Applications in Scientific Computing
Assignment 1: Navigating Linux and Vim

530.390.13

Due: Wednesday 6 January 2016

1. Remotely connect to `merlin.me.jhu.edu` and record the required steps.

   (a) Using Windows:
      i. Launch PuTTY
      ii. Enter hostname `merlin.me.jhu.edu`
      iii. Enable X11 Forwarding
      iv. Type JHED username
      v. Type password

   (b) Using OSX or Linux:
      i. Type `ssh -X user@merlin.me.jhu.edu`
      ii. Type password

2. What is your working directory upon login? What command prints the working directory?

   (a) `/home/user`
   (b) `pwd`

3. Create a new directory called `assignments`. Inside this directory, create another directory called `assignment-1` and navigate into it. Record the four required steps. What is your working directory?

   (a) `mkdir assignments`
   (b) `cd assignments`
   (c) `mkdir assignment-1`
   (d) `cd assignment-1`
   (e) Working directory: `/home/user/assignments/assignment-1`

4. Using Vim, create a new file in $\sim$`/assignments/assignment-1` called `vim-practice`, write your name on the first line, and save without exiting. Record the required steps. Bonus: What does the tilde ('$\sim$') represent in this directory path?

   (a) `vim vim-practice`
   (b) Press `i` to enter Insert mode
   (c) Type `Your Name`
   (d) Press `esc` to return to Normal mode
   (e) Type `:w` and press enter
   (f) Bonus: The tilde is a shortcut to your home directory (`/home/user`)

5. After a blank Line 2, type on Line 3 the following phrase 100 times: "Typing this phrase 100 times is the worst." Record the required steps.

(a) Beginning on Line 1 in Normal mode, press `o` to enter Insert mode below the current line and press enter to move to Line 3

(b) Press `esc` to return to Normal mode

(c) Type 100 and press `i` to enter Insert mode

(d) Type "Typing this phase 100 times is the worst."

(e) Press `esc` to return to Normal mode

6. Replace every instance of the phrase "the worst" with "easy using Vim." Record the required steps.

    (a) From Normal mode, type `:%s/the worst/easy using Vim/g`

7. Explore the function of the 'h', 'j', 'k', and 'l' keys. What do they do? Why is this useful?

    (a) `h`: move left

    (b) `j`: move down

    (c) `k`: move up

    (d) `l`: move right

    (e) Useful because it's nice to be lazy and navigate without moving your hands away from the home row.

8. Explore the function of the 'w' and 'b' keys. What do they do?

    (a) `w`: move forward an entire word

    (b) `b`: move backward an entire word

9. Copy and paste Line 1 into Line 5 (after a blank Line 4). Record the required steps.

    (a) Navigate to Line 1

    (b) Press `V` to highlight the entire line

    (c) Press `y`

    (d) Navigate to Line 3

    (e) Press `o` to enter Insert mode below Line 3 and press enter

    (f) Press `esc`

    (g) Press `p`

10. Delete Line 5 by pressing one key two times. What key did you press?

    (a) `d`

11. Undo what you deleted. How did you do this?

    (a) `u`

12. Redo what you just undid. How did you (un-)undo this?

    (a) `ctrl+r`

13. When in Normal Mode, what are the functions of 'i', 'a', 's', 'o', and 'r'? What happens if you hold shift while pressing these keys?

    (a) `i`: enter Insert mode in front of the cursor

    (b) `a`: enter Insert mode in behind of the cursor

    (c) `s`: enter Insert mode after deleting the character under the cursor

    (d) `o`: enter Insert mode in a new line below the current line

(e) `r`: replace the character under the cursor with the following character

(f) `I`: enter Insert mode at the beginning of the current line

(g) `A`: enter Insert mode at the end of the current line

(h) `S`: enter Insert mode after deleting the current line

(i) `O`: enter Insert mode in a new line below the current line

(j) `R`: enter Replace mode at the current cursor position

14. Save the file and quit Vim. Record the required steps.

   (a) `:wq` or `:x`

15. Navigate to your home directory. Record the required steps. Bonus: Can you do it using the tilde?

   (a) Type `cd` and press enter

   (b) Bonus `cd ~`

16. From your home directory, use `less` to view the `vim-practice` file. How is `less` different from Vim? There are two different ways to access this file: one by changing your working directory, and one by using the relative directory location. Record both commands.

   (a) `less` may only view the file, it cannot edit it

   (b) `cd assignments/assignment-1/` then `less vim-practice`

   (c) `less assignments/assignment-1/vim-practice`

   (d) Bonus: quit `less` by pressing `q`

17. Draw the file structure as it currently sits in your home directory.

   (a) `assignments` → `assignment-1` → `vim-practice`