

CS2030S

Programming Methodology II

VIM: Bootcamp

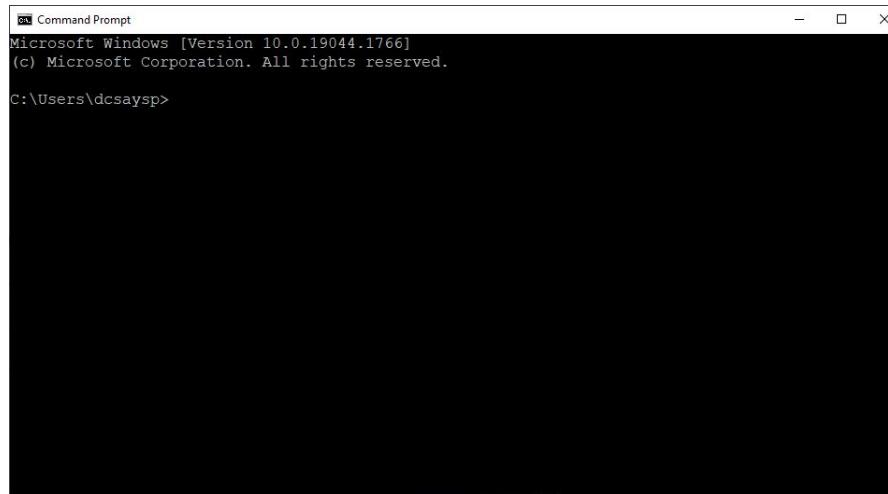
Unix

Unix

Starting
PE Node
Navigation
File
Help
Shortcut

Starting Windows

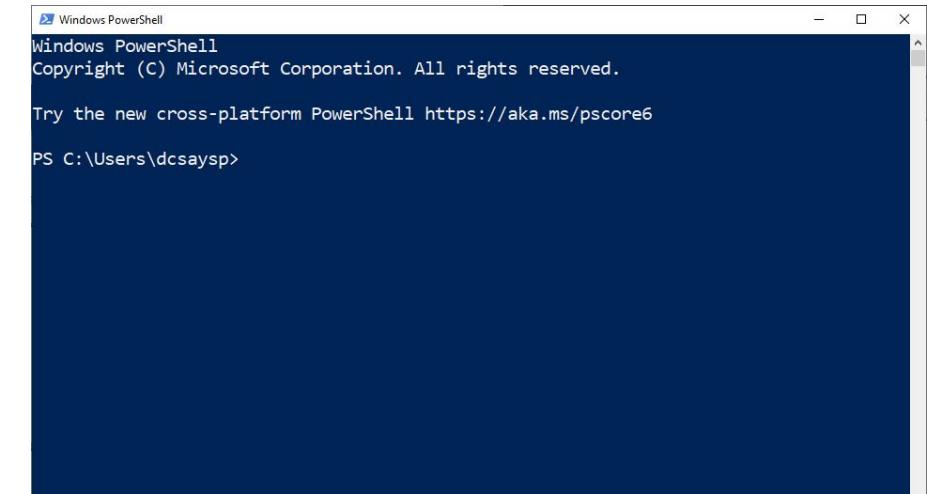
Command Prompt



```
Microsoft Windows [Version 10.0.19044.1766]
(c) Microsoft Corporation. All rights reserved.

C:\Users\dcsaysp>
```

PowerShell



```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\dcsaysp>
```

Starting
PE Node

- SSH
- Password
- Homepage

Navigation
File
Help
Shortcut

Connecting to PE Node

SSH

stu

```
ssh <username>@<pe_node>.comp.nus.edu.sg
```

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\dcsaysp> ssh adi-yoga@pe118.comp.nus.edu.sg
The authenticity of host 'pe118.comp.nus.edu.sg (192.168.48.120)' can't be established.
ECDSA key fingerprint is SHA256:JibcZGMORFdJppw+nHmzghUSJ0xm6kGLYrOuUH0aJpI.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
```

Notes

- <username> is your SoC Unix account
- <pe_node>
 - pe111
 - pe112
 - pe113
 - pe114
 - pe117
 - pe118
 - pe119
 - pe120

Unix

Starting PE Node

- SSH

- Password

- Homepage

Navigation

File

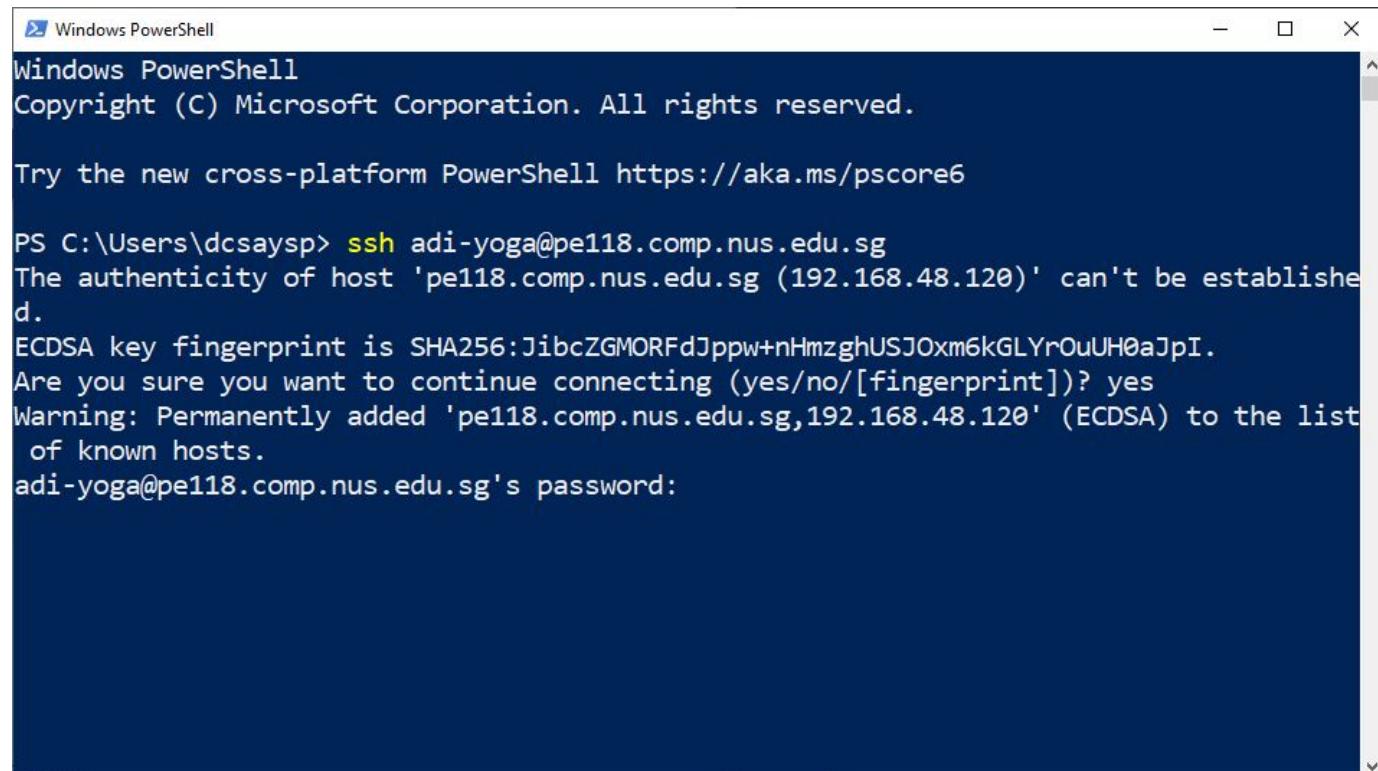
Help

Shortcut

Connecting to PE Node

Password

```
ssh <username>@<pe_node>.comp.nus.edu.sg
```



A screenshot of a Windows PowerShell window titled "Windows PowerShell". The window shows the command `ssh adi-yoga@pe118.comp.nus.edu.sg` being run. The output indicates that the host's authenticity cannot be established, and it prompts for a password. The password is partially obscured by dots.

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\dcsaysp> ssh adi-yoga@pe118.comp.nus.edu.sg
The authenticity of host 'pe118.comp.nus.edu.sg (192.168.48.120)' can't be established.
ECDSA key fingerprint is SHA256:JibcZGMORFdJppw+nHmzghUSJ0xm6kGLYrOuUH0aJpI.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'pe118.comp.nus.edu.sg,192.168.48.120' (ECDSA) to the list
of known hosts.
adi-yoga@pe118.comp.nus.edu.sg's password:
```

Notes

- Your password will not be echoed back

Unix

Starting PE Node

- SSH
- Password
- Homepage

Navigation

File

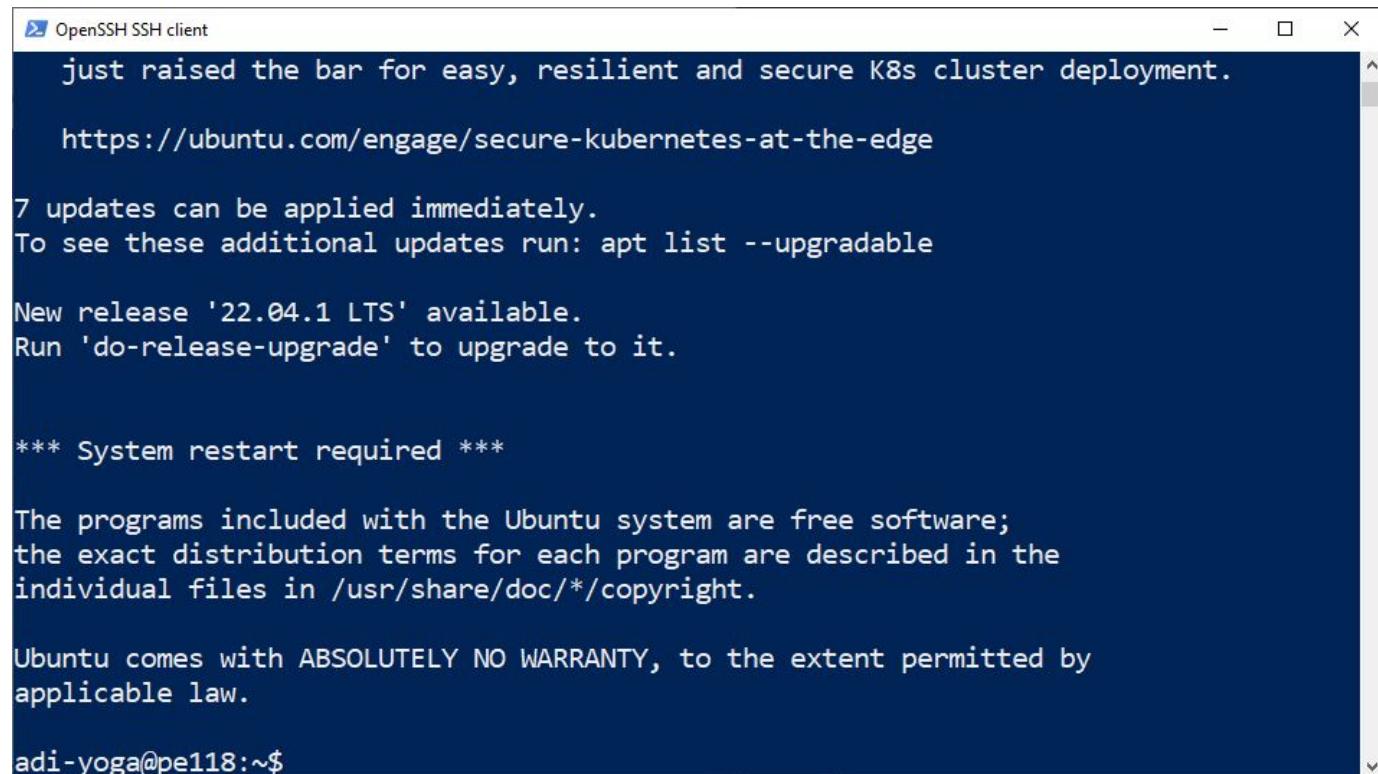
Help

Shortcut

Connecting to PE Node

Homepage

```
ssh <username>@<pe_node>.comp.nus.edu.sg
```



The screenshot shows a terminal window titled "OpenSSH SSH client". The session is connected to a host that has just raised the bar for easy, resilient, and secure K8s cluster deployment. It provides a link to a blog post: <https://ubuntu.com/engage/secure-kubernetes-at-the-edge>. It also indicates that 7 updates can be applied immediately and provides instructions to run apt list --upgradable. A new release '22.04.1 LTS' is available, and it suggests running 'do-release-upgrade' to upgrade to it. A warning message states "*** System restart required ***". The text then describes the free software nature of the Ubuntu system, mentioning individual files in /usr/share/doc/*/.copyright. Finally, it states that Ubuntu comes with ABSOLUTELY NO WARRANTY. The prompt at the bottom is "adi-yoga@pe118:~\$".

Notes

- Welcome to Unix world!

Unix

Starting
PE Node

Navigation

- *Current*

- *List*

- *Make Dir*

- *Change Dir*

File

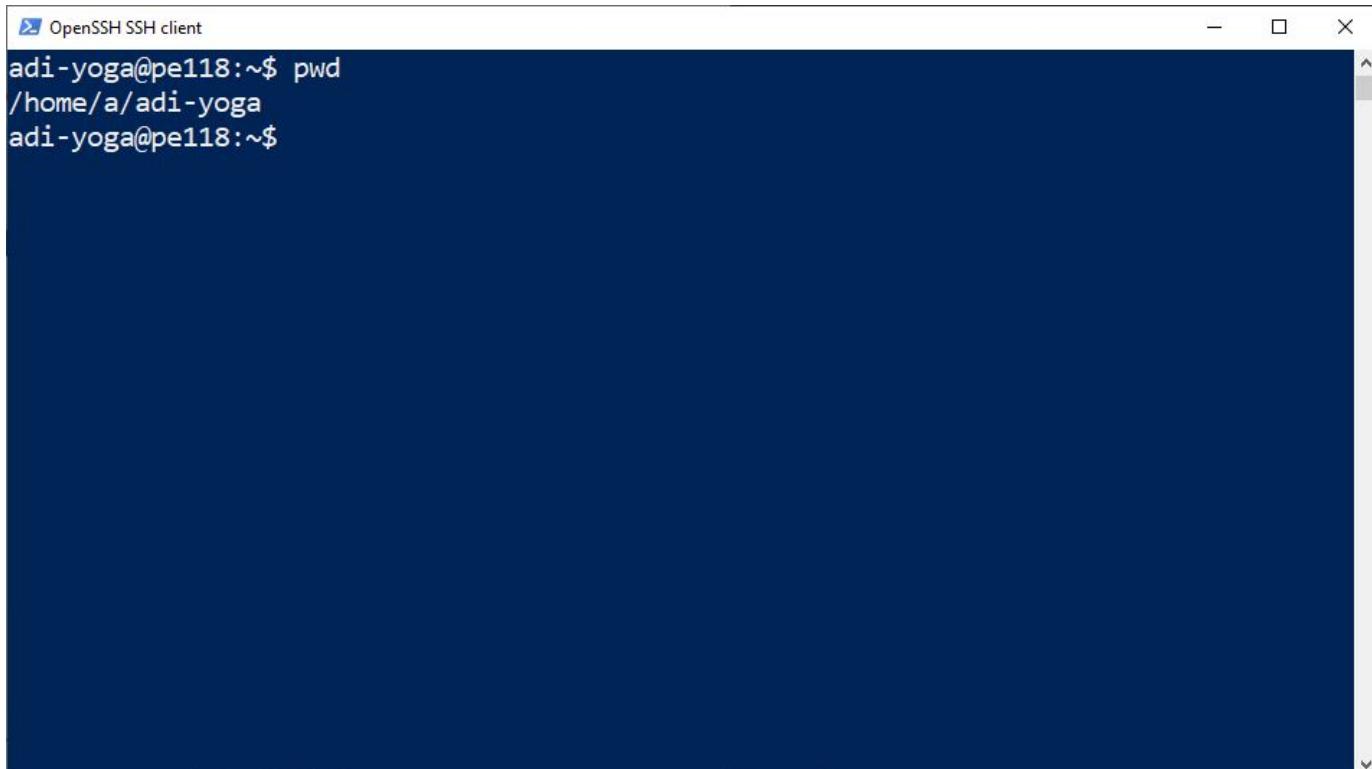
Help

Shortcut

Navigation

Current Directory

`pwd`



The screenshot shows a terminal window titled "OpenSSH SSH client". The window contains the following text:

```
adi-yoga@pe118:~$ pwd
/home/a/adi-yoga
adi-yoga@pe118:~$
```

Notes

- `pwd`

print
working
directory

Unix

Starting
PE Node

Navigation

- Current

- List

- Make Dir

- Change Dir

File

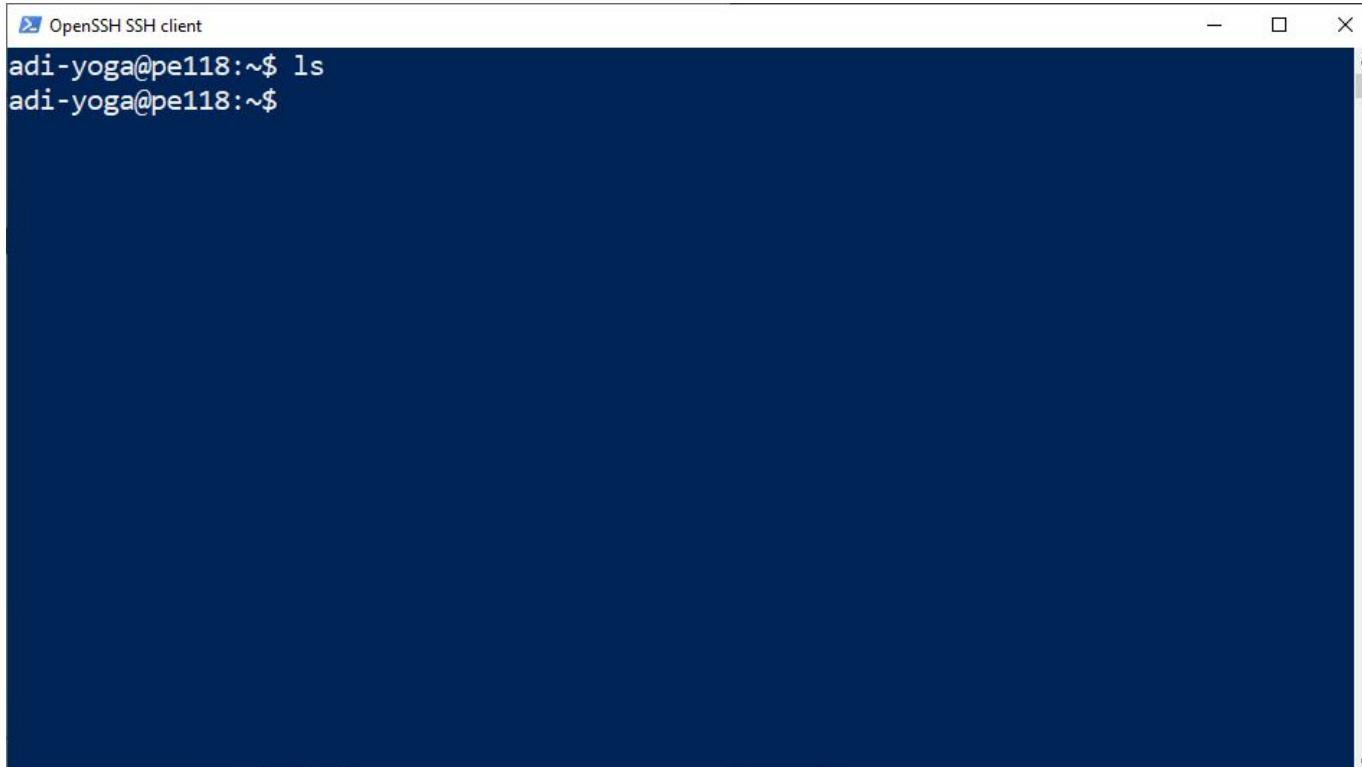
Help

Shortcut

Navigation

List Directory

ls



The screenshot shows a terminal window titled "OpenSSH SSH client". The command "ls" is typed at the prompt "adi-yoga@pe118:~\$". The output shows two lines: "adi-yoga@pe118:~\$ ls" and "adi-yoga@pe118:~\$". The window has a dark blue background and a light gray border.



Notes

- ls

list
directory

Unix

Starting
PE Node

Navigation

- Current

- List

- Make Dir

- Change Dir

File

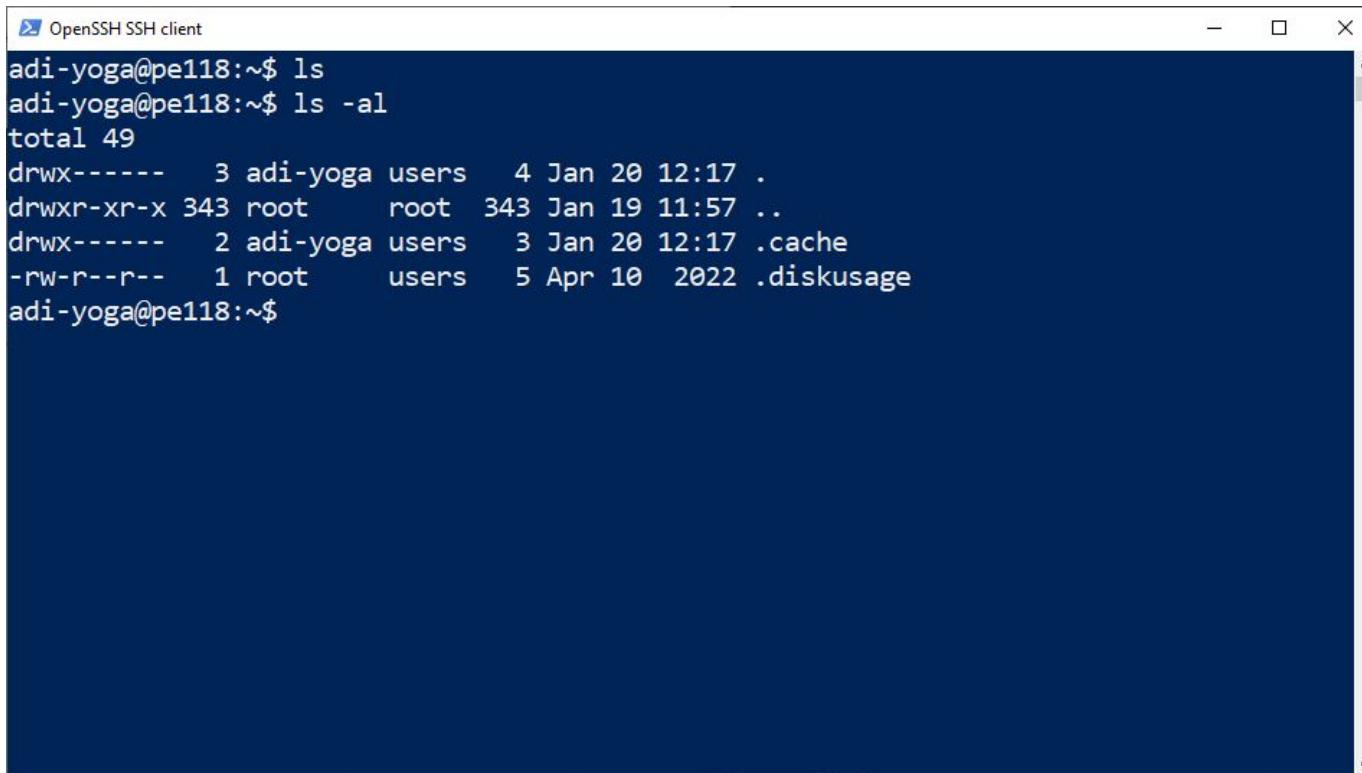
Help

Shortcut

Navigation

List Directory

ls



```
OpenSSH SSH client
adi-yoga@pe118:~$ ls
adi-yoga@pe118:~$ ls -al
total 49
drwx----- 3 adi-yoga users 4 Jan 20 12:17 .
drwxr-xr-x 343 root      root 343 Jan 19 11:57 ..
drwx----- 2 adi-yoga users 3 Jan 20 12:17 .cache
-rw-r--r-- 1 root      users 5 Apr 10 2022 .diskusage
adi-yoga@pe118:~$
```

Notes

- ls -al
 - list
 - directory
- Hidden files/dirs starts with a dot (i.e., .)
- Flags:
 - a: all
 - l: long

Unix

Starting
PE Node

Navigation

- Current

- List

- Make Dir

- Change Dir

File

Help

Shortcut

Navigation

List Directory

ls

-rwxrwx---	10	root	root	2048	Jan 13 07:11	afile.exe
?UUUUGGG000S	00	UUUUUU	GGGGGG	####	MON DD XX:XX	FILENAME
^ ^ ^ ^		^	^	^	^	^
						Filename
						Time of last modification
						File Size
						Group Name
						Owner Acct
+----+						
Read, Write and Special access						
File[-] / Dir[d] Flag						

Notes

- ls -al
 - list directory
- Hidden files/dirs starts with a dot (i.e., .)
- Flags:
 - a: all
 - l: long

Unix

Starting
PE Node

Navigation

- Current
- List
- **Make Dir**
- Change Dir

File

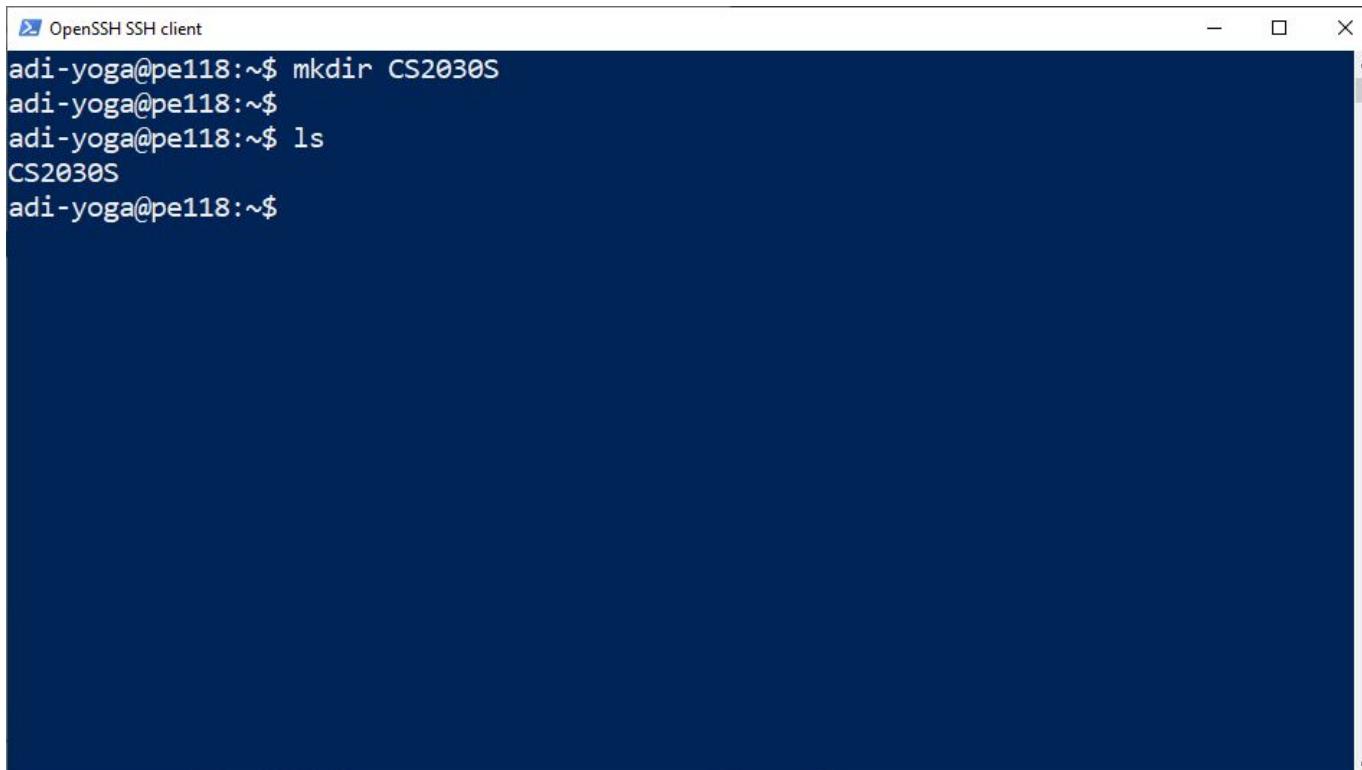
Help

Shortcut

Navigation

Make (*Sub*) Directory

```
mkdir <dirname>
```



The screenshot shows a terminal window titled "OpenSSH SSH client". The command "mkdir CS2030S" is entered at the prompt, followed by "ls" to list the contents of the newly created directory. The output shows the directory "CS2030S" has been created.

```
adi-yoga@pe118:~$ mkdir CS2030S
adi-yoga@pe118:~$ ls
CS2030S
adi-yoga@pe118:~$
```

Notes

- **mkdir**
make
sub
directory

Unix

Starting
PE Node

Navigation

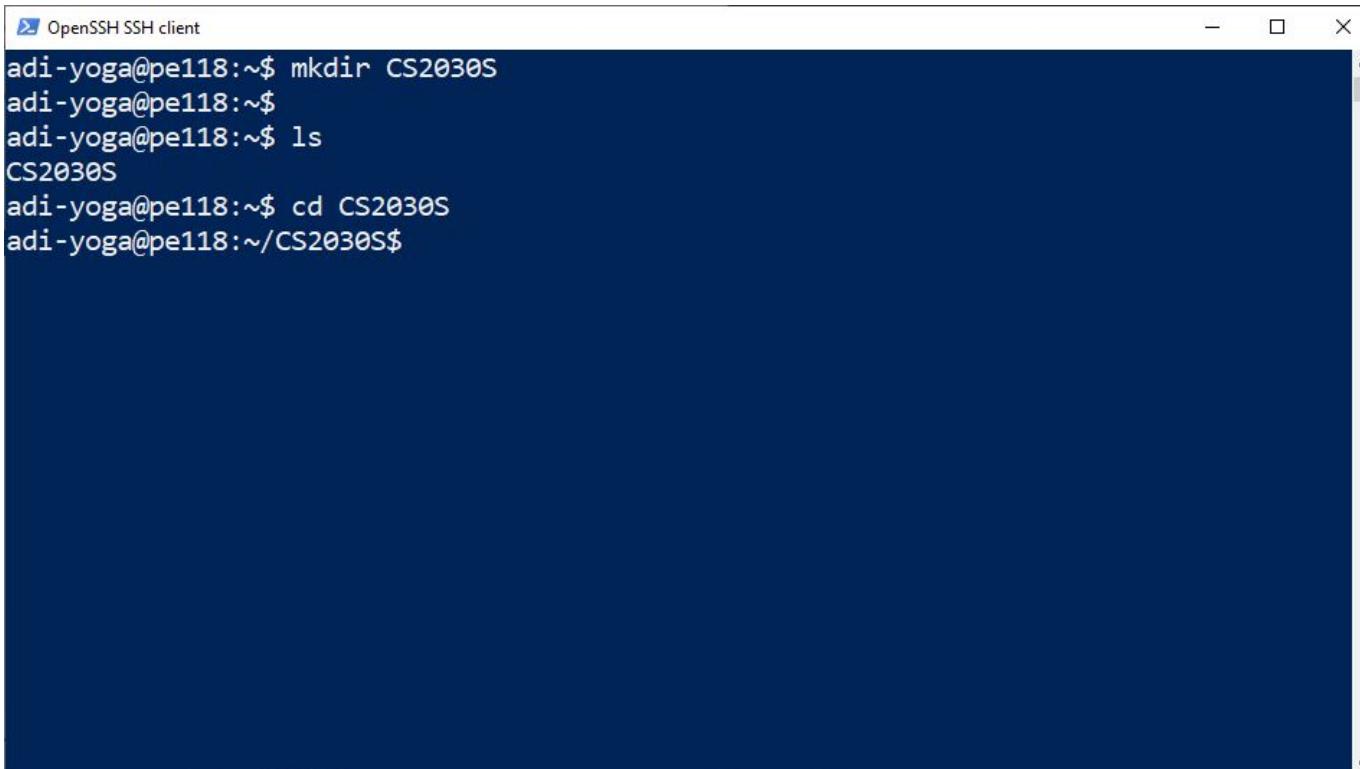
- Current
- List
- Make Dir
- Change Dir

File
Help
Shortcut

Navigation

Change Directory

`cd <dirname>`



The screenshot shows a terminal window titled "OpenSSH SSH client". The session is connected to a host named "pe118". The user has run several commands:

```
adi-yoga@pe118:~$ mkdir CS2030S
adi-yoga@pe118:~$ ls
CS2030S
adi-yoga@pe118:~$ cd CS2030S
adi-yoga@pe118:~/CS2030S$
```

<tab>

Notes

- `cd`
change
directory
- To go back to home directory quickly
 - `cd ~`

Unix

Starting
PE Node

Navigation

- Current
- List
- Make Dir
- Change Dir

File
Help
Shortcut

Navigation

Change Directory

```
cd <dirname>
```

```
<username>@<hostname>: ~/dir1/dir2$  
^ ^ ^ ^ ^ ^  
| | | | | | Your code here  
| | | | +---+ Prompt  
| | | | |  
| | | | Current Sub Directory  
| | | Home Directory  
| | Hostname (peXXX)  
| Username (SoC Unix)
```

Notes

- cd
 - change directory
- To go back to home directory quickly
 - cd ~

Unix

Starting
PE Node
Navigation

File

- Create

- Copy

- Remove

- Move

- Read

Help

Shortcut

File Manipulation

Create

`touch <filename>`

```
OpenSSH SSH client
adi-yoga@pe118:~$ mkdir CS2030S
adi-yoga@pe118:~$ 
adi-yoga@pe118:~$ ls
CS2030S
adi-yoga@pe118:~$ cd CS2030S
adi-yoga@pe118:~/CS2030S$ touch test.txt
adi-yoga@pe118:~/CS2030S$ ls
test.txt
adi-yoga@pe118:~/CS2030S$
```

Notes

- `touch` (??!!)



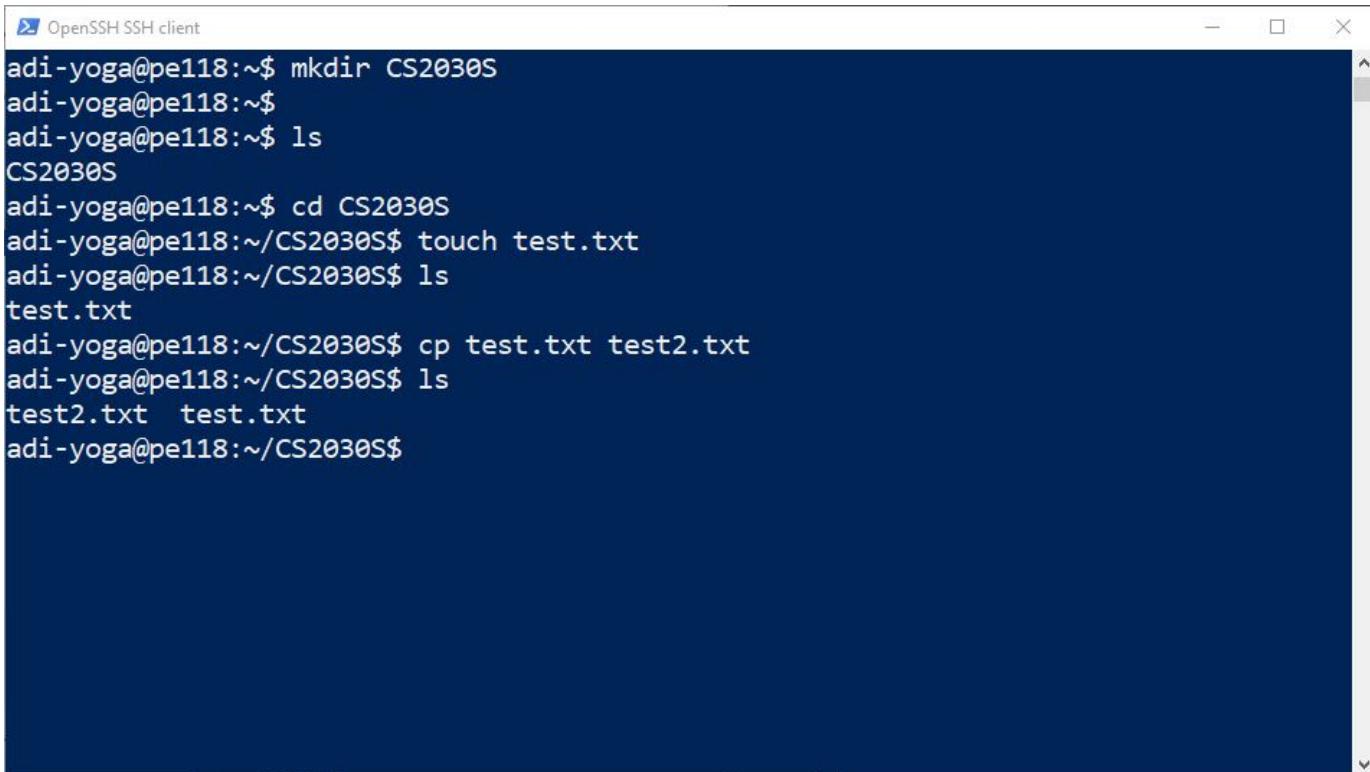
Unix

Starting
PE Node
Navigation
File
- Create
- **Copy**
- Remove
- Move
- Read
Help
Shortcut

File Manipulation

Copy

```
cp <src> <dest>
```



```
adi-yoga@pe118:~$ mkdir CS2030S
adi-yoga@pe118:~$ 
adi-yoga@pe118:~$ ls
CS2030S
adi-yoga@pe118:~$ cd CS2030S
adi-yoga@pe118:~/CS2030S$ touch test.txt
adi-yoga@pe118:~/CS2030S$ ls
test.txt
adi-yoga@pe118:~/CS2030S$ cp test.txt test2.txt
adi-yoga@pe118:~/CS2030S$ ls
test2.txt test.txt
adi-yoga@pe118:~/CS2030S$
```

Notes

- cp
copy
- <dest> can be in a different directory
 - e.g.,
 `../test.txt`

Unix

Starting
PE Node
Navigation
File
- Create
- Copy
- Remove
- Move
- Read
Help
Shortcut

File Manipulation

Remove

rm <name>

```
OpenSSH SSH client
adi-yoga@pe118:~$ mkdir CS2030S
adi-yoga@pe118:~$ 
adi-yoga@pe118:~$ ls
CS2030S
adi-yoga@pe118:~$ cd CS2030S
adi-yoga@pe118:~/CS2030S$ touch test.txt
adi-yoga@pe118:~/CS2030S$ ls
test.txt
adi-yoga@pe118:~/CS2030S$ cp test.txt test2.txt
adi-yoga@pe118:~/CS2030S$ ls
test2.txt test.txt
adi-yoga@pe118:~/CS2030S$ rm test.txt
rm: remove regular empty file 'test.txt'? y
adi-yoga@pe118:~/CS2030S$ ls
test2.txt
adi-yoga@pe118:~/CS2030S$
```

Notes

- rm *remove*
- Flags:
 - r: recursive (*for dir*)
 - f: forced (*be careful*)

Unix

Starting
PE Node
Navigation

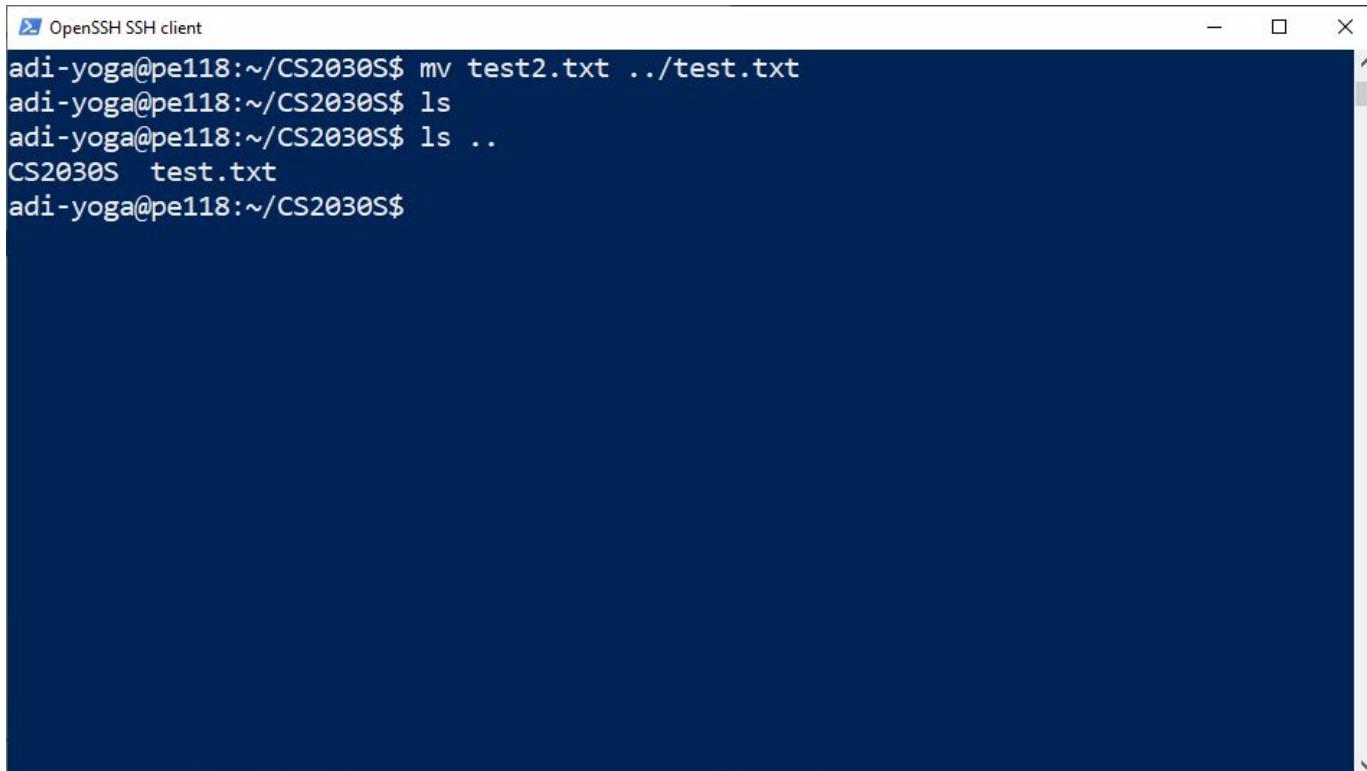
File

- Create
 - Copy
 - Remove
 - Move
 - Read
- Help
Shortcut

File Manipulation

Move

```
mv <src> <dest>
```



The screenshot shows a terminal window titled "OpenSSH SSH client". The terminal output is as follows:

```
adi-yoga@pe118:~/CS2030S$ mv test2.txt ..//test.txt
adi-yoga@pe118:~/CS2030S$ ls
adi-yoga@pe118:~/CS2030S$ ls ..
CS2030S  test.txt
adi-yoga@pe118:~/CS2030S$
```

Notes

- **mv** move
- **<dest>** can be in the same directory
 - Renaming!

Unix

Starting
PE Node
Navigation

File

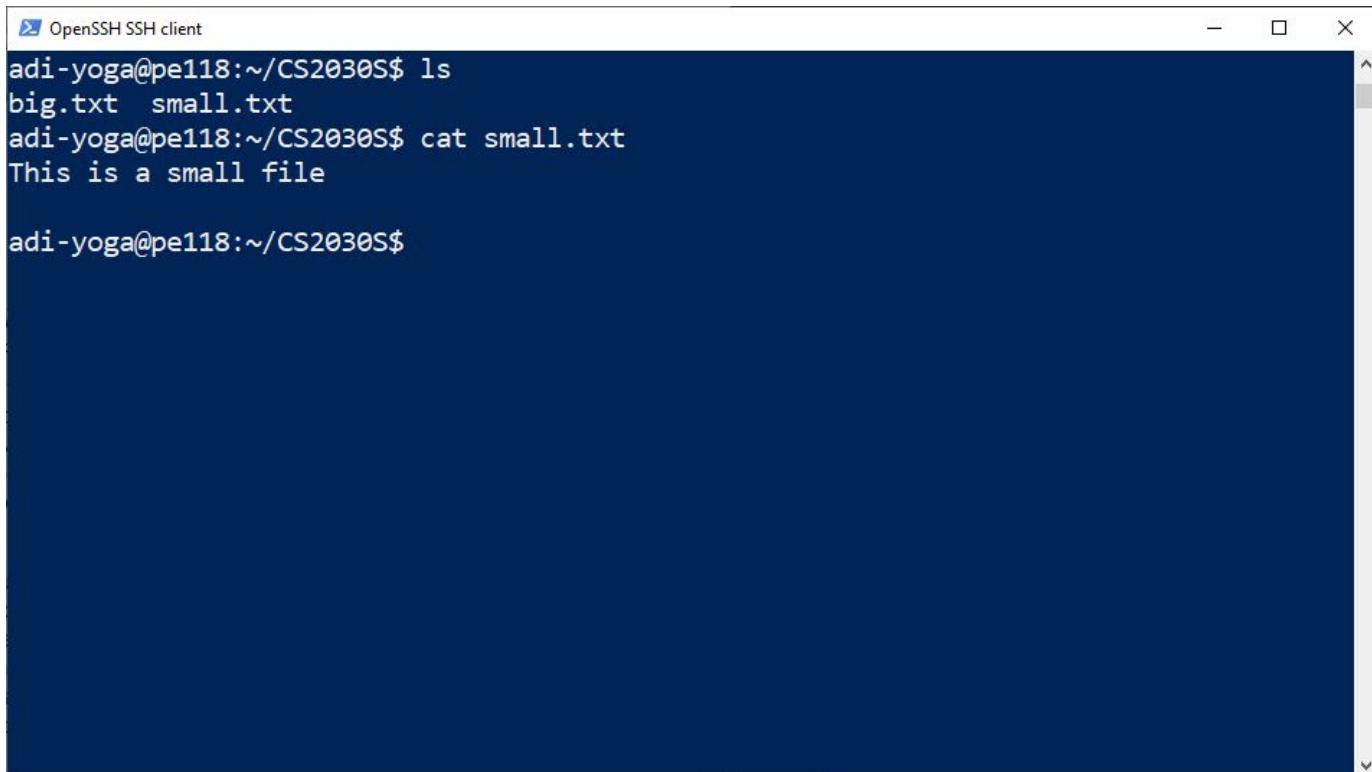
- Create
- Copy
- Remove
- Move
- **Read**

Help
Shortcut

File Manipulation

Read

```
cat <filename>
```



The screenshot shows a terminal window titled "OpenSSH SSH client". The terminal output is as follows:

```
adi-yoga@pe118:~/CS2030S$ ls
big.txt small.txt
adi-yoga@pe118:~/CS2030S$ cat small.txt
This is a small file

adi-yoga@pe118:~/CS2030S$
```

Notes

- **cat**
concatenate?
- Useful for small file

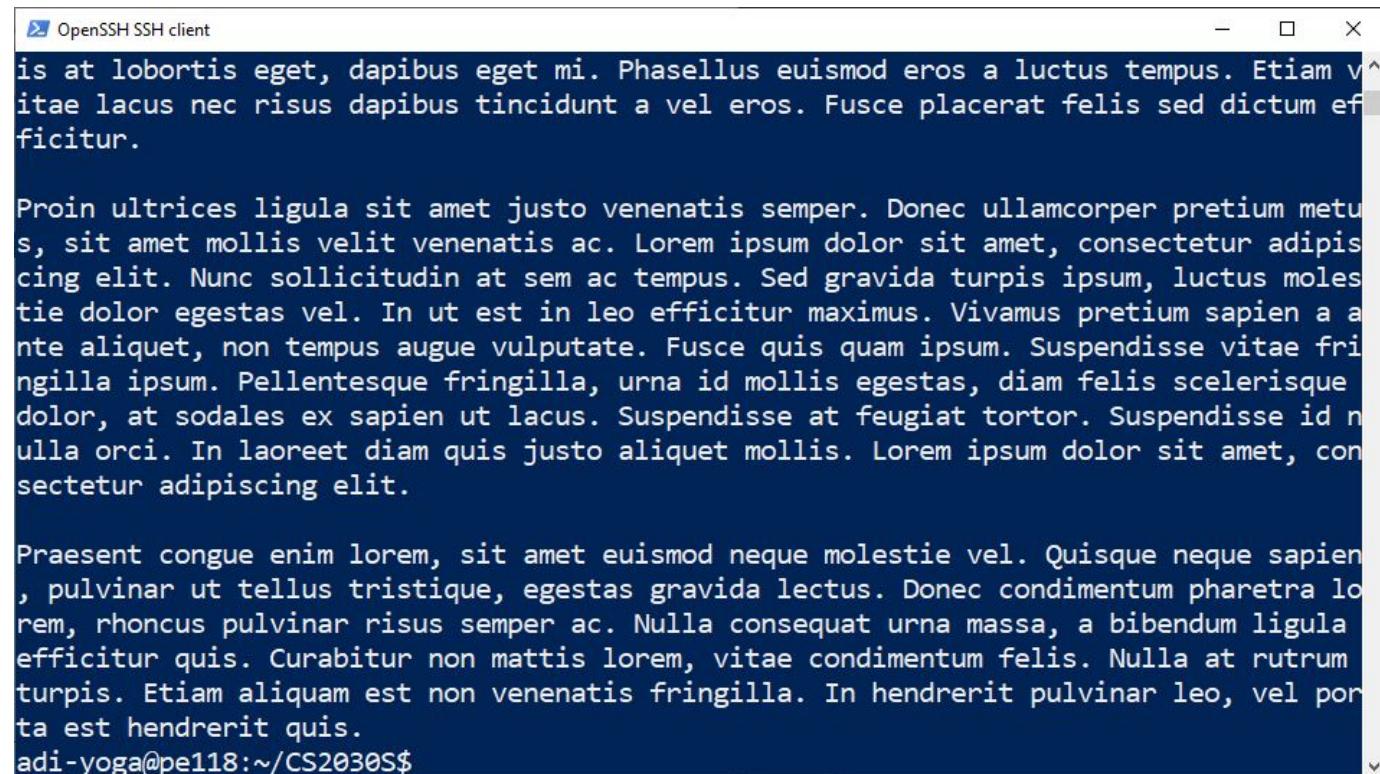
Unix

Starting
PE Node
Navigation
File
- Create
- Copy
- Remove
- Move
- **Read**
Help
Shortcut

File Manipulation

Read

```
cat <filename>
```



The terminal window shows the output of the `cat` command on a file containing three blocks of Lorem ipsum text. The first block starts with "is at lobortis eget, dapibus eget mi. Phasellus euismod eros a luctus tempus. Etiam v^". The second block starts with "Proin ultrices ligula sit amet justo venenatis semper. Donec ullamcorper pretium metu". The third block starts with "Praesent congue enim lorem, sit amet euismod neque molestie vel. Quisque neque sapien". At the bottom, the prompt shows the user's name and session ID: "adi-yoga@pe118:~/CS2030S\$".

```
is at lobortis eget, dapibus eget mi. Phasellus euismod eros a luctus tempus. Etiam v^  
itiae lacus nec risus dapibus tincidunt a vel eros. Fusce placerat felis sed dictum ef  
ficitur.  
  
Proin ultrices ligula sit amet justo venenatis semper. Donec ullamcorper pretium metu  
s, sit amet mollis velit venenatis ac. Lorem ipsum dolor sit amet, consectetur adipis  
cing elit. Nunc sollicitudin at sem ac tempus. Sed gravida turpis ipsum, luctus moles  
tie dolor egestas vel. In ut est in leo efficitur maximus. Vivamus pretium sapien a a  
nte aliquet, non tempus augue vulputate. Fusce quis quam ipsum. Suspendisse vitae fri  
ngilla ipsum. Pellentesque fringilla, urna id mollis egestas, diam felis scelerisque  
dolor, at sodales ex sapien ut lacus. Suspendisse at feugiat tortor. Suspendisse id n  
ulla orci. In laoreet diam quis justo aliquet mollis. Lorem ipsum dolor sit amet, con  
sectetur adipiscing elit.  
  
Praesent congue enim lorem, sit amet euismod neque molestie vel. Quisque neque sapien  
, pulvinar ut tellus tristique, egestas gravida lectus. Donec condimentum pharetra lo  
rem, rhoncus pulvinar risus semper ac. Nulla consequat urna massa, a bibendum ligula  
efficitur quis. Curabitur non mattis lorem, vitae condimentum felis. Nulla at rutrum  
turpis. Etiam aliquam est non venenatis fringilla. In hendrerit pulvinar leo, vel por  
ta est hendrerit quis.  
adi-yoga@pe118:~/CS2030S$
```

Notes

- `cat`
concatenate?
- Useful for small file
- Not so useful for large file

Unix

Starting
PE Node
Navigation

File

- Create
- Copy
- Remove
- Move
- Read

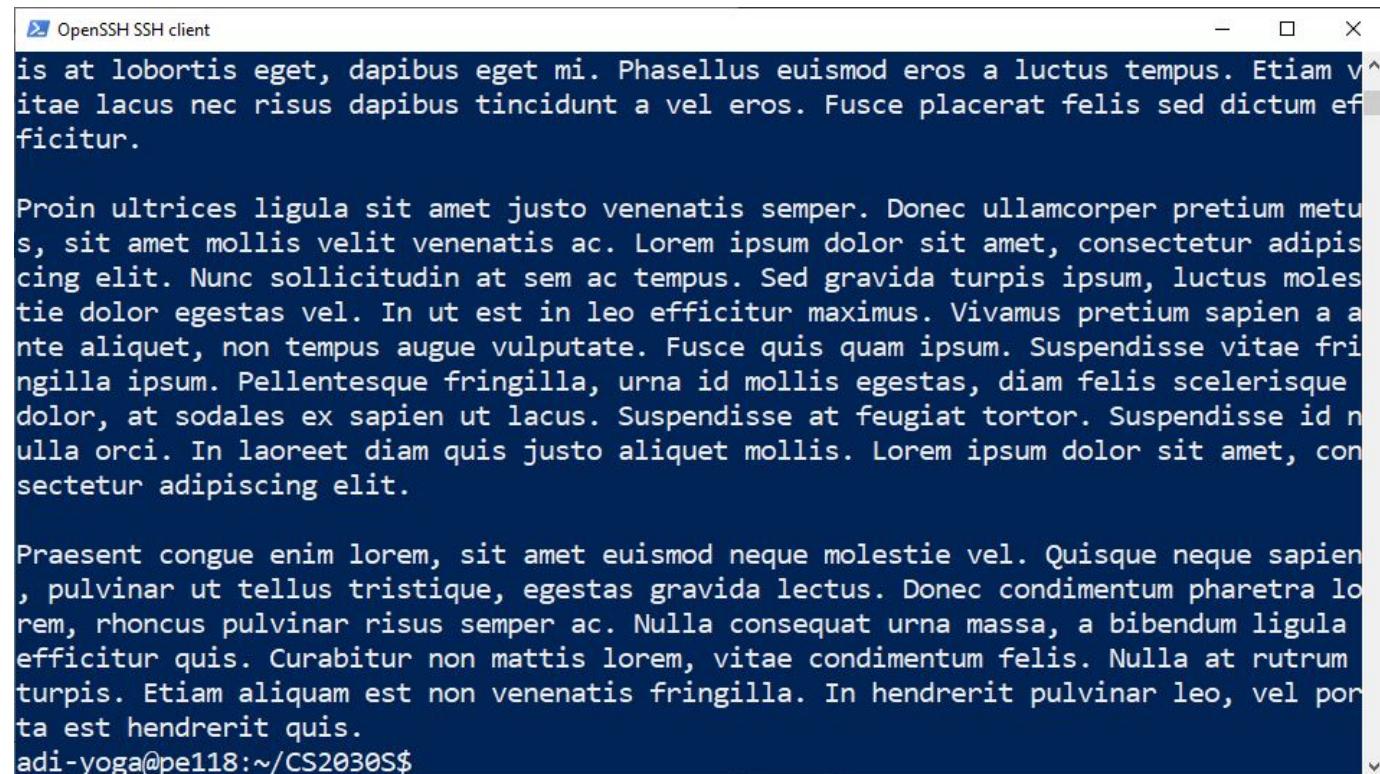
Help

Shortcut

File Manipulation

Read

```
less <filename>
```



```
is at lobortis eget, dapibus eget mi. Phasellus euismod eros a luctus tempus. Etiam v^  
itiae lacus nec risus dapibus tincidunt a vel eros. Fusce placerat felis sed dictum ef-  
ficitur.  
  
Proin ultrices ligula sit amet justo venenatis semper. Donec ullamcorper pretium metu-  
s, sit amet mollis velit venenatis ac. Lorem ipsum dolor sit amet, consectetur adipis-  
cing elit. Nunc sollicitudin at sem ac tempus. Sed gravida turpis ipsum, luctus moles  
tie dolor egestas vel. In ut est in leo efficitur maximus. Vivamus pretium sapien a a-  
nte aliquet, non tempus augue vulputate. Fusce quis quam ipsum. Suspendisse vitae fri-  
ngilla ipsum. Pellentesque fringilla, urna id mollis egestas, diam felis scelerisque  
dolor, at sodales ex sapien ut lacus. Suspendisse at feugiat tortor. Suspendisse id n-  
ulla orci. In laoreet diam quis justo aliquet mollis. Lorem ipsum dolor sit amet, con-  
sectetur adipiscing elit.  
  
Praesent congue enim lorem, sit amet euismod neque molestie vel. Quisque neque sapien  
, pulvinar ut tellus tristique, egestas gravida lectus. Donec condimentum pharetra lo-  
rem, rhoncus pulvinar risus semper ac. Nulla consequat urna massa, a bibendum ligula  
efficitur quis. Curabitur non mattis lorem, vitae condimentum felis. Nulla at rutrum  
turpis. Etiam aliquam est non venenatis fringilla. In hendrerit pulvinar leo, vel por-  
ta est hendrerit quis.  
adi-yoga@pe118:~/CS2030S$
```

Lctrl+> + \

\$ clear

Notes

- **less**
less is more?
- Useful for large file
- Navigate:
 - ↑ ↓ ← →
 - q: quit

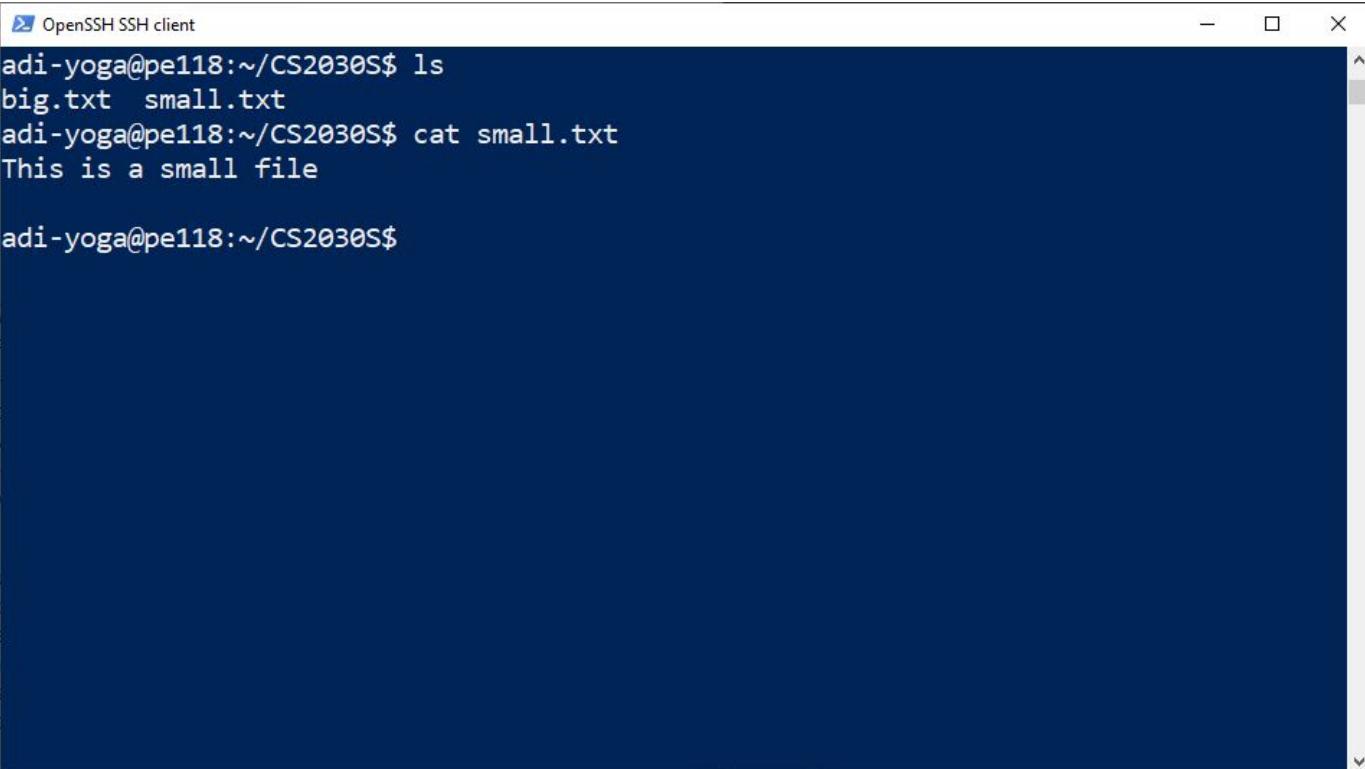
Unix

Starting
PE Node
Navigation
File
Help
Shortcut

Help

Manual

`man <command>`



A screenshot of a terminal window titled "OpenSSH SSH client". The window shows the following session:

```
adi-yoga@pe118:~/CS2030S$ ls
big.txt small.txt
adi-yoga@pe118:~/CS2030S$ cat small.txt
This is a small file

adi-yoga@pe118:~/CS2030S$
```

Notes

- `man`
[manual](#)
- `man man`
 - Manual for `man`
- `q` to quit

Unix

Starting
PE Node
Navigation
File
Help

Shortcut
- Directory
- Commands

Shortcut

Directory

Root

/

Home

~

Current

.

Parent

..

Example Usage

Go to parent, CS2030S, and lab01

```
cd ../../CS2030S/Lab01
```

Copy to home, CS2030S

```
cp test.txt ~/CS2030S/test.txt
```

Unix

Starting
PE Node
Navigation
File
Help

Shortcut
- Directory
- Commands

Shortcut

Commands

Command History

↑ ↓

Auto-Complete

<tab>

Matching

Zero or More

*

Example Usage

Delete all .txt file

`rm *.txt`

Compile all Java file

`javac *.java`

Unix

Starting
PE Node
Navigation
File
Help

Shortcut
- Directory
- Commands

Shortcut

Commands

Command History

↑ ↓

Auto-Complete

<tab>

Matching

Zero or More

*

SSH HOP

① SSH to

@stu.Comp---

② SSH to

@peXXX.Comp---

Example Usage

Delete all .txt file

`rm *.txt`

Compile all Java file

`javac *.java`

VIM

VIM

Setup

- Basic

- Test

Task

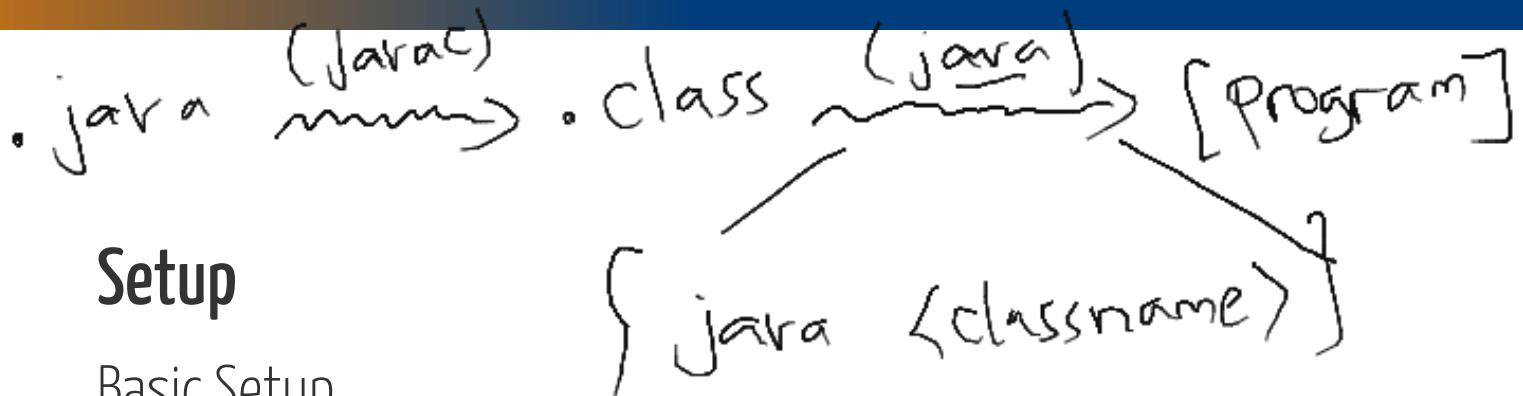
Work

Split

Editing

Unix

Error



Setup

Basic Setup

```
cp ~cs2030s/.vimrc ~
```

```
cp -r ~cs2030s/.vim ~
```

```
mkdir ~./backup
```

```
OpenSSH SSH client
adi-yoga@pe118:~$ cp ~cs2030s/.vimrc ~
adi-yoga@pe118:~$ cp -r ~cs2030s/.vim ~
adi-yoga@pe118:~$ mkdir .backup
adi-yoga@pe118:~$ ls -al
total 109
drwx----- 6 adi-yoga users 8 Jan 20 13:31 .
drwxr-xr-x 343 root      root 343 Jan 19 11:57 ..
drwx----- 2 adi-yoga users 2 Jan 20 13:31 .backup
drwx----- 2 adi-yoga users 3 Jan 20 12:17 .cache
drwx----- 2 adi-yoga users 2 Jan 20 13:17 CS2030S
-rw-r--r-- 1 root      users 6 Jan 20 13:00 .diskusage
drwx----- 5 adi-yoga users 6 Jan 20 13:30 .vim
-rw----- 1 adi-yoga users 1642 Jan 20 13:30 .vimrc
adi-yoga@pe118:~$
```

class {classname}{
 }
 pub static
 main(String args){
 }
 }

VIM

Setup

- Basic

- Test

Task

Work

Split

Editing

Unix

Error

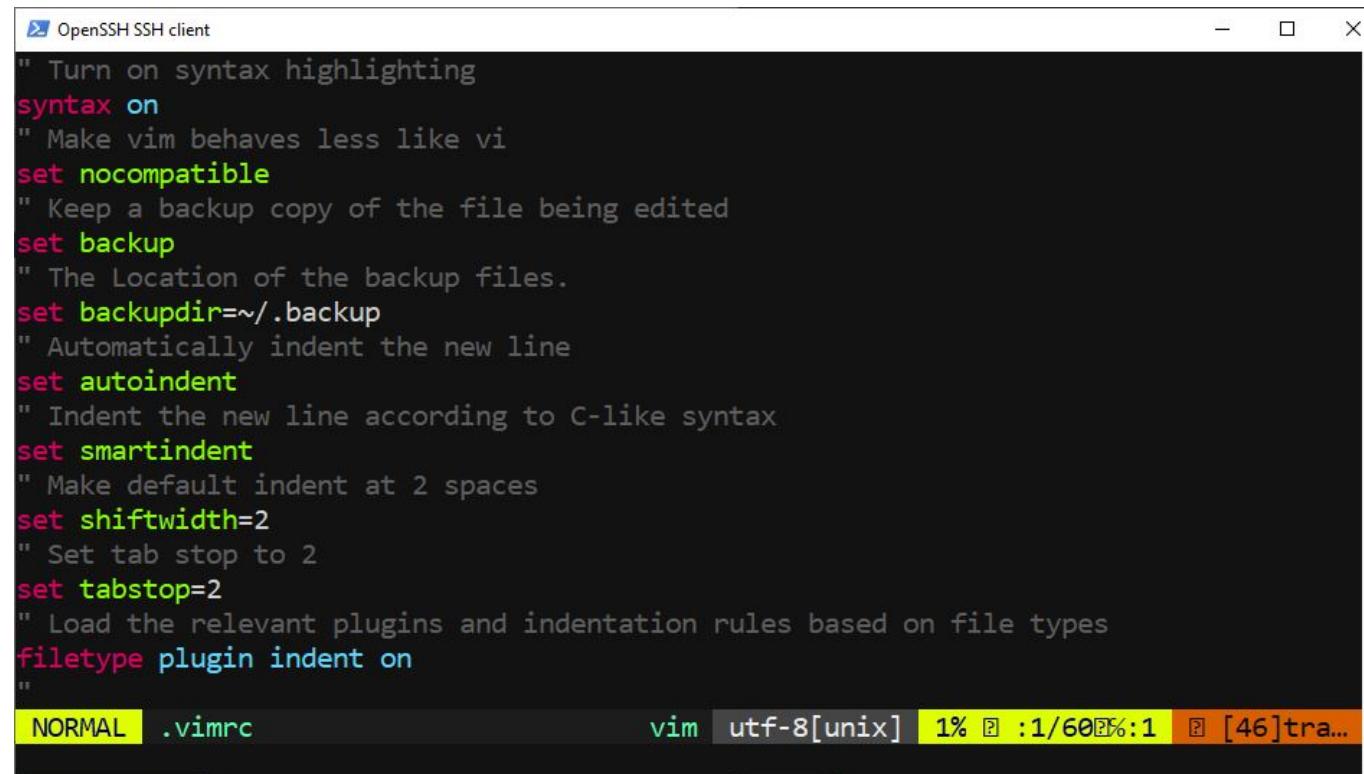
Setup

Test

```
vim .vimrc
```

↳ end

↳ home



```
" Turn on syntax highlighting
syntax on
" Make vim behaves less like vi
set nocompatible
" Keep a backup copy of the file being edited
set backup
" The Location of the backup files.
set backupdir=~/backup
" Automatically indent the new line
set autoindent
" Indent the new line according to C-like syntax
set smartindent
" Make default indent at 2 spaces
set shiftwidth=2
" Set tab stop to 2
set tabstop=2
" Load the relevant plugins and indentation rules based on file types
filetype plugin indent on
"
NORMAL .vimrc          vim  utf-8[unix] 1% :1/60%:1 [46]tra...
```

:q!

Setup

Task

- *Template*

- *Design*

Work

Split

Editing

Unix

Error

Task

Old McDonald

Old MacDonald Had A Farm | Nursery Rhymes | Super Simple Songs



Setup

Task

- *Template*- *Design*

Work

Split

Editing

Unix

Error

Task

Old McDonald

Template

Old MacDonald had a farm, E-I-E-I-0!
And on his farm he had a {name}, E-I-E-I-0!
With a {sound}-{sound} here and a {sound}-{sound} there,
Here a {sound}, there a {sound}, —
Everywhere a {sound}-{sound},
Old MacDonald had a farm, E-I-E-I-0!

Setup

Task- *Template*- *Design*

Work

Split

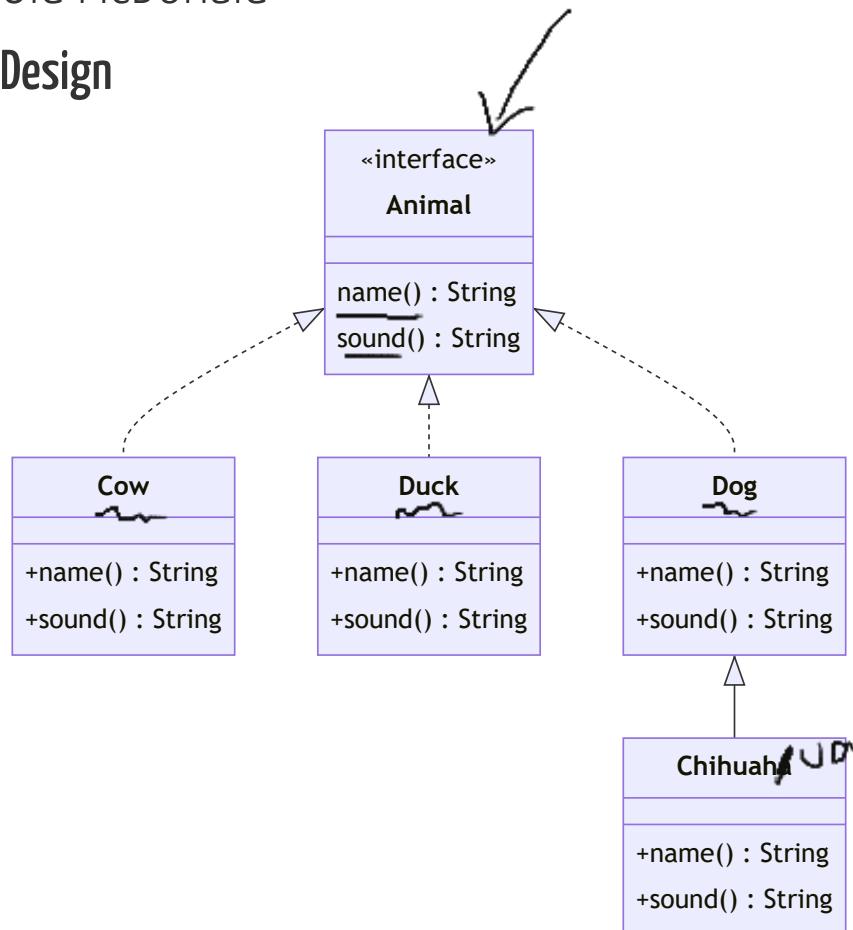
Editing

Unix

Error

Task

Old McDonald

Design

VIM

Setup
Task

Work

- Open/Create

- Editing

- Saving

- Quitting

- Compiling

Split

Editing

Unix

Error

Work

Open/Create File

`vim Animal.java`

A screenshot of a terminal window titled "OpenSSH SSH client". The window is in "NORMAL" mode, displaying the file "Animal.java". The status bar at the bottom shows "NORMAL Animal.java", "jav... [unix] 100% :0/1:1", and the message "'Animal.java' [New File]". The terminal window is mostly black with white text.

Notes

- If a file does not exist, it will be created
 - [New File]
- You are in *Command mode*
- You can go to specific line using `vim +n <file>`

VIM

Setup
Task

Work

- Open/Create

Editing

- Saving

- Quitting

- Compiling

Split

Editing

Unix

Error

Work

Editing on File

1. Press **i** to go to *Insert mode*
2. Type on the editor

```
interface Animal {  
    String name();  
    String sound();  
}
```

Notes

- Check that you are in *Insert mode*
--- INSERT ---

VIM

Setup Task

Work

- ## - Open/Create

- ## - Editing

- Saving

- Quitting

- Compiling Solutions

Split

Editing

Learning Unix

Unit
Effects

EITOI

Work

Saving the File

1. Press **<esc>** to go back to Command mode
 2. Type **:w** to save the file

```
OpenSSH SSH client
interface Animal {
    String name();
    String sound();
}
~
~
```

Notes

- : M

write

VIM

Setup Task

Work

- ### - Open/Create

- ## - Editing

- ## - Saving

- Quitting

- ## - Compiling

Split

Editing

8
Unix

Error

Work

Quitting VIM

1. Press **<esc>** to go back to *Command mode*
 2. Type **:q** to quit vim

The screenshot shows two windows side-by-side. The left window is titled 'OpenSSH SSH client' and contains the following Java interface code:

```
interface Animal {  
    String name();  
    String sound();  
}  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~  
~
```

The right window is also titled 'OpenSSH SSH client' and shows the command prompt 'adi-yoga@pe118:~/CS2030S\$'. The Java code from the left window has been executed, resulting in the following output:

```
adi-yoga@pe118:~/CS2030S$
```

Notes

- :q
 - quit
 - You can also combine
 - Bm:
 - Write
 - Quit
 - :q! force quit

VIM

Setup

Task

Work

- Open/Create

- Editing

- Saving

- Quitting

- Compiling

Split

Editing

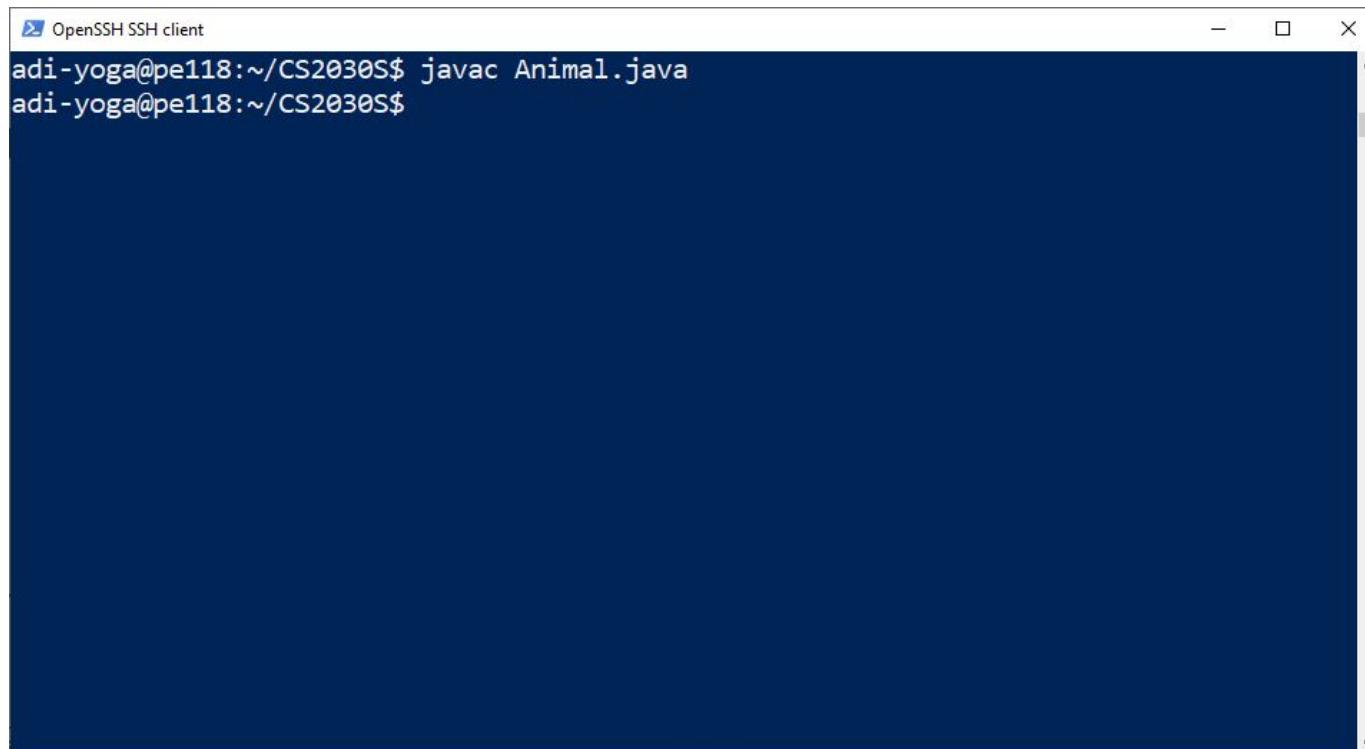
Unix

Error

Work

Compiling File

`javac Animal.java`



A screenshot of a terminal window titled "OpenSSH SSH client". The window shows the command `javac Animal.java` being run at the prompt `adi-yoga@pe118:~/CS2030S$`. The output shows the command was successful, with no errors displayed.

Notes

- `javac`
`java`
compiler

No news is
good news

VIM

Setup
Task
Work

Split

- Motivation

- Split

- Moving

- Closing

- Opening

Editing

Unix

Error

Split Screen

Motivation

vim Cow.java

A screenshot of a terminal window titled "OpenSSH SSH client". The terminal is running the Vim editor on a file named "Cow.java". The Vim status bar at the bottom left shows "NORMAL Cow.java" and "Cow.java [New File]". The status bar at the bottom right shows "jav... [unix] 100% :0/1%:1". The main area of the terminal is mostly black, indicating that the file is currently empty.

Thought

- Cow should implement Animal
 - What were the methods in Animal again?

VIM

Setup
Task
Work

Split

- Motivation

- Split

- Moving

- Closing

- Opening

Editing

Unix

Error

Split Screen

Split (*Command Mode*)

```
:vsp Animal.java
```

A screenshot of a terminal window titled "OpenSSH SSH client". The window is split vertically. The left half contains the following Java code:

```
interface Animal {  
    String name();  
    String sound();  
}
```

The right half of the screen is currently blank. At the bottom of the terminal window, the status bar indicates the active file is "Animal.java", it has 4 lines and 56 columns.

```
N... Animal.java  
"Animal.java" 4L, 56C
```

Notes

- **vsp** vertical **split**
- **sp** horizontal **split**

Choose
based on
your
monitor

VIM

Setup

Task

Work

Split

- Motivation

- Split

- Moving

- Closing

- Opening Editing

Edith
Lilja

unix

Split Screen

Moving to Other Viewport (*Command Mode*)

<ctrl>+<w> <ctrl>+<w>

```
SSH OpenSSH SSH client

interface Animal {
    String name();
    String sound();
}

class Cow implements Animal {
    private String name;
    private String sound;

    public Animal(String name, String
sound) {
        this.name = name;
        this.sound = sound;
    }

    public String name() {
        return this.name;
    }
    public String sound() {
        return this.sound;
    }
}

Animal.java
-- INSERT --
I... Cow.java[+]
```

Notes

- If you have multiple viewport
 - Press `<ctrl>+<w>` then
 - `h` (right)
 - `j` (down)
 - `k` (up)
 - `l` (left)

VIM

Setup

Task

Work

Split

- Motivation

- Split

- Moving

- Closing

- Opening

Editing

Unix

Error

Split Screen

Closing (*Command Mode*)

<ctrl>+<w> <q>

```
class Cow implements Animal {  
    private String name;  
    private String sound;  
  
    public Animal(String name, String sound) {  
        this.name = name;  
        this.sound = sound;  
    }  
  
    public String name() {  
        return this.name;  
    }  
    public String sound() {  
        return this.sound;  
    }  
}
```

Notes

- Go to the viewport that you want to close first!

[Setup](#)[Task](#)[Work](#)[Split](#)[- Motivation](#)[- Split](#)[- Moving](#)[- Closing](#)[- Opening](#)[Editing](#)[Unix](#)[Error](#)

Split Screen

Opening a File (*Command Mode*)

```
:e <filename>
```

```
class Cow implements Animal {  
    private String name;  
    private String sound;  
  
    public Animal(String name, String sound) {  
        this.name = name;  
        this.sound = sound;  
    }  
  
    public String name() {  
        return this.name;  
    }  
    public String sound() {  
        return this.sound;  
    }  
}
```

N... OldMcDonald.java "OldMcDonald.java" [New File] Cow.java[+]

Notes

- Go to the viewport that you want to close first!
- Try:

```
:vsp Animal.java  
:e OldMcDonald.java
```

Setup

Task

Work

Split

Editing

- Copy

- Paste

- Delete

- Multi

- Search

- Replace

- Indent

- Tips

Unix

Error

Useful Editing Commands

Copy (*Command Mode*)

yy

```
OpenSSH SSH client
class OldMcDonald {
    public static void main(String[] args) {
        System.out.println("Old MacDonald had
a farm, E-I-E-I-O");
        System.out.println(
    }
}
class Cow implements Animal {
    private String name;
    private String sound;

    public Animal(String name, String
sound) {
        this.name = name;
        this.sound = sound;
    }

    public String name() {
        return this.name;
    }
    public String sound() {
        return this.sound;
    }
}
```

N... OldMcDonald.java[+] Cow.java[+]

Notes

- y
yank
- Go to the line you want to copy first

VIM

Setup

Task

Work

Editing

- Copy
 - Paste
 - Delete
 - Multi
 - Search
 - Replace
 - Indent
 - Tips

Useful Editing Commands

Paste (*Command Mode*)

P

```
OpenSSH SSH client
```

```
class OldMcDonald {
    public static void main(String[] args) {
        System.out.println("Old MacDonald had
a farm, E-I-E-I-O");
        System.out.println(
        System.out.println(
        System.out.println(
        System.out.println(
        System.out.println(
        System.out.println(
    }
}

class Cow implements Animal {
    private String name;
    private String sound;

    public Animal(String name, String
sound) {
        this.name = name;
        this.sound = sound;
    }

    public String name() {
        return this.name;
    }

    public String sound() {
        return this.sound;
    }
}
```

Notes

- P
paste
 - Will insert after the line your cursor is in
 - Try pressing p 5 times

Whoops,
too many
times!

VIM

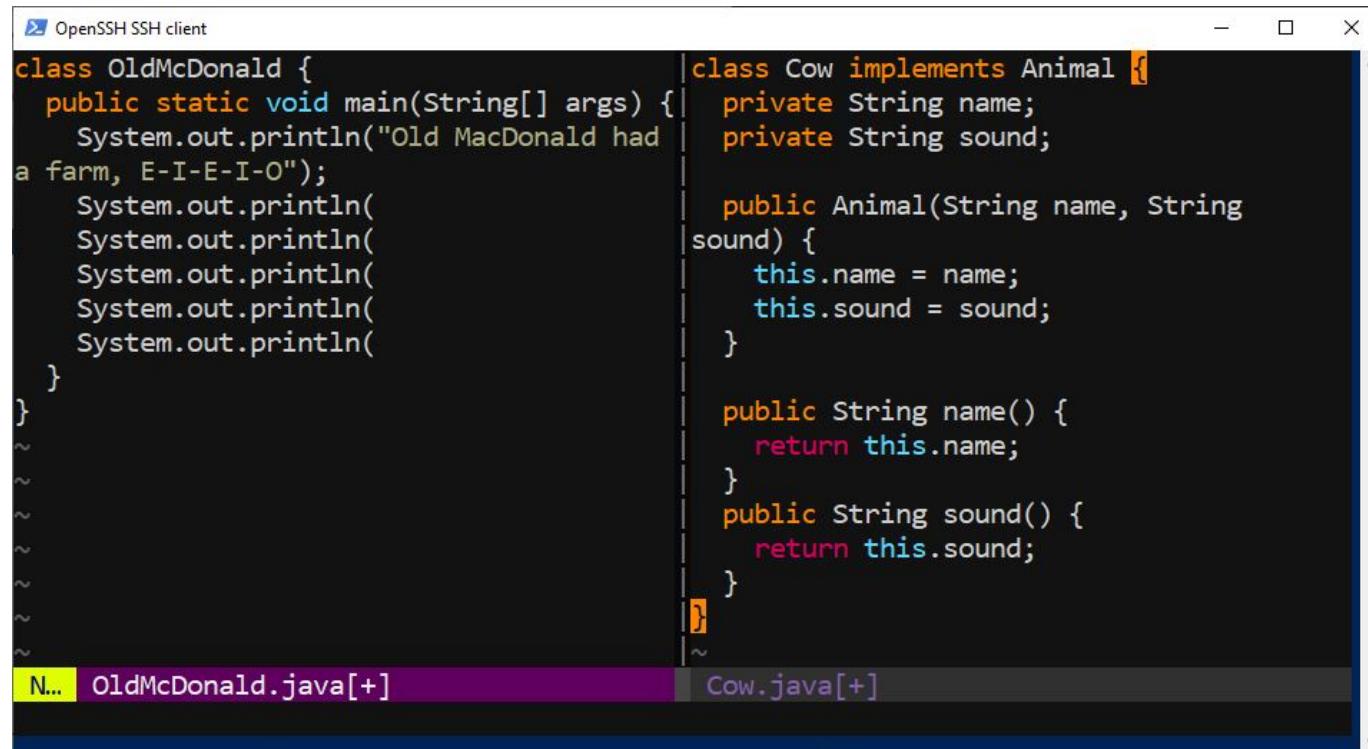
Setup
Task
Work
Split
Editing

- Copy
- Paste
- **Delete**
- Multi
- Search
- Replace
- Indent
- Tips
Unix
Error

Useful Editing Commands

Delete (*Command Mode*)

dd



```
class OldMcDonald {
    public static void main(String[] args) {
        System.out.println("Old MacDonald had
a farm, E-I-E-I-O");
        System.out.println(
        System.out.println(
        System.out.println(
        System.out.println(
        System.out.println(
    }
}
class Cow implements Animal {
    private String name;
    private String sound;

    public Animal(String name, String
sound) {
        this.name = name;
        this.sound = sound;
    }

    public String name() {
        return this.name;
    }
    public String sound() {
        return this.sound;
    }
}
```

cut
yank 3 lines
y/d 2

Notes

- d
delete
- Go to the line you want to delete first
- Actually a "cut"

Setup

Task

Work

Split

Editing

- Copy

- Paste

- Delete

- Multi

- Search

- Replace

- Indent

- Tips

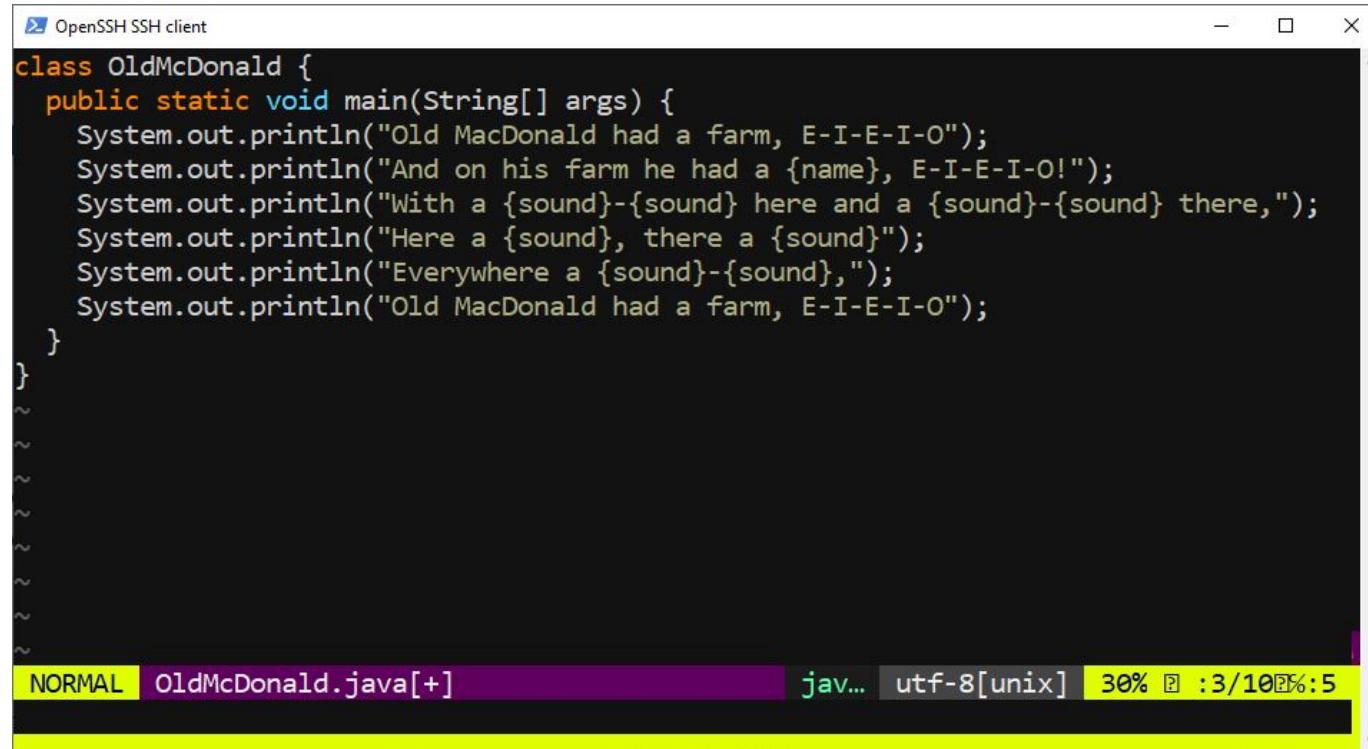
Unix

Error

Useful Editing Commands

Multi Command (*Command Mode*)

d5↓



A screenshot of a terminal window titled "OpenSSH SSH client" showing Java code in VIM. The code defines a class named OldMcDonald with a main method that prints lyrics. The cursor is positioned at the start of the class definition. The status bar at the bottom shows "NORMAL OldMcDonald.java[+]" and other file information.

```
class OldMcDonald {  
    public static void main(String[] args) {  
        System.out.println("Old MacDonald had a farm, E-I-E-I-O");  
        System.out.println("And on his farm he had a {name}, E-I-E-I-O!");  
        System.out.println("With a {sound}-{sound} here and a {sound}-{sound} there,");  
        System.out.println("Here a {sound}, there a {sound}");  
        System.out.println("Everywhere a {sound}-{sound},");  
        System.out.println("Old MacDonald had a farm, E-I-E-I-O");  
    }  
}
```

Notes

- d delete
- 5 this and 5 other lines

- ↓ below

Before

VIM

Setup

Task

Work

Split

Editing

- Copy

- Paste

- Delete

- Multi

- Search

- Replace

- Indent

- Tips

Unix

Error

Useful Editing Commands

Multi Command (*Command Mode*)

d5↓

A screenshot of a terminal window titled "OpenSSH SSH client". Inside, a Java code snippet is shown:

```
class OldMcDonald {
    public static void main(String[] args) {
    }
}
```

The cursor is positioned at the end of the first line of the class definition. The command `d5↓` has been entered, indicating a multi-command sequence where 'd' (delete) is followed by '5' (selecting 5 lines) and then '↓' (deleting the current line and moving down one). The terminal status bar at the bottom shows "NORMAL OldMcDonald.java[+]" and "6 fewer lines".

Notes

- d **delete**
- 5 this and 5 other lines

- ↓ below

After

VIM

Setup

Task

Work

Split

Editing

- Copy

- Paste

- Delete

- **Multi**

- Search

- Replace

- Indent

- Tips

Unix

Error

Useful Editing Commands

Multi Command (*Command Mode*)

d5↓

```
class OldMcDonald {
    public static void main(String[] args) {
    }
    public static void sing(Animals[] animals) {
        System.out.println("Old MacDonald had a farm, E-I-E-I-O");
        System.out.println("And on his farm he had a {name}, E-I-E-I-O!");
        System.out.println("With a {sound}-{sound} here and a {sound}-{sound} there,");
        System.out.println("Here a {sound}, there a {sound}");
        System.out.println("Everywhere a {sound}-{sound},");
        System.out.println("Old MacDonald had a farm, E-I-E-I-O");
    }
}
~
```

NORMAL OldMcDonald.java[+] jav... utf-8[unix] 41% :5/12%:5
6 more lines

Notes

- d delete
- 5 this and 5 other lines

- ↓ below

| Refactoring!

Setup

Task

Work

Split

Editing

- Copy

- Paste

- Delete

- Multi

- Search

- Replace

- Indent

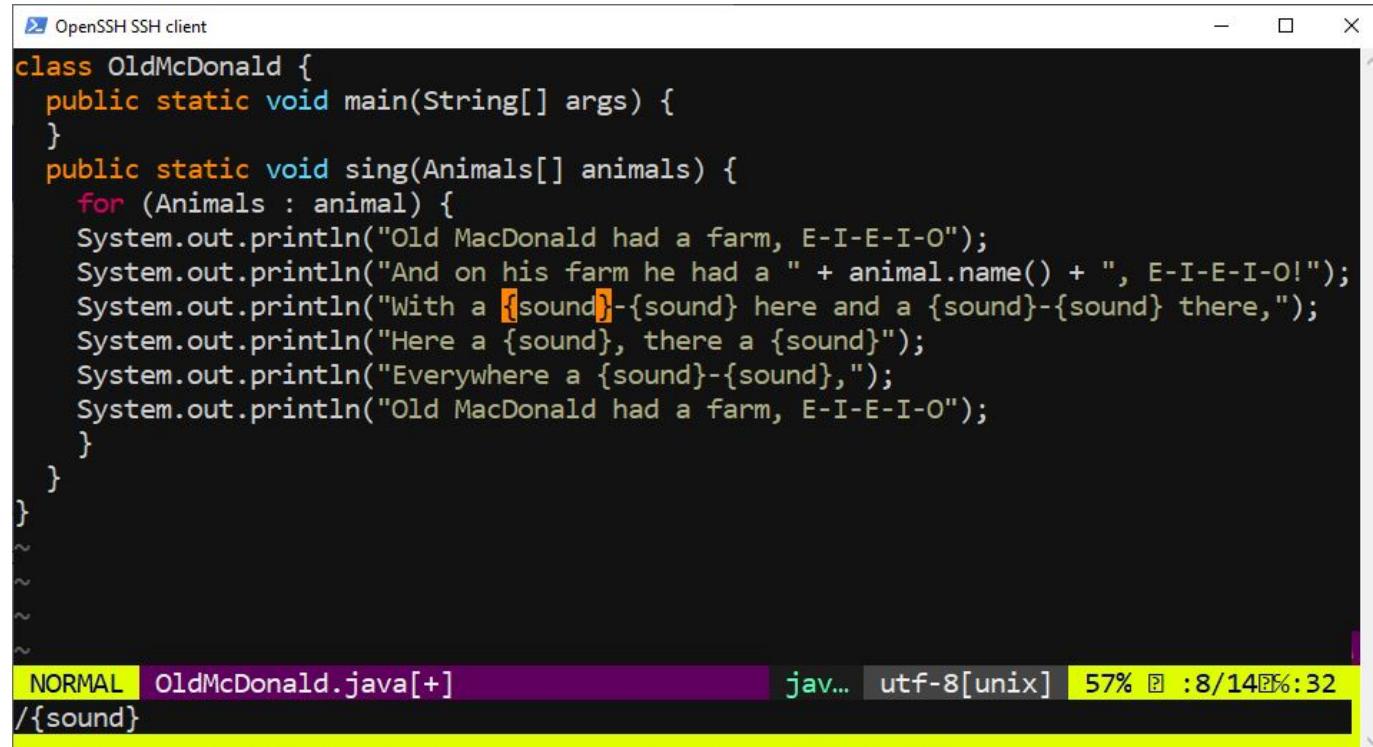
- Tips

Unix

Error

Useful Editing Commands

Search (*Command Mode*)

`/<text>`

A screenshot of a terminal window titled "OpenSSH SSH client" displaying Java code. The code is a class named OldMcDonald with a main method and a sing method that prints lyrics. The terminal shows the output of running this code. The bottom status bar indicates the mode is "NORMAL", the file is "OldMcDonald.java[+]", the encoding is "utf-8[unix]", the buffer size is "57%", the line number is "8/14", and the column number is "32". A search pattern, "/{sound}", is visible at the bottom of the screen.

Notes

- Find next:
 - `n`
- Find prev:
 - `<shift>+<n>`

Useful Editing Commands

Replace (*Command Mode*)

```
:%s/old/new/gc
```

```
:%s/{sound}/"  
+ animal.sound()  
+ "/gc
```

$\langle \text{ctrl} \rangle \leftarrow \wedge E$

+ animal.sound()
+ "/gc is being run to replace these with actual animal sounds. The terminal shows the prompt 'replace with " + animal.sound() + " (y/n/a/q/l/^E/^Y)?'" at the bottom." data-bbox="216 403 750 922"/>

```
OpenSSH SSH client
class OldMcDonald {
    public static void main(String[] args) {
    }
    public static void sing(Animals[] animals) {
        for (Animals : animal) {
            System.out.println("Old MacDonald had a farm, E-I-E-I-O");
            System.out.println("And on his farm he had a " + animal.name() + ", E-I-E-I-O!");
            System.out.println("With a {sound}-{sound} here and a {sound}-{sound} there,");
            System.out.println("Here a {sound}, there a {sound}");
            System.out.println("Everywhere a {sound}-{sound},");
            System.out.println("Old MacDonald had a farm, E-I-E-I-O");
        }
    }
}
~  

~  

~  

~  

~  

PROMPT OldMcDonald.java[+]          jav... utf-8[unix] 57% :8/14%:32
replace with " + animal.sound() + " (y/n/a/q/l/^E/^Y)?
```

Notes

- Try the command above!
- Press:
 - y: yes
 - n: no (*skip*)
 - a: yes to all
 - l: just one
 - q: quit
 - $\langle \text{ctrl} \rangle + \langle y \rangle$: scroll down
 - $\langle \text{ctrl} \rangle + \langle e \rangle$: scroll up

Setup

Task

Work

Split

Editing

- Copy

- Paste

- Delete

- Multi

- Search

- Replace

- Indent

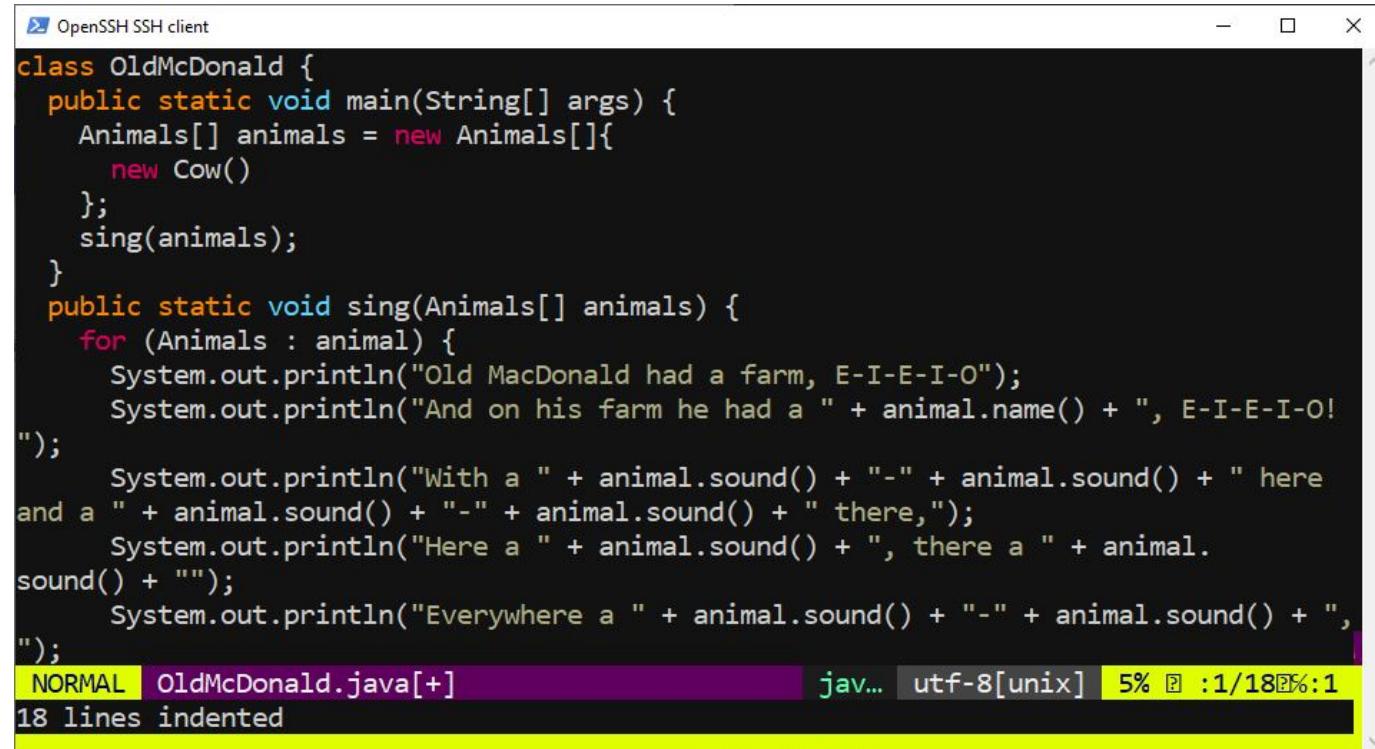
- Tips

Unix

Error

Useful Editing Commands

Auto-Indent (*Command Mode*)

gg=G

```
class OldMcDonald {
    public static void main(String[] args) {
        Animals[] animals = new Animals[]{
            new Cow()
        };
        sing(animals);
    }
    public static void sing(Animals[] animals) {
        for (Animals : animal) {
            System.out.println("Old MacDonald had a farm, E-I-E-I-O");
            System.out.println("And on his farm he had a " + animal.name() + ", E-I-E-I-O!");
        };
        System.out.println("With a " + animal.sound() + "-" + animal.sound() + " here
and a " + animal.sound() + "-" + animal.sound() + " there,");
        System.out.println("Here a " + animal.sound() + ", there a " + animal.
sound() + "");
        System.out.println("Everywhere a " + animal.sound() + "-" + animal.sound() + ",
");
    }
}
```

NORMAL OldMcDonald.java[+] jav... utf-8[unix] 5% :1/18%:1
18 lines indented

Notes

- gg └── go to top
- = └── indent
- G └── until end

[Setup](#)[Task](#)[Work](#)[Split](#)**Editing**[- Copy](#)[- Paste](#)[- Delete](#)[- Multi](#)[- Search](#)[- Replace](#)[- Indent](#)[- Tips](#)[Unix](#)[Error](#)

Useful Editing Commands

General Tips & Tricks

1. Design your program before coding
 - It takes longer to debug than to design
2. Always write the closing bracket before writing the content
 - Then press ↑ and `<end>`
 - This generally makes auto-indent (*i.e., gg=G*) well-behaved
 - Also may prevents compilation error due to mismatch bracket
3. Always compile everything before testing
 - Maybe even delete all `.class` files just to be doubly sure

Additional Useful Shortcuts

- To go to matching bracket (*in command mode*), press `%`
- To initiate auto-complete, press `<ctrl>+<n>` or `<ctrl>+<p>`

VIM

Setup

Task

Work

Split

Editing

Unix

- Compiling

- Correcting

- Running

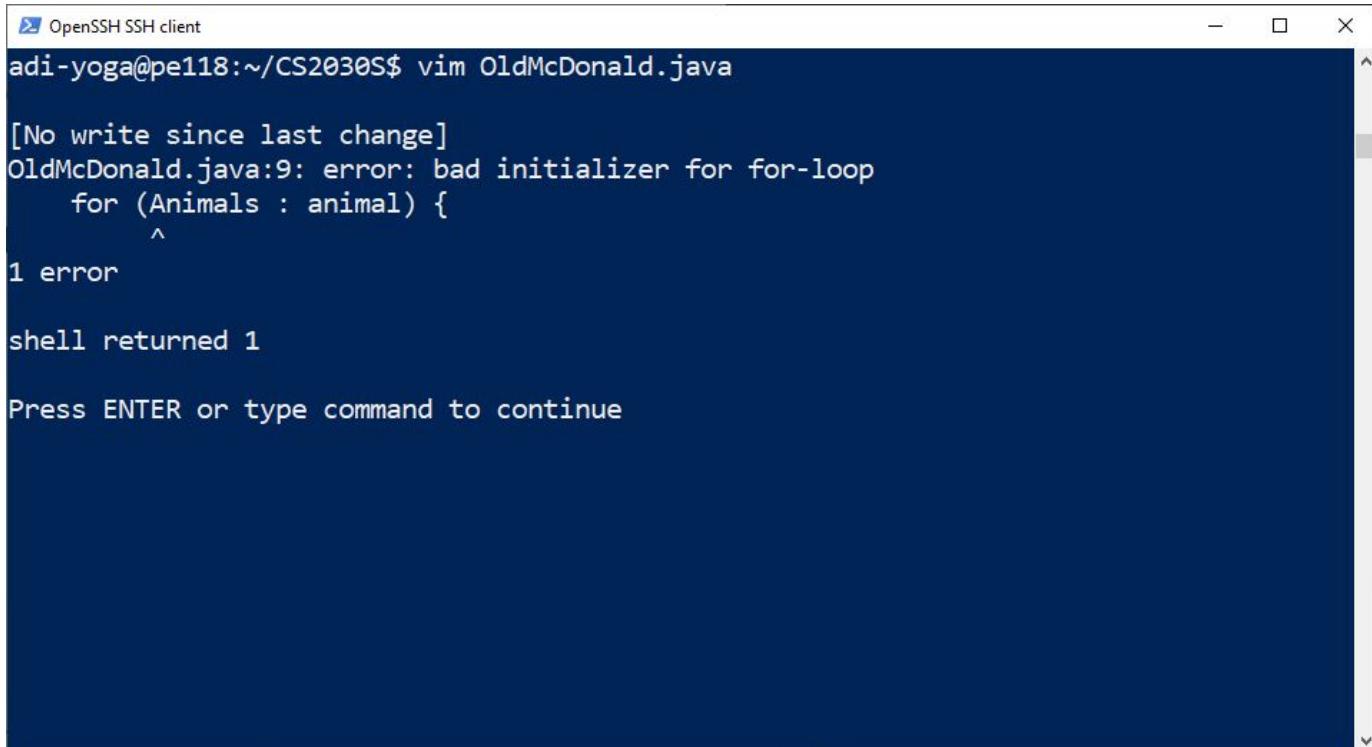
- Testing

Error

Unix Command from VIM

Compiling (*Command Mode*)

```
:!javac OldMcDonald.java
```



The screenshot shows a terminal window titled "OpenSSH SSH client". The command `vim OldMcDonald.java` was run, which triggered the compilation process. The output shows:

```
adi-yoga@pe118:~/CS2030S$ vim OldMcDonald.java
[No write since last change]
OldMcDonald.java:9: error: bad initializer for for-loop
    for (Animals : animal) {
          ^
1 error

shell returned 1

Press ENTER or type command to continue
```

Notes

- You don't have to leave VIM!

Setup

Task

Work

Split

Editing

Unix

- Compiling

- Correcting

- Running

- Testing

Error

Unix Command from VIM

Correcting (*Command Mode*)

gg8↓

```
OpenSSH SSH client
class OldMcDonald {
    public static void main(String[] args) {
        Animal[] animals = new Animal[]{
            new Cow()
        };
        sing(animals);
    }
    public static void sing(Animal[]
animals) {
        for (Animal animal : animals) {
            System.out.println("Old MacDonald
had a farm, E-I-E-I-O");
            System.out.println("And on his farm
he had a " + animal.name() + ", E-I-E-I-O!
");
        }
    }
}
class Cow implements Animal {
    private String name;
    private String sound;

    public Cow() {
        this.name = "Cow";
        this.sound = "Moo";
    }

    public String name() {
        return this.name;
    }
    public String sound() {
        return this.sound;
    }
}
OldMcDonald.java
Cow.java
"OldMcDonald.java" 16L, 253C written
```

Notes

- We know the problem is at line 9
- So let's go there
- Make the correction
- Save the file
- Rerun `javac`
 - Repeat until no more error

Setup

Task

Work

Split

Editing

Unix

- Compiling

- Correcting

- Running

- Testing

Error

Unix Command from VIM

Running (*Command Mode*)

```
:!java OldMcDonald
```

The screenshot shows a terminal window titled "OpenSSH SSH client". It displays the following text:

```
Press ENTER or type command to continue
Cow.java:5: error: invalid method declaration; return type required
    public Animal(String name, String sound) {
                           ^
1 error

shell returned 1

Press ENTER or type command to continue

Press ENTER or type command to continue
Old MacDonald had a farm, E-I-E-I-O
And on his farm he had a Cow, E-I-E-I-O!
With a Moo-Moo here and a Moo-Moo there,
Here a Moo, there a Moo
Everywhere a Moo-Moo,
Old MacDonald had a farm, E-I-E-I-O

Press ENTER or type command to continue
```

Notes

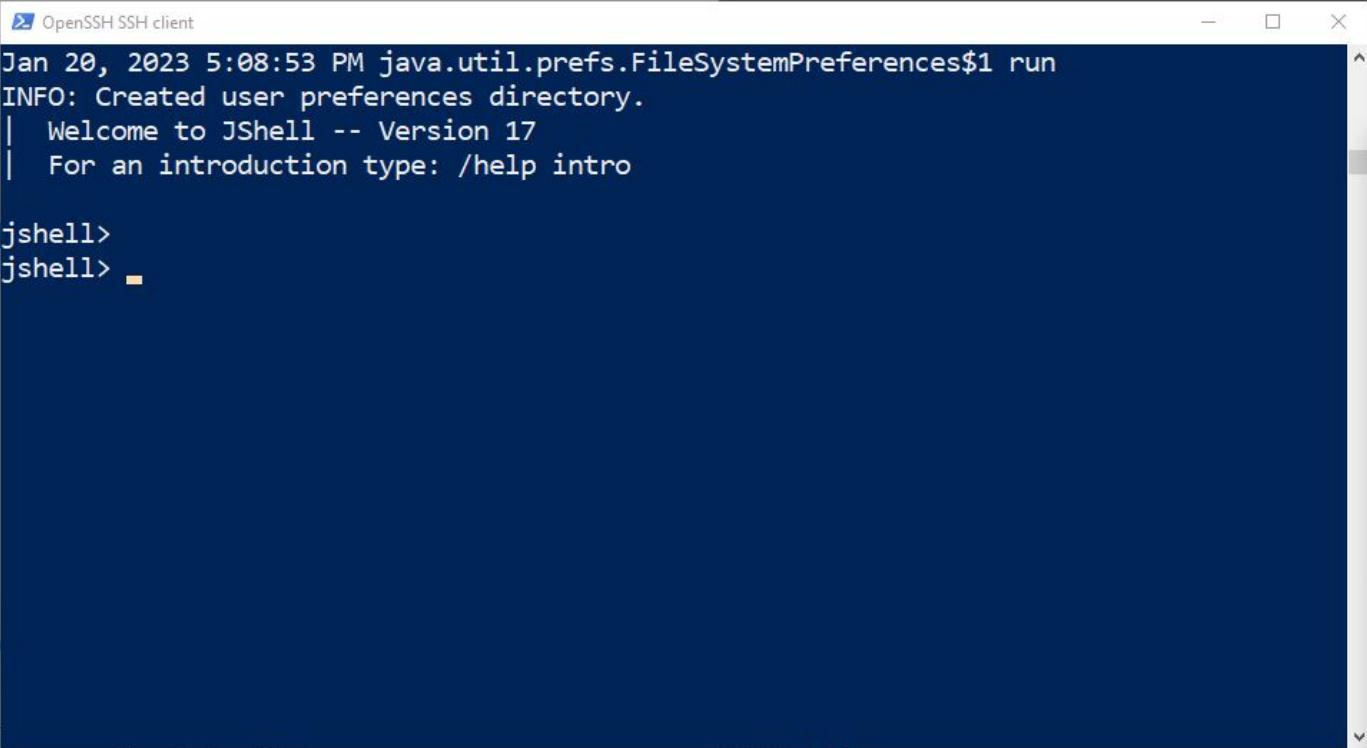
- Basically, the format is : !<command>
- Includes:
 - jshell
 - ls
 - cp
 - etc

[Setup](#)[Task](#)[Work](#)[Split](#)[Editing](#)[Unix](#)[- Compiling](#)[- Correcting](#)[- Running](#)[- Testing](#)[Error](#)

Unix Command from VIM

Running (*Command Mode*)

```
:!jshell Animal.java Cow.java Duck.java OldMcDonald.java
```



The screenshot shows a terminal window titled "OpenSSH SSH client". The output of the command `:!jshell Animal.java Cow.java Duck.java OldMcDonald.java` is displayed. The terminal shows the Java runtime environment initializing, creating a user preferences directory, and welcoming the user to JShell version 17. It also displays the JShell prompt twice: "jshell>" followed by a cursor.

```
Jan 20, 2023 5:08:53 PM java.util.prefs.FileSystemPreferences$1 run
INFO: Created user preferences directory.
| Welcome to JShell -- Version 17
| For an introduction type: /help intro

jshell>
jshell> ■
```

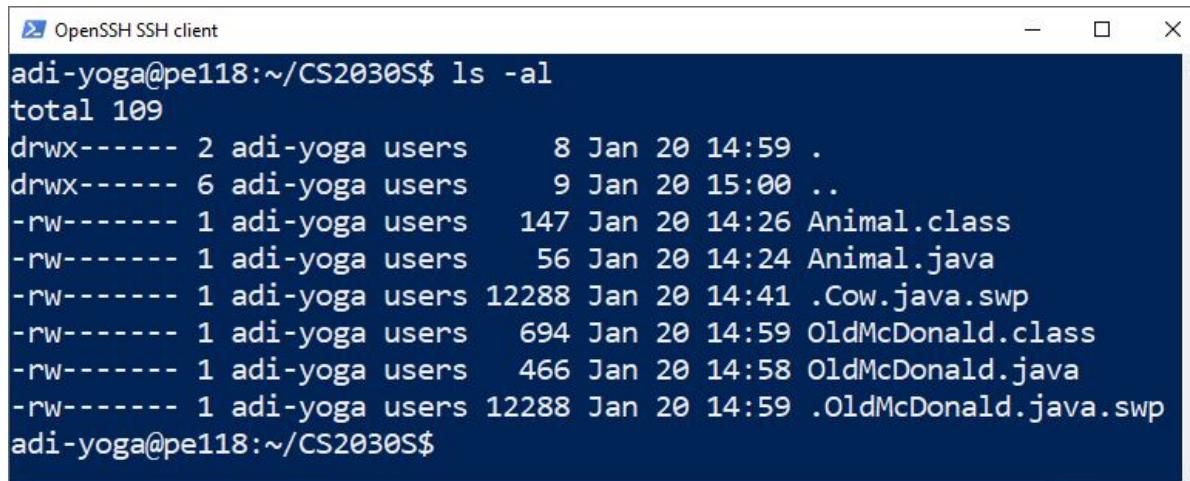
Notes

- In all of these, we have not left VIM!

Dealing with Error

Swap Files

- Sometimes, when you are doing work, bad things may happen
 - Connection timeout
 - Accidentally closing VIM (*e.g.*, $\langle \text{ctrl} \rangle + \langle c \rangle$)
 - etc
- In such cases, swap files will be created



```
adi-yoga@pe118:~/CS2030S$ ls -al
total 109
drwx----- 2 adi-yoga users      8 Jan 20 14:59 .
drwx----- 6 adi-yoga users      9 Jan 20 15:00 ..
-rw------- 1 adi-yoga users    147 Jan 20 14:26 Animal.class
-rw------- 1 adi-yoga users     56 Jan 20 14:24 Animal.java
-rw------- 1 adi-yoga users 12288 Jan 20 14:41 .Cow.java.swp
-rw------- 1 adi-yoga users    694 Jan 20 14:59 OldMcDonald.class
-rw------- 1 adi-yoga users    466 Jan 20 14:58 OldMcDonald.java
-rw------- 1 adi-yoga users 12288 Jan 20 14:59 .OldMcDonald.java.swp
adi-yoga@pe118:~/CS2030S$
```

[Setup](#)[Task](#)[Work](#)[Split](#)[Editing](#)[Unix](#)[Error](#)[- Swap File](#)[- Recovery](#)[- Cleanup](#)[- Artefacts](#)

Dealing with Error

Recovery

- If you try to open it, you will be greeted by a warning

The screenshot shows a terminal window titled "OpenSSH SSH client". The window contains the following text:

```
E325: ATTENTION
Found a swap file by the name ".Cow.java.swp"
    owned by: adi-yoga    dated: Fri Jan 20 14:41:51 2023
    file name: ~adi-yoga/CS2030S/Cow.java
    modified: YES
    user name: adi-yoga    host name: pe118
    process ID: 275599 (STILL RUNNING)
While opening file "Cow.java"
    CANNOT BE FOUND

(1) Another program may be editing the same file. If this is the case,
    be careful not to end up with two different instances of the same
    file when making changes. Quit, or continue with caution.
(2) An edit session for this file crashed.
    If this is the case, use ":recover" or "vim -r Cow.java"
    to recover the changes (see ":help recovery").
    If you did this already, delete the swap file ".Cow.java.swp"
    to avoid this message.

Swap file ".Cow.java.swp" already exists!
-- More --
```



VIM

Setup

Task

Work

Split

Editing

Unix

Error

- Swap File

- Recovery

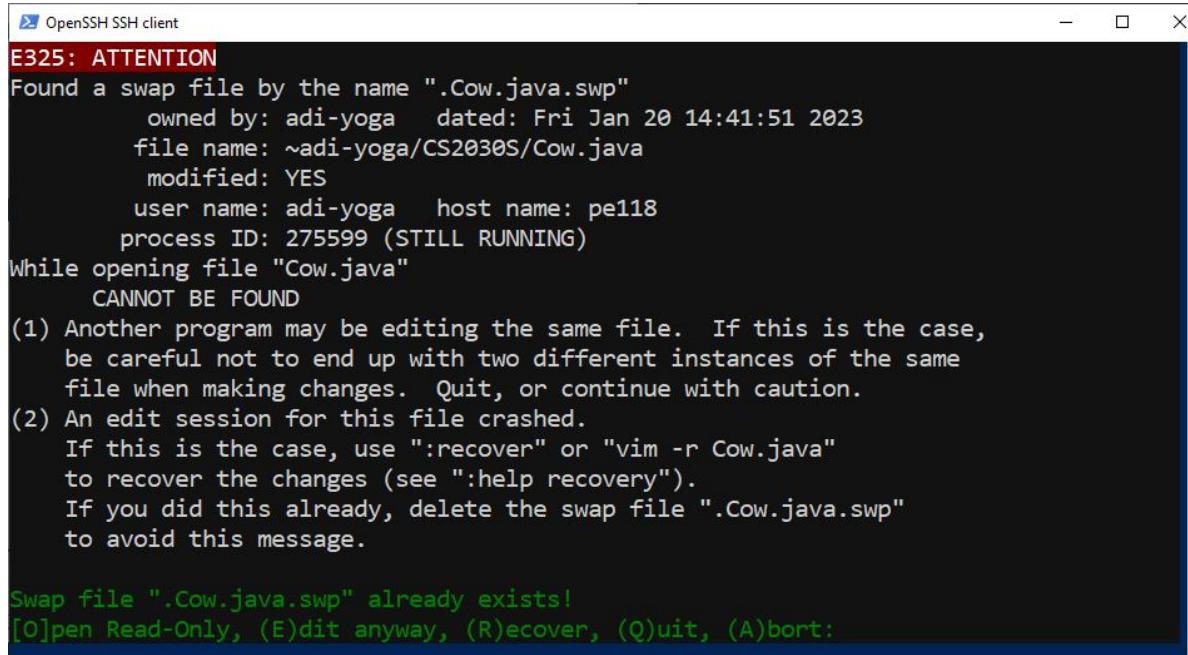
- Cleanup

- Artefacts

Dealing with Error

Recovery

- You have options!



The screenshot shows a terminal window titled "OpenSSH SSH client". The window displays an error message from Vim:

```
E325: ATTENTION
Found a swap file by the name ".Cow.java.swp"
    owned by: adi-yoga    dated: Fri Jan 20 14:41:51 2023
    file name: ~adi-yoga/CS2030S/Cow.java
    modified: YES
    user name: adi-yoga    host name: pe118
    process ID: 275599 (STILL RUNNING)
While opening file "Cow.java"
    CANNOT BE FOUND

(1) Another program may be editing the same file. If this is the case,
    be careful not to end up with two different instances of the same
    file when making changes. Quit, or continue with caution.
(2) An edit session for this file crashed.
    If this is the case, use ":recover" or "vim -r Cow.java"
    to recover the changes (see ":help recovery").
    If you did this already, delete the swap file ".Cow.java.swp"
    to avoid this message.

Swap file ".Cow.java.swp" already exists!
[O]pen Read-Only, (E)dit anyway, (R)ecover, (Q)uit, (A)bort:
```

- You may want to (R)ecover

VIM

Setup

Task

Work

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Editing

Unix

Error

- Swap File

- Recovery

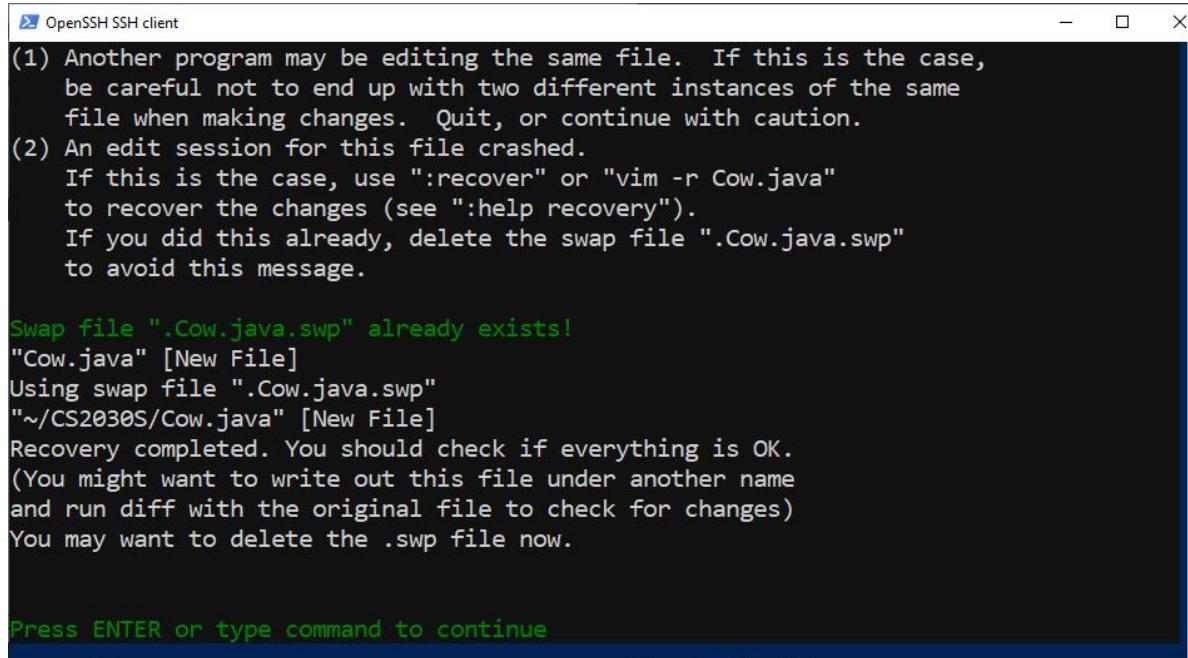
- Cleanup

- Artefacts

Dealing with Error

Recovery

- Press R



The screenshot shows a terminal window titled "OpenSSH SSH client". The text inside the window is as follows:

```
(1) Another program may be editing the same file. If this is the case,
    be careful not to end up with two different instances of the same
    file when making changes. Quit, or continue with caution.
(2) An edit session for this file crashed.
    If this is the case, use ":recover" or "vim -r Cow.java"
    to recover the changes (see ":help recovery").
    If you did this already, delete the swap file ".Cow.java.swp"
    to avoid this message.

Swap file ".Cow.java.swp" already exists!
"Cow.java" [New File]
Using swap file ".Cow.java.swp"
("~/CS2030S/Cow.java" [New File]
Recovery completed. You should check if everything is OK.
(You might want to write out this file under another name
and run diff with the original file to check for changes)
You may want to delete the .swp file now.

Press ENTER or type command to continue
```

- Check if it is indeed correct

Setup

Task

Work

Split

Editing

Unix

Error

- Swap File

- Recovery

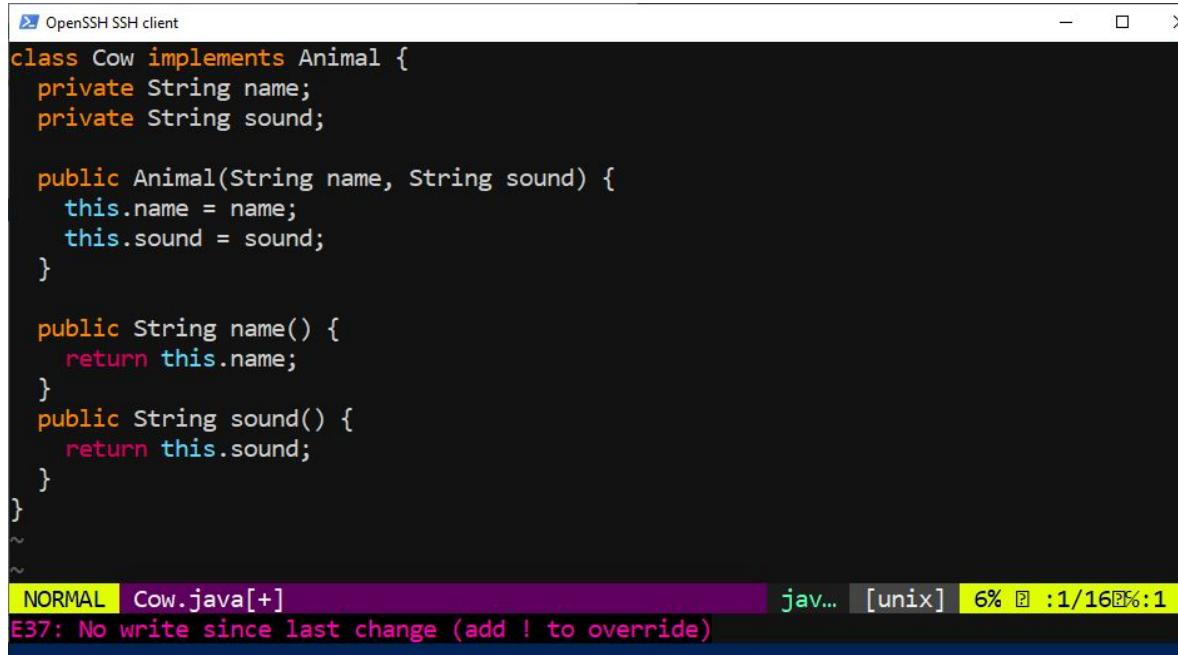
- Cleanup

- Artefacts

Dealing with Error

Recovery

- If you are happy, save (`:w`) otherwise quit (`:q!`)



A screenshot of a terminal window titled "OpenSSH SSH client". The window contains Java code for a "Cow" class:

```
class Cow implements Animal {  
    private String name;  
    private String sound;  
  
    public Animal(String name, String sound) {  
        this.name = name;  
        this.sound = sound;  
    }  
  
    public String name() {  
        return this.name;  
    }  
    public String sound() {  
        return this.sound;  
    }  
}
```

The status bar at the bottom shows "NORMAL | Cow.java[+]" and "E37: No write since last change (add ! to override)".

- Do the alternative if unhappy (e.g., [0]pen Read-Only)

VIM

Setup

Task

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Editing

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Error

- Swap File

- Recovery

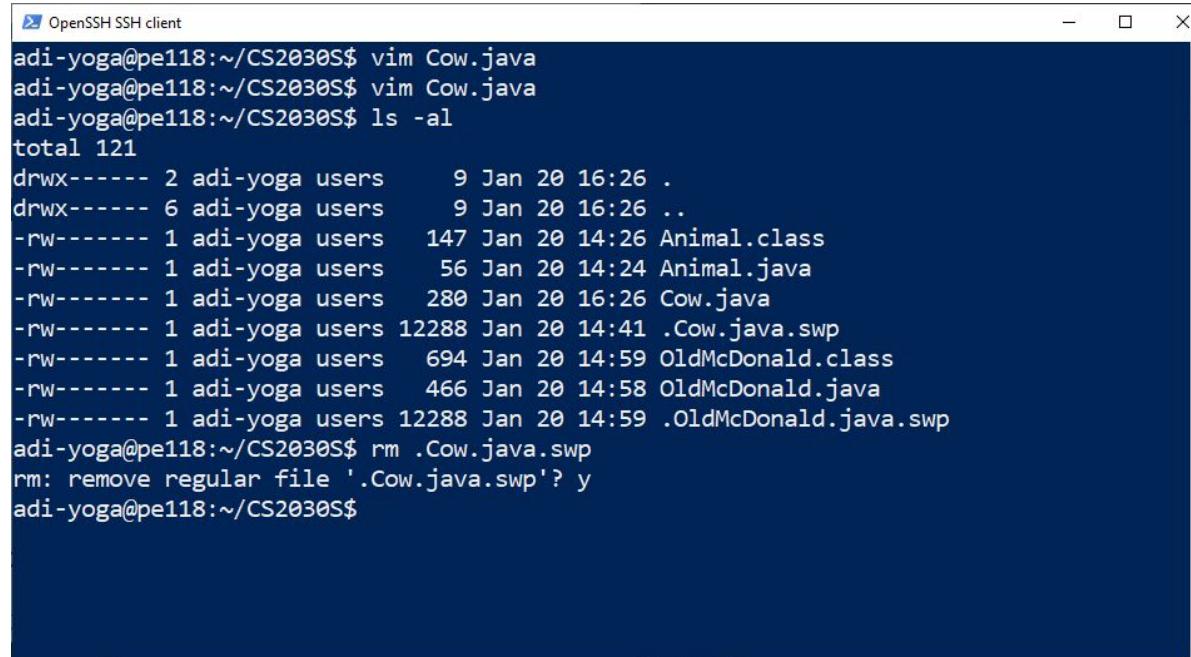
- **Cleanup**

- Artefacts

Dealing with Error

Cleanup

- Once you are happy, remove the swap file (`rm .Cow.java.swp`)



The screenshot shows a terminal window titled "OpenSSH SSH client". The command history and output are as follows:

```
adi-yoga@pe118:~/CS2030S$ vim Cow.java
adi-yoga@pe118:~/CS2030S$ vim Cow.java
adi-yoga@pe118:~/CS2030S$ ls -al
total 121
drwx----- 2 adi-yoga users      9 Jan 20 16:26 .
drwx----- 6 adi-yoga users      9 Jan 20 16:26 ..
-rw----- 1 adi-yoga users    147 Jan 20 14:26 Animal.class
-rw----- 1 adi-yoga users     56 Jan 20 14:24 Animal.java
-rw----- 1 adi-yoga users   280 Jan 20 16:26 Cow.java
-rw----- 1 adi-yoga users 12288 Jan 20 14:41 .Cow.java.swp
-rw----- 1 adi-yoga users   694 Jan 20 14:59 OldMcDonald.class
-rw----- 1 adi-yoga users   466 Jan 20 14:58 OldMcDonald.java
-rw----- 1 adi-yoga users 12288 Jan 20 14:59 .OldMcDonald.java.swp
adi-yoga@pe118:~/CS2030S$ rm .Cow.java.swp
rm: remove regular file '.Cow.java.swp'? y
adi-yoga@pe118:~/CS2030S$
```

- Do this for all swap files

// comment until EOL

Setup
Task
Work
Split
Editing
Unix

Error

- Swap File
- Recovery
- Cleanup
- Artefacts

Dealing with Error

Artefacts

- Sometimes you got a "silly rename" (*i.e., files to be deleted later*)

```
adi-yoga@pe118:~/CS2030S$ ls -al
total 121
drwx----- 2 adi-yoga users 9 Jan 20 16:30 .
drwx----- 6 adi-yoga users 9 Jan 20 16:29 ..
-rw----- 1 adi-yoga users 147 Jan 20 14:26 Animal.class
-rw----- 1 adi-yoga users 56 Jan 20 14:24 Animal.java
-rw----- 1 adi-yoga users 280 Jan 20 16:26 Cow.java
-rw----- 1 adi-yoga users 12288 Jan 20 14:41 .nfs0000000056015d0d00000031
-rw----- 1 adi-yoga users 12288 Jan 20 14:59 .nfs0000000056017a5700000032
-rw----- 1 adi-yoga users 694 Jan 20 14:59 OldMcDonald.class
-rw----- 1 adi-yoga users 466 Jan 20 16:29 OldMcDonald.java
adi-yoga@pe118:~/CS2030S$
```

- You can safely ignore those

/*
all comment
until it
is closed

*/

```
jshell> /exit  
|   Goodbye
```