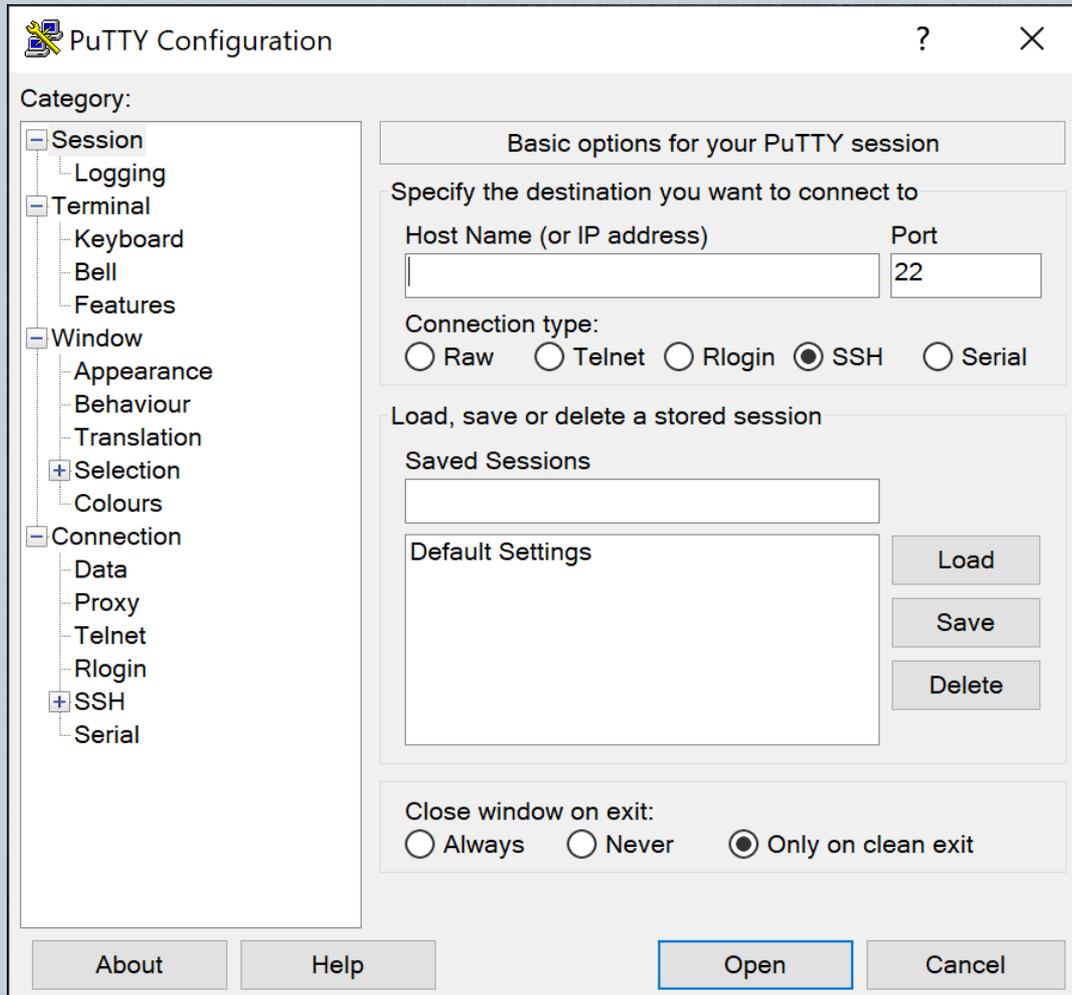


# Starting a (Remote) Command Window to Linux: putty

- Use `putty.exe`
  - It may already be installed on your computer
    - ✦ Look for the putty icon on the desktop
      - Looks like two computers with yellow lightning bolt between them
  - If it's not on your desktop
    - ✦ Download both putty and winscp from the class website
  - Double click on putty
    - ✦ Enter `lumen.cs.mtech.edu` for the Host Name
    - ✦ Click Open button
    - ✦ Enter login name (first initial last name, all lowercase)
    - ✦ Enter password: `CHANGE_ME`
      - Nothing will show on the screen as you type your password



# Starting a (Remote) Command Window to Linux: putty

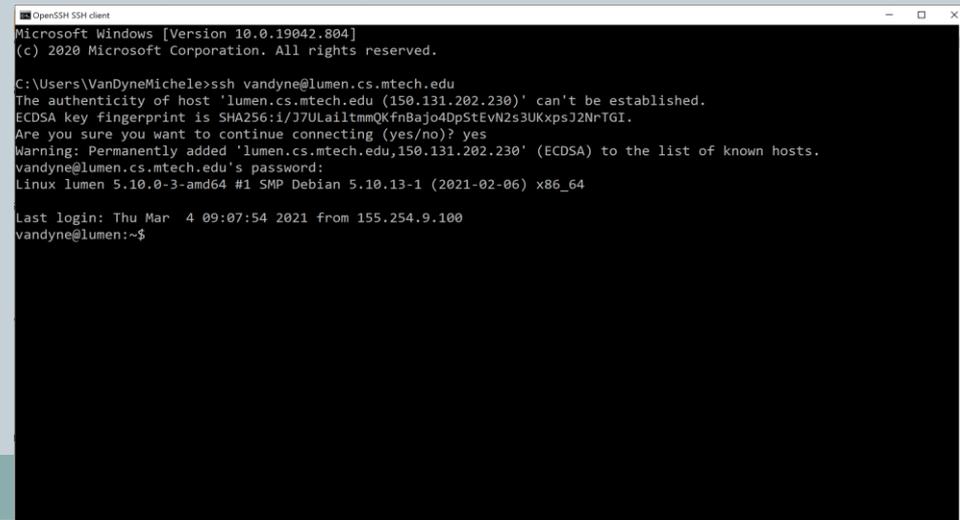


# Starting a (Remote) Command Window to Linux: putty



# Starting a (Remote) Command Window to Linux: ssh

- In the Command Window:
  - Type:
    - ✦ ssh <your login name>@lumen.cs.mtech.edu
      - Your login name is: first initial last name, all lowercase
    - ✦ Type “y” when asked if you want to continue connecting (this will change soon, once certificates are finalized)
    - ✦ Enter password: CHANGE\_ME
      - Nothing will show on the screen as you type your password



```
OpenSSH SSH client
Microsoft Windows [Version 10.0.19042.804]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\VandyneMichele>ssh vandyne@lumen.cs.mtech.edu
The authenticity of host 'lumen.cs.mtech.edu (150.131.202.230)' can't be established.
ECDSA key fingerprint is SHA256:1/77ULa1ltmmQKfnBajo4DpStEvN2s3UKxpsJ2NrTGI.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'lumen.cs.mtech.edu,150.131.202.230' (ECDSA) to the list of known hosts.
vandyne@lumen.cs.mtech.edu's password:
Linux lumen 5.10.0-3-amd64 #1 SMP Debian 5.10.13-1 (2021-02-06) x86_64

Last login: Thu Mar  4 09:07:54 2021 from 155.254.9.100
vandyne@lumen:~$
```

# Change Your Password!

- At the screen prompt, type:
  - passwd
  - And then press enter
- It will ask you for your current password
  - Enter CHANGE\_ME
- It will ask for new password
  - Enter your new password
  - Enter it again to verify
- Remember this password!
  - You will need it to log in every time now
- On all of these password entries, nothing will show on the screen as you type

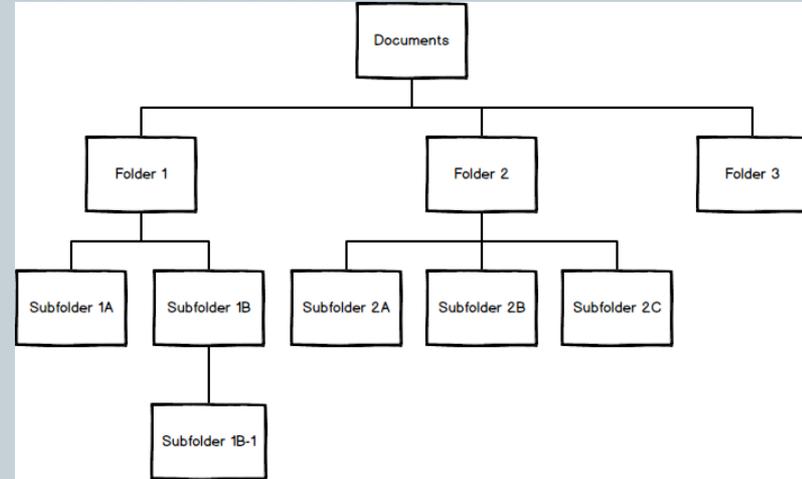
# Directory Structure

- “Folders”/Directories organized in a tree structure

- Root is at the top, branches below
- Files are stored in folders/directories
- On Windows, different devices have different letters
  - ✦ Primary hard drive is C:
  - ✦ Flash drives are usually E: onward

- Navigating the tree

- To change to a directory:
  - ✦ Windows: `cd C:\Documents\Folder 1\Subfolder 1A`
  - ✦ Linux: `cd “root/Documents/Folder 1/Subfolder 1B”`
  - ✦ Up one directory level: `cd ..`
  - ✦ The current directory: `.`
  - ✦ Where am I?
    - Linux: `pwd`
    - Windows: usually shown in the “prompt”



## Getting Around in the Command Shell

```

Administrator: Command Prompt
F:\CSCI135\Fall 2015\Workspace\03-CommandWindow>dir
Volume in drive F is Lexar
Volume Serial Number is 4FF2-8A1B

Directory of F:\CSCI135\Fall 2015\Workspace\03-CommandWindow

10/06/2016  11:43 AM    <DIR>          .
10/06/2016  11:43 AM    <DIR>          ..
10/06/2016  11:43 AM                392 .project
10/06/2016  11:43 AM    <DIR>          .settings
10/06/2016  11:43 AM                295 .classpath
10/06/2016  11:47 AM                558 AvgNums.java
10/06/2016  11:43 AM                365 RandomNums.java
           4 File(s)                1,610 bytes
           3 Dir(s)  23,167,860,736 bytes free

F:\CSCI135\Fall 2015\Workspace\03-CommandWindow>
    
```

```

katie.mtech.edu - PuTTY
ceskridge      helloworld      ksteinmetz      qstormer        twinsor
cfiechtner     hknights       lbblankenship   rbriese         vefoley
chand          hmuth           ljschuler       rcolling        vfoley
chansen        ht              lmullaney       rcunningham     wbrhyne
ckerins        janderson       lstout          rgratwohl       wcflynn
cladouceur     jbbaldwin      lswarner        rjmoon          wgildehaus
cmcclore       jbanderson     malnahwi        rkinsella       zbrown
cmlacey        jbeaudry       malobayshi      rmccarty        zburke
cmschahczenski jcwareham      maustin         rpmitchell      zsmith
coneill        jdickson       mblotz          sbdeavours      zvalenzuela

vandyne@katie:~/students$ cd $HOME
vandyne@katie:~$ ls
cars          CSCI460          Nostradamus.java  results.txt      zebra2.pl
cars.pl       gen_encrypt      Pennell           Stapley          zebra3
CSCI136       Morasco         Predictor.class   temp_gen         zebra3.pl
CSCI446       Nostradamus.class Predictor.java     zebra           zebra.pl

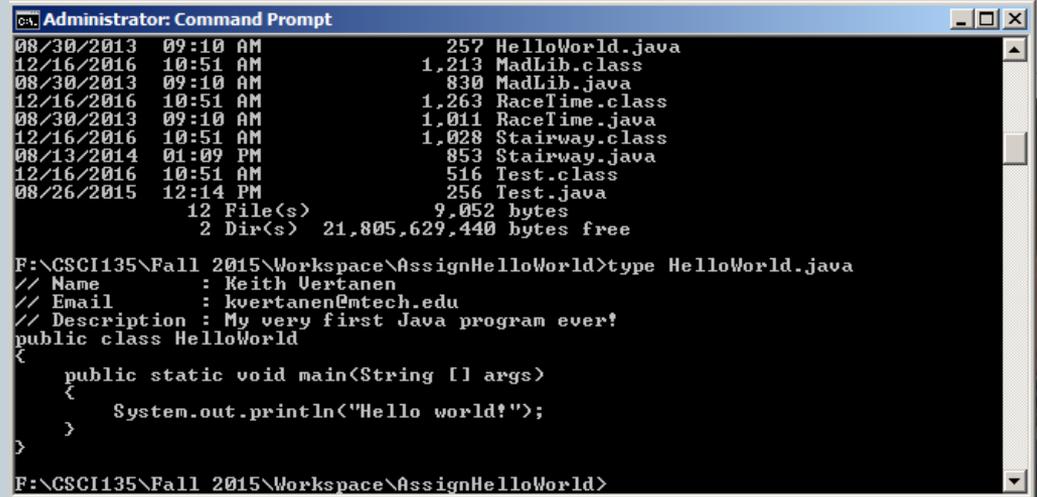
vandyne@katie:~$ cd CSCI136
vandyne@katie:~/CSCI136$ ls
Dir with spaces  Lines.class      Lines.java        StdDraw.java
Line.class       LineServer.class MarsLander        StdIn.class
LineClient.class LineServer.java  Scratch.class     StdIn.java
LineClient.java  LineServerWorker.class Scratch.java
Line.java        LineServerWorker.java StdDraw.class

vandyne@katie:~/CSCI136$
    
```

Looking at the contents of a folder  
 Windows: **dir**  
 Linux: **ls**

# Displaying the Contents of Text File

- Windows:
  - type HelloWorld.py

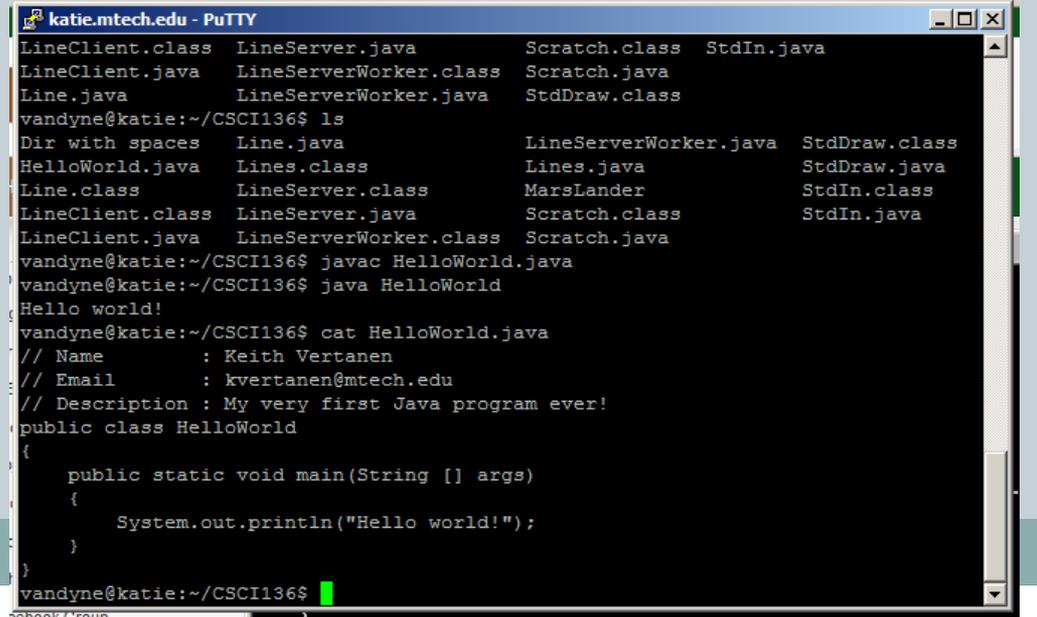


```
Administrator: Command Prompt
08/30/2013 09:10 AM          257 HelloWorld.java
12/16/2016 10:51 AM        1,213 MadLib.class
08/30/2013 09:10 AM          830 MadLib.java
12/16/2016 10:51 AM        1,263 RaceTime.class
08/30/2013 09:10 AM          1,011 RaceTime.java
12/16/2016 10:51 AM        1,028 Stairway.class
08/13/2014 01:09 PM          853 Stairway.java
12/16/2016 10:51 AM          516 Test.class
08/26/2015 12:14 PM          256 Test.java
                12 File(s)          9,052 bytes
                2 Dir(s)  21,805,629,440 bytes free

F:\CSCI135\Fall 2015\Workspace\AssignHelloWorld>type HelloWorld.java
// Name      : Keith Vertanen
// Email     : kvertanen@mttech.edu
// Description : My very first Java program ever!
public class HelloWorld
{
    public static void main(String [] args)
    {
        System.out.println("Hello world!");
    }
}

F:\CSCI135\Fall 2015\Workspace\AssignHelloWorld>
```

- Linux:
  - cat HelloWorld.py



```
katie.mtech.edu - PuTTY
LineClient.class  LineServer.java      Scratch.class  StdIn.java
LineClient.java  LineServerWorker.class Scratch.java
Line.java         LineServerWorker.java StdDraw.class
vandyne@katie:~/CSCI136$ ls
Dir with spaces  Line.java             LineServerWorker.java StdDraw.class
HelloWorld.java Lines.class           Lines.java          StdDraw.java
Line.class       LineServer.class      MarsLander          StdIn.class
LineClient.class LineServer.java       Scratch.class       StdIn.java
LineClient.java LineServerWorker.class Scratch.java
vandyne@katie:~/CSCI136$ javac HelloWorld.java
vandyne@katie:~/CSCI136$ java HelloWorld
Hello world!
vandyne@katie:~/CSCI136$ cat HelloWorld.java
// Name      : Keith Vertanen
// Email     : kvertanen@mttech.edu
// Description : My very first Java program ever!
public class HelloWorld
{
    public static void main(String [] args)
    {
        System.out.println("Hello world!");
    }
}
vandyne@katie:~/CSCI136$
```

# Running a Python Program

---

- Windows or Linux:
  - **python3** Hello.py
- If things go wrong with compilation, you will get a list of compiler errors and associated line numbers
  - Not always where the error is, but will give you some clues
- If things go wrong at runtime, you will get a runtime error and the name of the exception that was thrown
  - Again, will give you some clues
- If it all runs correctly, you'll get the program results and a prompt

# Editing a Python Program

- Use any text editor
  - In Linux, vim
    - ✦ `vim HelloWorld.py`
    - ✦ Opens up an editor so you can change the code (or create a file)
    - ✦ Reference for vim commands:
      - <http://www.cmrr.umn.edu/~strupp/vim-3.0.refcard.html>
    - ✦ To save and exit your file, type ZZ
      - Yep, two capital z's
  - In Windows, any text editor
    - ✦ Notepad, Wordpad, Idle Editor, Eclipse, etc.
      - Just be careful – some editors try to help you by giving the file a .txt extension when you save it – you should have a .py extension
  - May be easier to edit on Windows and move files back and forth

# Copying a File to Another Computer: scp

- In the Command Window:
- To move a file from local to remote:
  - `scp <filename> <login name>@lumen.cs.mtech.edu:<path>`
- To move a file from remote to local:
  - `scp <login name>@lumen.cs.mtech.edu:<path/file> .`



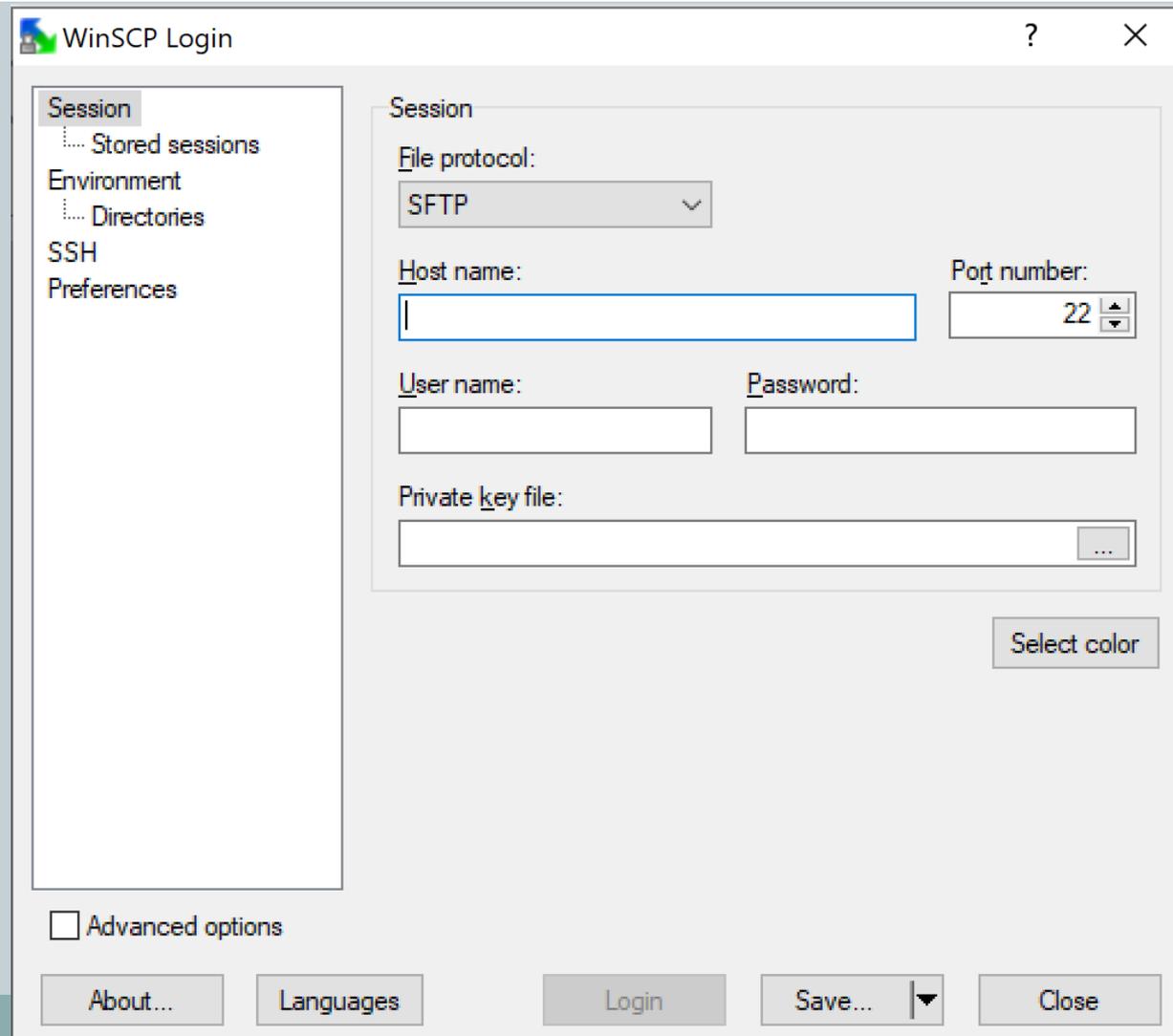
```
Command Prompt
C:\Users\VanDyneMichele\Downloads>scp Tour.py vandyne@lumen.cs.mtech.edu:public_html
```

# Copying a File to Another Computer: winscp

- Double click on winscp (you should have already downloaded it from the class website, or already have it on your computer)
- Enter lumen.cs.mtech.edu for the host name
- Enter your user name in the User name box
- Enter your password in the Password box
- Hit Enter or click the Login button

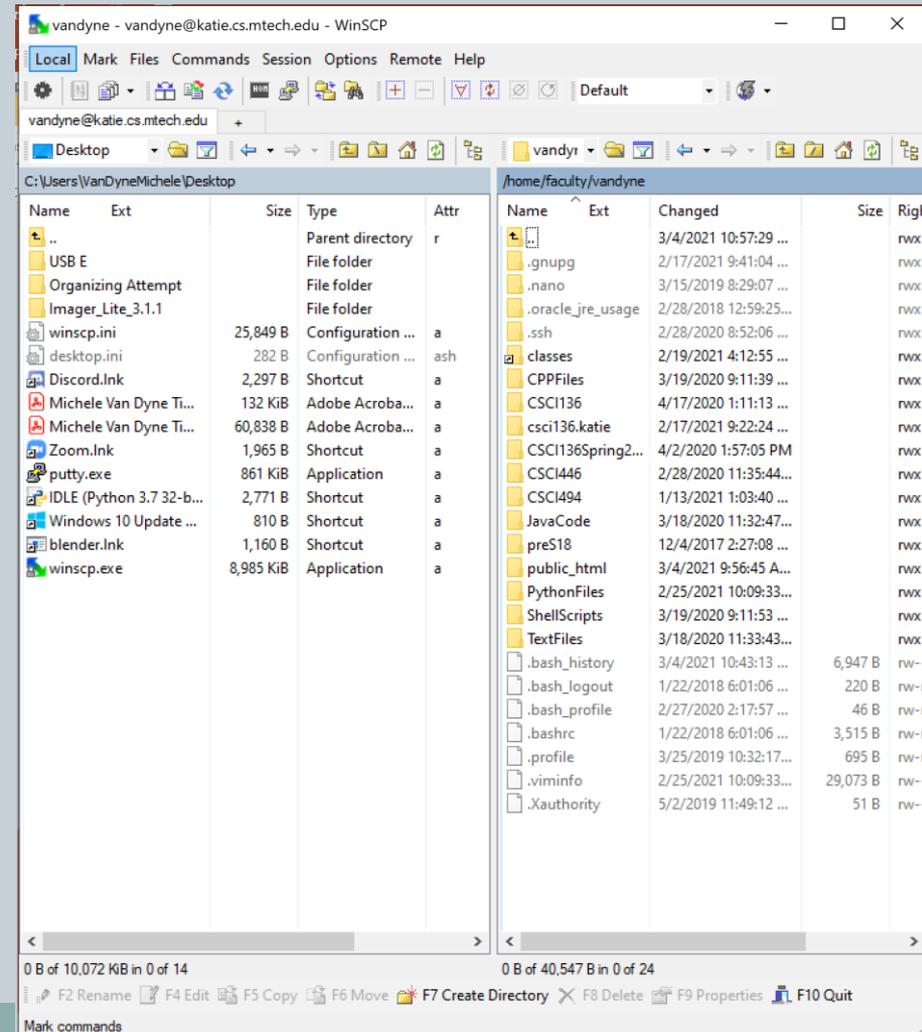


# Copying a File to Another Computer: winscp

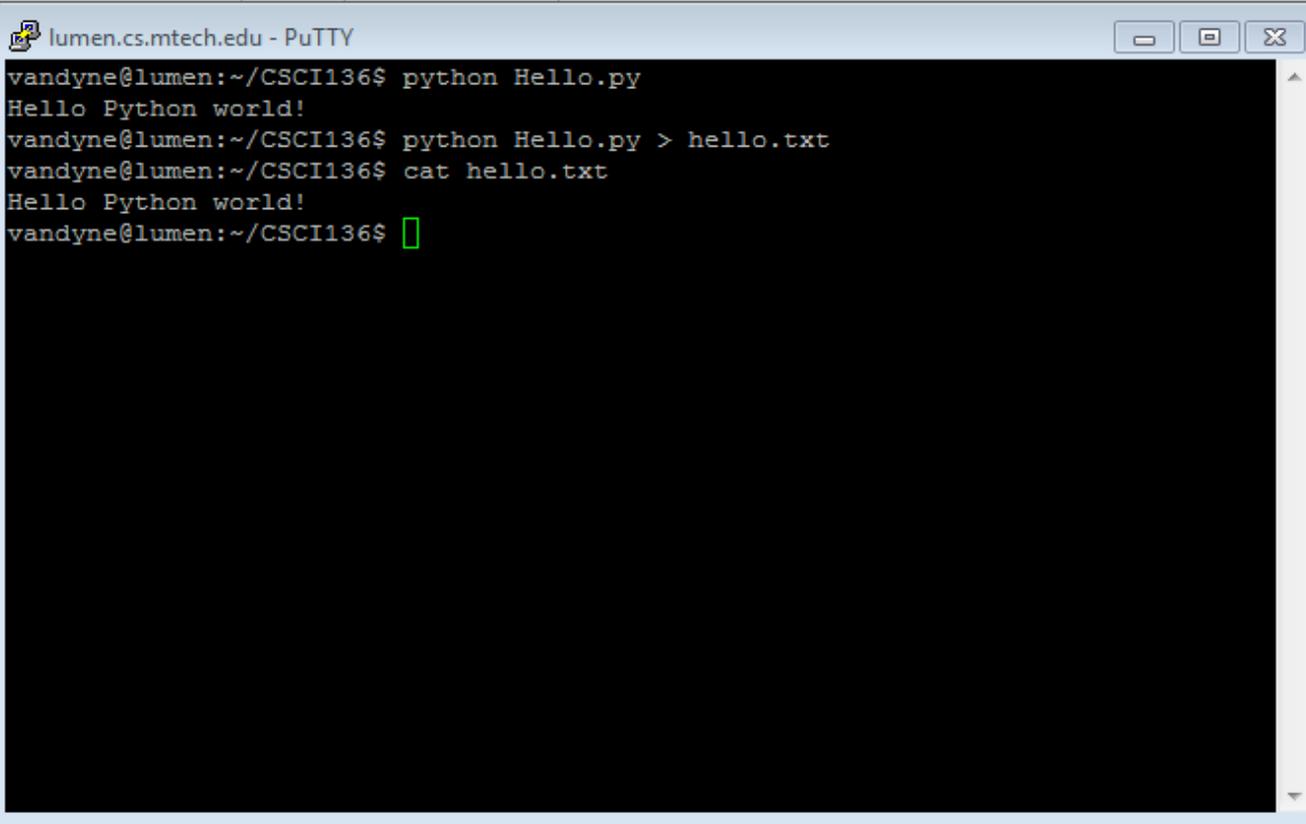


# Copying a File to Another Computer: winscp (continued)

- You will see two panes in a window
  - The left side is your local computer
  - The right side is the computer you just logged in to (remote)
  - Can drag and drop files between the two sides
  - Or you can drag files from and to File Manager on your local computer



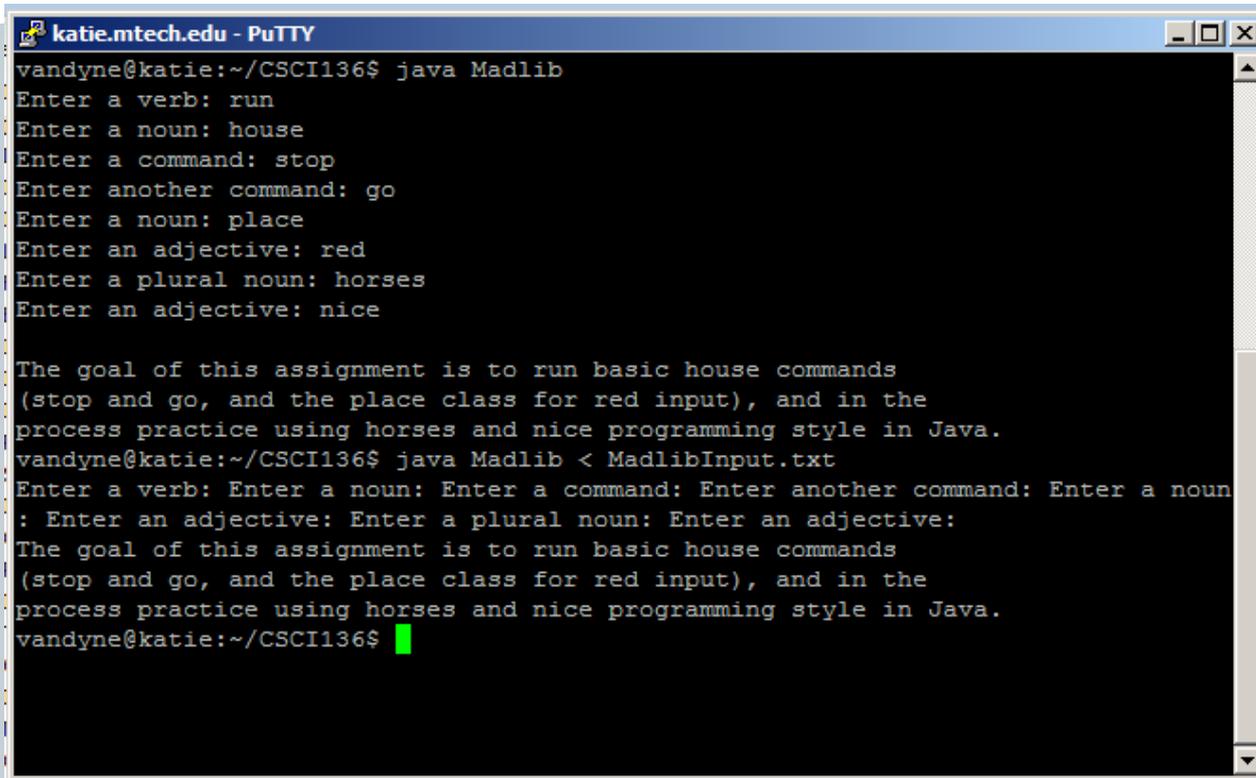
# Redirection

A screenshot of a PuTTY terminal window titled "lumen.cs.mtech.edu - PuTTY". The terminal shows a sequence of commands and their outputs. The first command is "python Hello.py", which outputs "Hello Python world!". The second command is "python Hello.py > hello.txt", which does not produce any visible output. The third command is "cat hello.txt", which outputs "Hello Python world!". The prompt "vandyne@lumen:~/CSCI136\$" is visible at the end of each line, and a green cursor is shown at the end of the last line.

```
vandyne@lumen:~/CSCI136$ python Hello.py
Hello Python world!
vandyne@lumen:~/CSCI136$ python Hello.py > hello.txt
vandyne@lumen:~/CSCI136$ cat hello.txt
Hello Python world!
vandyne@lumen:~/CSCI136$ █
```

Redirecting program **output to a file** using **>** followed by the output filename.

# Redirection



```
katie.mtech.edu - PuTTY
vandyne@katie:~/CSCI136$ java Madlib
Enter a verb: run
Enter a noun: house
Enter a command: stop
Enter another command: go
Enter a noun: place
Enter an adjective: red
Enter a plural noun: horses
Enter an adjective: nice

The goal of this assignment is to run basic house commands
(stop and go, and the place class for red input), and in the
process practice using horses and nice programming style in Java.
vandyne@katie:~/CSCI136$ java Madlib < MadlibInput.txt
Enter a verb: Enter a noun: Enter a command: Enter another command: Enter a noun:
: Enter an adjective: Enter a plural noun: Enter an adjective:
The goal of this assignment is to run basic house commands
(stop and go, and the place class for red input), and in the
process practice using horses and nice programming style in Java.
vandyne@katie:~/CSCI136$
```

Reading input from **file** using **<** followed by the filename.

# Piping



```
katie.mtech.edu - PuTTY
vandyne@katie:~/CSCI136$ java Madlib < MadlibInput.txt
Enter a verb: Enter a noun: Enter a command: Enter another command: Enter a noun
: Enter an adjective: Enter a plural noun: Enter an adjective:
The goal of this assignment is to run basic house commands
(stop and go, and the place class for red input), and in the
process practice using horses and nice programming style in Java.
vandyne@katie:~/CSCI136$ java Madlib < MadlibInput.txt | java GerundFinder2
programming
vandyne@katie:~/CSCI136$
```

Using the output of  
one program as the  
input to another

Use the | operator

# Summary of Helpful Commands

Action	Windows	Mac OS / Unix / Linux
Move into a folder	<code>cd myfolder</code>	<code>cd myfolder</code>
Move into parent folder	<code>cd ..</code>	<code>cd ..</code>
Move into a folder, absolute folder	<code>cd \Users\keith</code>	<code>cd /Users/keith</code>
Where am I?	(shown in prompt)	<code>pwd</code>
List files in current folder	<code>dir</code>	<code>ls</code>
Run a Python program	<code>python Prog.py</code>	<code>python3 Prog.py</code>
See what is in a text file	<code>type Prog.py</code>	<code>cat Prog.py</code>
Auto-complete filenames	<tab key>	<tab key>
Previous command	<up arrow>	<up arrow>
<b>Exiting the shell</b>	<b>exit or click x</b>	<b>logout or exit or &lt;CTRL&gt;D</b>

# Summary

- **Starting the Command Shell**
  - Locally
  - Remote Host
- **Directory Structure**
  - Moving around the directories
- **Displaying File Contents**
- **Compiling and Running a Java Program**
- **Editing a Text File**
- **Copying Files between Computers**
- **File Redirection and Piping**
- **Command Summary**

