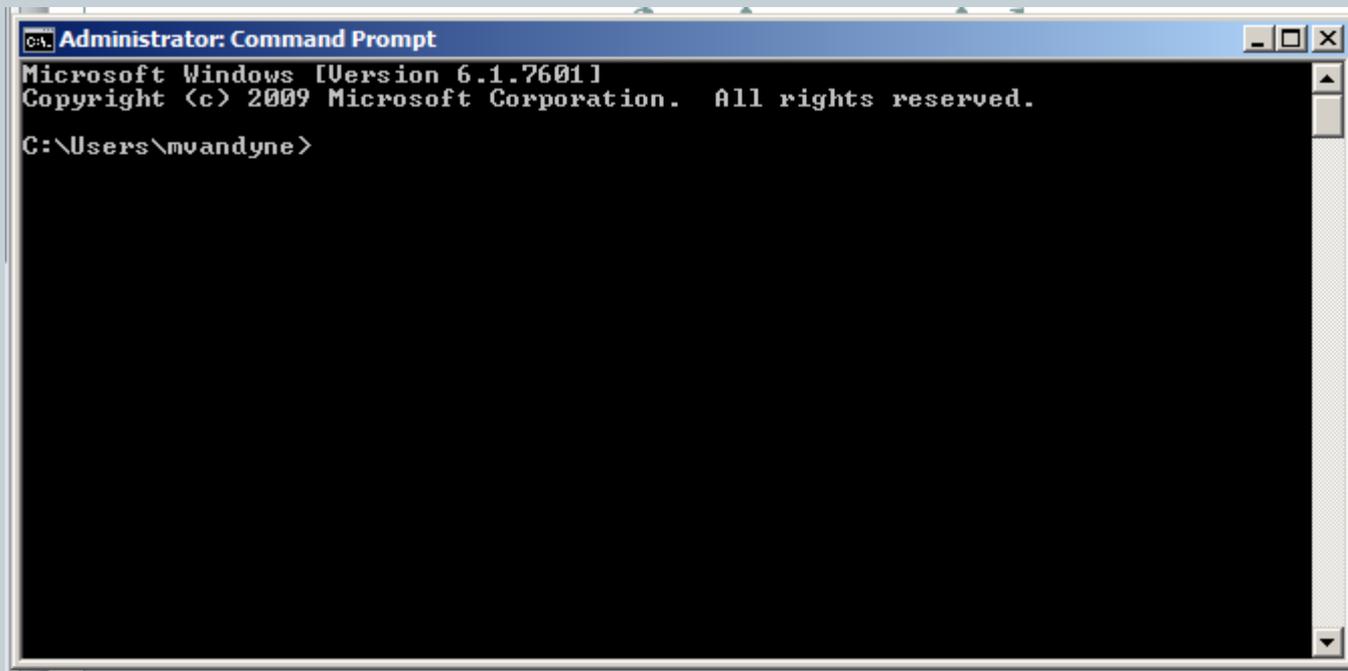


# The Command Shell



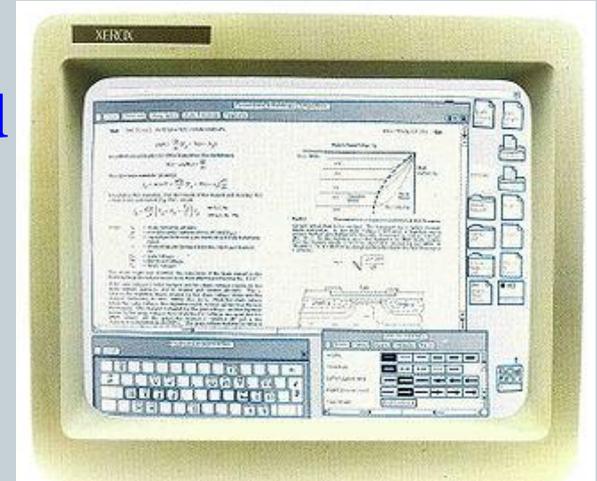
# Outline

---

- 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

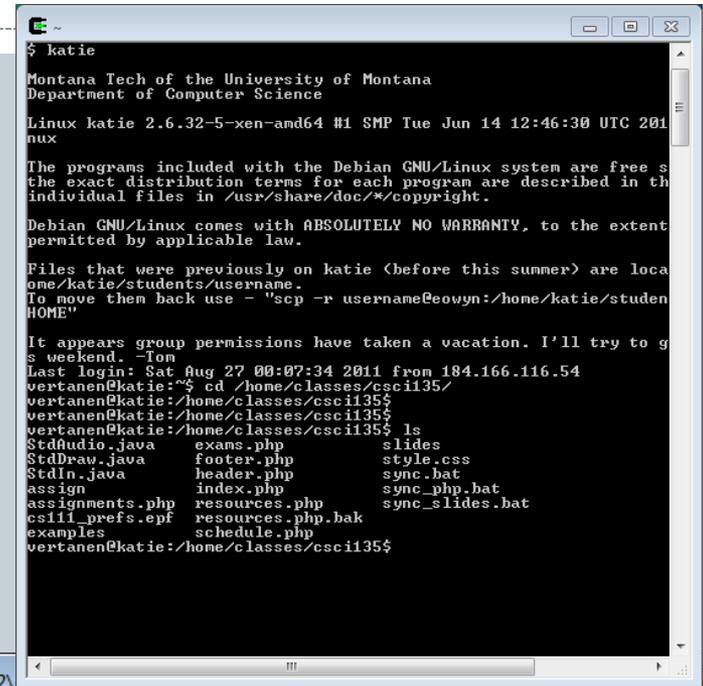
# Interfacing with your Computer

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

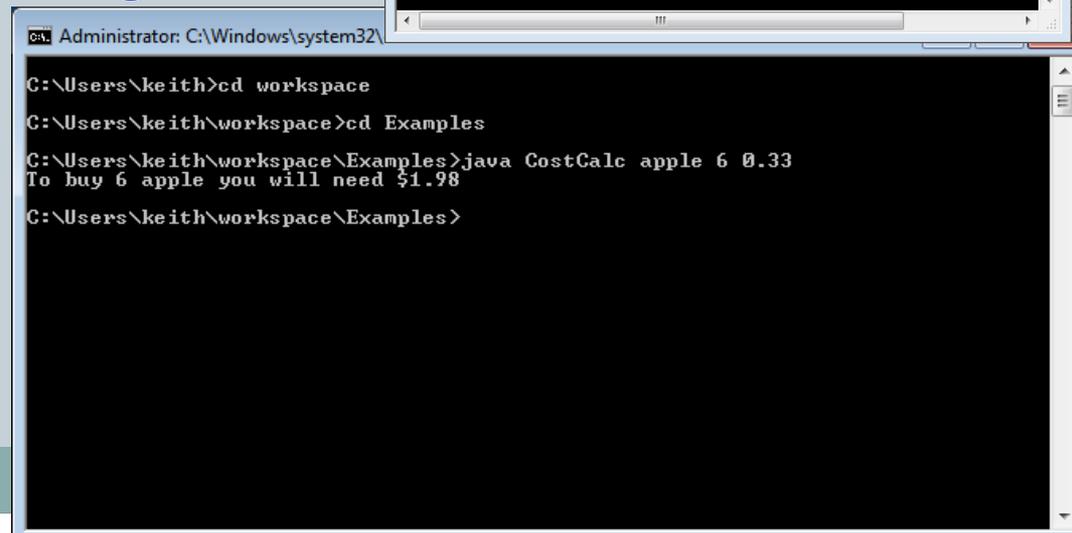


## Interfacing with your Computer

- **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 software; the  
exact distribution terms for each program are described in the individual files in  
/usr/share/doc/*/copyright.  
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent permitted  
by applicable law.  
Files that were previously on katie (before this summer) are located at  
/home/katie/students/username.  
To move them back use - "scp -r username@oovyn:/home/katie/students/username  
HOME"  
It appears group permissions have taken a vacation. I'll try to get them back  
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$
```



```
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 Command Shell

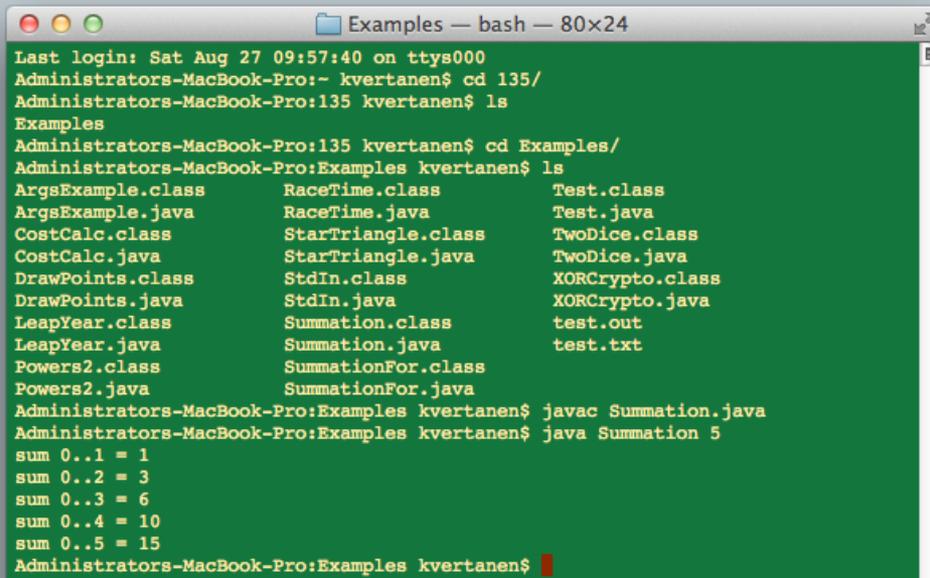


```
Administrator: C:\Windows\system32\cmd.exe
C:\Users\keith>cd workspace
C:\Users\keith\workspace>cd Examples
C:\Users\keith\workspace\Examples>java CostCalc apple 6 0.33
To buy 6 apple you will need $1.98
C:\Users\keith\workspace\Examples>
```

### Windows 7

Start → type "cmd"

All Programs → Accessories →  
Command Prompt



```
Examples — bash — 80x24
Last login: Sat Aug 27 09:57:40 on ttys000
Administrators-MacBook-Pro:~ kvertanen$ cd /
Administrators-MacBook-Pro:~ kvertanen$ ls
Examples
Administrators-MacBook-Pro:~ kvertanen$ cd Examples/
Administrators-MacBook-Pro:Examples kvertanen$ ls
ArgsExample.class      RaceTime.class        Test.class
ArgsExample.java       RaceTime.java         Test.java
CostCalc.class         StarTriangle.class    TwoDice.class
CostCalc.java          StarTriangle.java     TwoDice.java
DrawPoints.class       StdIn.class           XORCrypto.class
DrawPoints.java        StdIn.java            XORCrypto.java
LeapYear.class         Summation.class       test.out
LeapYear.java          Summation.java        test.txt
Powers2.class          SummationFor.class
Powers2.java           SummationFor.java
Administrators-MacBook-Pro:Examples kvertanen$ javac Summation.java
Administrators-MacBook-Pro:Examples kvertanen$ java Summation 5
sum 0..1 = 1
sum 0..2 = 3
sum 0..3 = 6
sum 0..4 = 10
sum 0..5 = 15
Administrators-MacBook-Pro:Examples kvertanen$
```

### Mac

Spotlight → type "terminal"

Go → Applications → Utilities  
→ Terminal

# Starting a Command Window in Linux: putty

- Use putty.exe
  - cs.mtech.edu then go to the Students tab, select Software
  - Download both putty and winscp
  - Double click on putty
    - ✦ Enter katie.mtech.edu for the Host Name (or you can use an IP)
    - ✦ Click Open button
    - ✦ Enter login name (first initial last name, all lowercase)
      - Except Keith – yours is bocian
    - ✦ Enter password: goldreagana2rcher
      - Except Taylor and Chris – you already have accounts and passwords
    - ✦ You will need to change this immediately – remember what you changed it to.

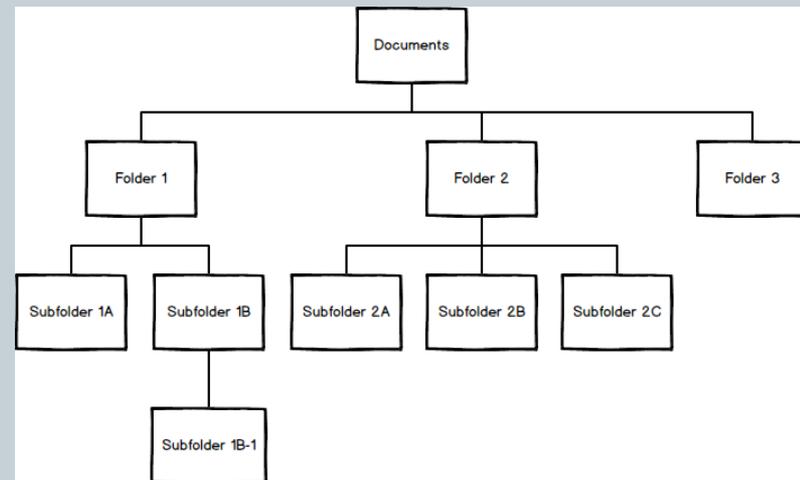
# Directory Structure

- “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>
    
```

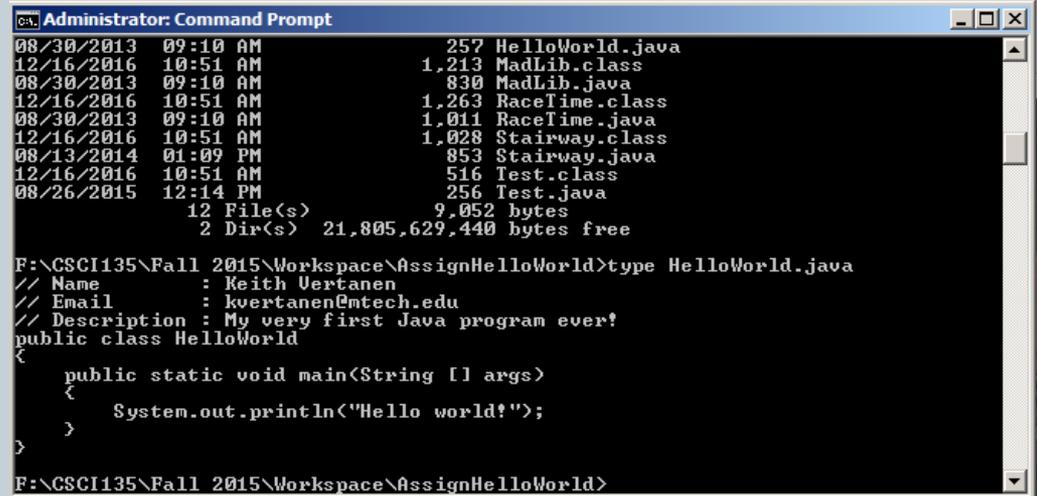
```

katie.mtech.edu - PuTTY
ceskridge      helloworld      ksteinmetz      qstormer        twinsor
cfiechtner     hknight        lbblankenship   rbriese         vefoley
chand          hmuth          ljschuler       rcolling        vfoley
chansen        htu            lmullaney       rcunningham     wbrhyn
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:~/home/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.java

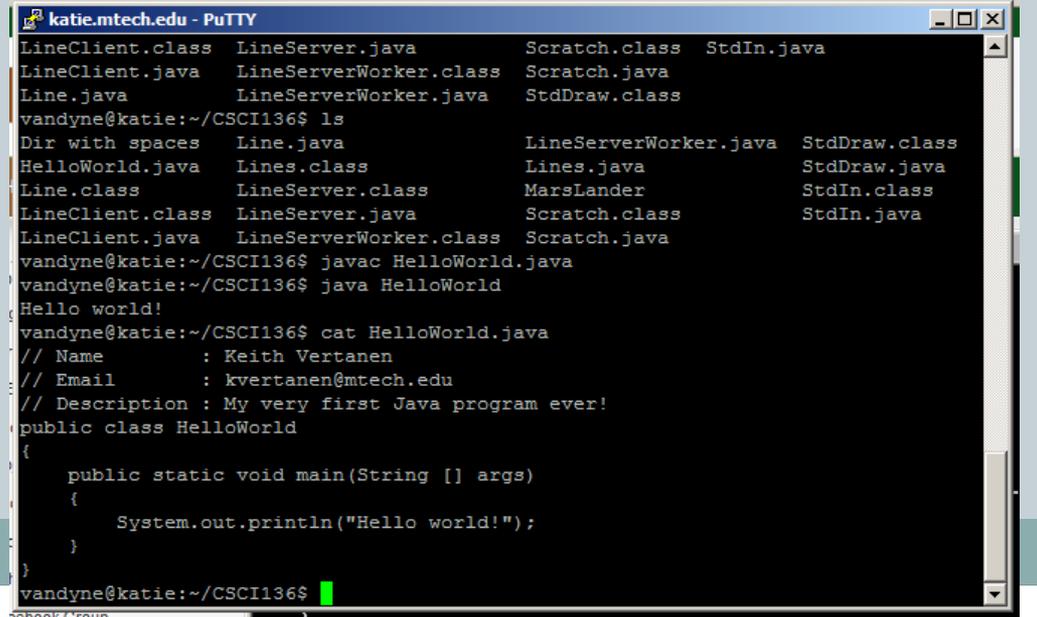


```
Administrator: Command Prompt
08/30/2013 09:10 AM          257 HelloWorld.java
12/16/2016 10:51 AM        1,213 MadLib.class
08/30/2013 09:10 AM          830 MadLib.java
12/16/2016 10:51 AM        1,263 RaceTime.class
08/30/2013 09:10 AM          1,011 RaceTime.java
12/16/2016 10:51 AM        1,028 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.java



```
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$
```

# Compiling a Java Program

- Windows or Linux:
  - `javac HelloWorld.java`
- If it all compiles correctly, you'll get back a prompt
  - The file `HelloWorld.class` is generated
- If things go wrong, you will get a list of compiler errors and associated line numbers
  - Not always where the error is, but will give you some clues – just like in Eclipse
- What if you want to compile multiple files?
  - `javac *.java`

# Running a Java Program

- Windows or Linux:
  - `java HelloWorld`
    - ✦ Note: you don't need to type the `.class` extension
- If it all runs correctly, you'll get the program results and a prompt
- If things go wrong, you will get a runtime error and the name of the exception that was thrown
  - Again, will give you some clues – just like in Eclipse
- You should run the file that contains the main method that you want – the JVM will find the rest of the files it needs

# Editing a Java Program

- Use any text editor
  - In Linux, vim
    - ✦ `vim HelloWorld.java`
    - ✦ 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>
  - In Windows, any text editor
    - ✦ Notepad, Wordpad, Eclipse, etc.
      - Just be careful – some editors try to help you by giving the file a .txt extension when you save it – you need a .java extension in order to compile it

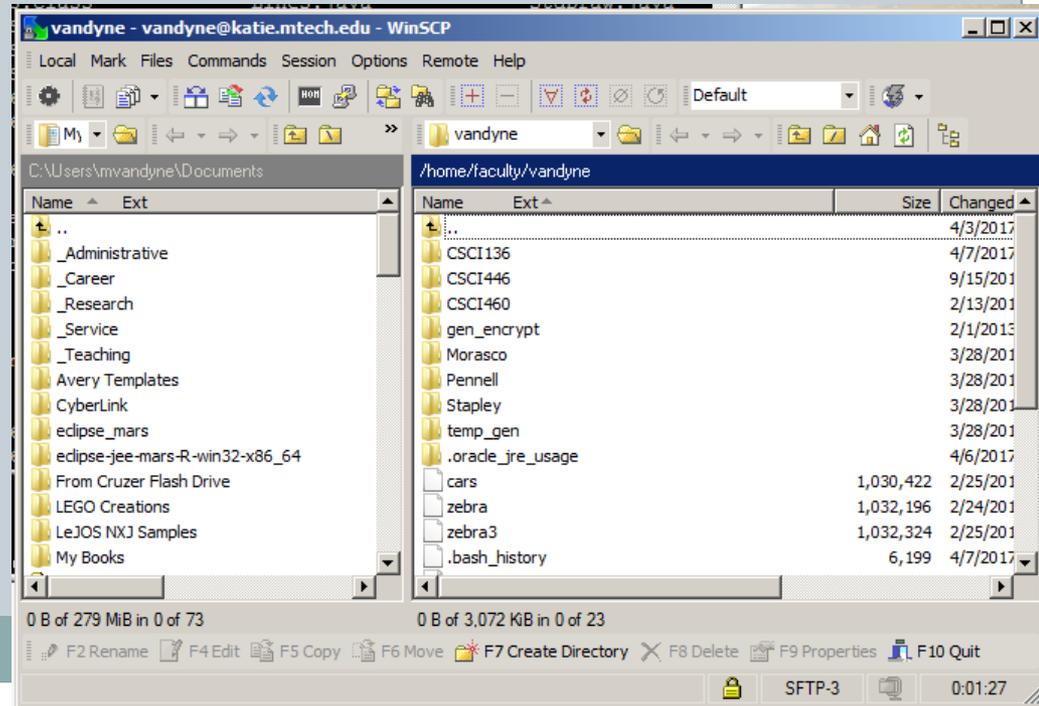
# Copying a File to Another Computer: winscp

---

- Double click on winscp (you should have already downloaded it from the [cs.mtech.edu](http://cs.mtech.edu) website)
- Click the Run button
- Enter `katie.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 (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
  - Can drag and drop files between the two sides
  - Or you can drag files from and to File Manager on your local computer



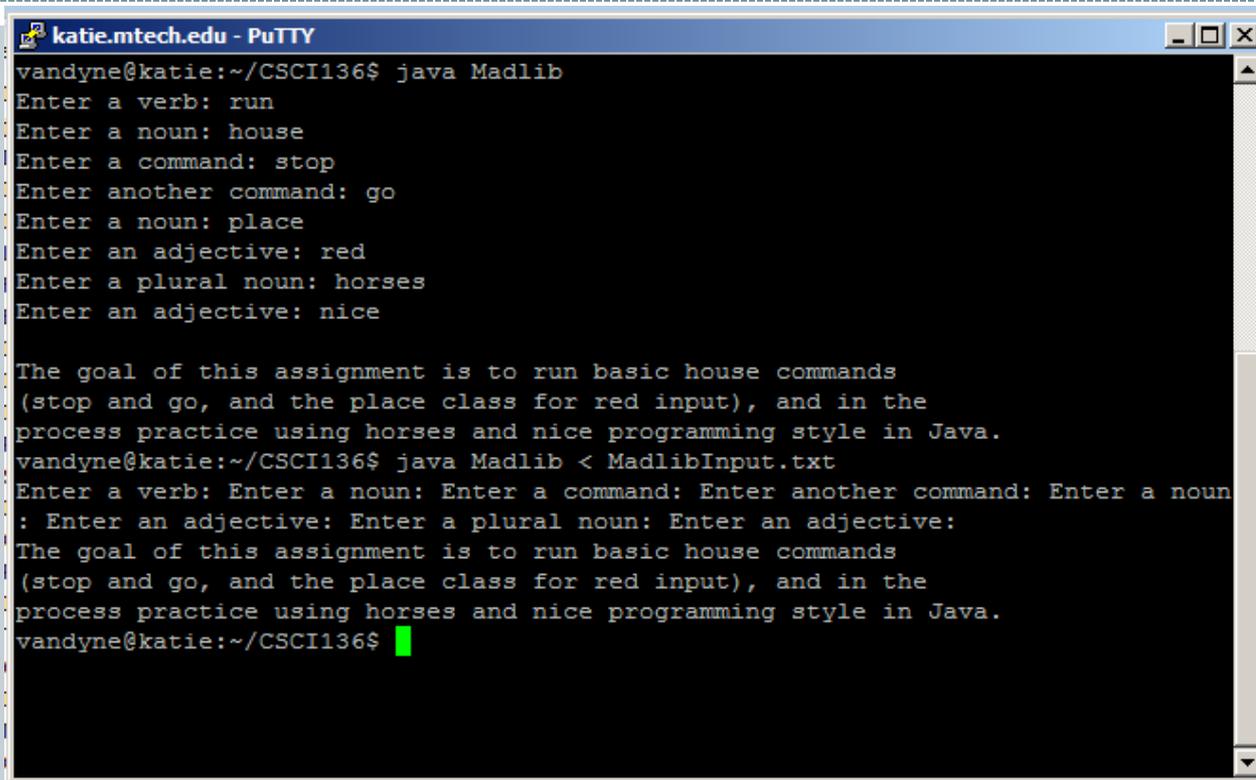
# Redirection

A screenshot of a PuTTY terminal window titled "katie.mtech.edu - PuTTY". The terminal shows a user named "vandyne" at a machine named "katie" in the directory "~/CSCI136". The user runs the command "java HelloWorld", which outputs "Hello world!". Then, the user runs "java HelloWorld > hello.txt", which redirects the output to a file named "hello.txt". Finally, the user runs "cat hello.txt", which outputs "Hello world!". The terminal prompt is currently "vandyne@katie:~/CSCI136\$" with a green cursor.

```
katie.mtech.edu - PuTTY
vandyne@katie:~/CSCI136$ java HelloWorld
Hello world!
vandyne@katie:~/CSCI136$ java HelloWorld > hello.txt
vandyne@katie:~/CSCI136$ cat hello.txt
Hello world!
vandyne@katie:~/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
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>
List files in current folder	<code>dir</code>	<code>ls</code>
Compile program in current folder	<code>javac Prog.java</code>	<code>javac Prog.java</code>
Run a compiled program	<code>java Prog</code>	<code>java Prog</code>
See what is in a text file	<code>type Prog.java</code>	<code>more Prog.java</code>
Auto-complete filenames	<code>&lt;tab key&gt;</code>	<code>&lt;tab key&gt;</code>
Previous command	<code>&lt;up arrow&gt;</code>	<code>&lt;up arrow&gt;</code>

# Summary

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  - Moving around the directories
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- **Copying Files between Computers**
- **File Redirection and Piping**
- **Command Summary**

