A Gentle Introduction to vi(m)

Why Learn vi?

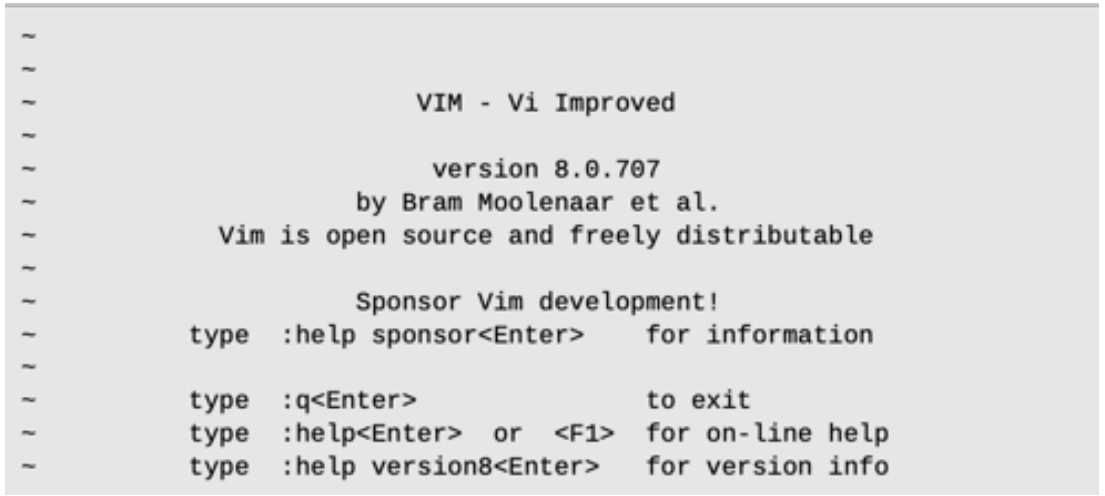
- vi is almost always available
- vi is lightweight and fast

vi derives its name from the word “visual,” because it was intended to allow editing on a video terminal with a moving cursor.

Most Linux distributions don't include real vi; rather, they ship with an enhanced replacement called vim (which is short for “vi improved”)

Starting and Stopping vi

- To start vi, we simply enter the following:
  ```
  $ vi
  ```
- A screen like this should appear:



- To exit, we enter the following command (note that the colon character is part of the command):
  ```
  :q
  ```
- The shell prompt should return. If, for some reason, vi will not quit (usually because we made a change to a file that has not yet been saved), we can tell vi that we really mean it by adding an exclamation point to the command.
  ```
  :q!
  ```

Compatibility Mode

- In the startup screen, if we see the text “Running in Vi compatible mode.” This means that vim will run in a mode that is closer to the normal behavior of `vi` rather than the enhanced behavior of `vim`.
- For the purposes of this chapter, we will want to run vim with its enhanced behavior. To do this, you have a few options. Try running vim instead of `vi`. If that works, consider adding alias `vi='vim'` to your `.bashrc` file. Alternatively, use this command to add a line to your vim configuration file:

```
echo "set nocp" >> ~/.vimrc
```

- Different Linux distributions package vim in different ways. Some distributions install a minimal version of vim (i.e., `vim-tiny`) by default that supports only a limited set of `vim` features.
- While performing the lessons that follow, you may encounter missing features. If this is the case, install the full version of `vim`.

Editing Modes

- Let's start vi again, this time passing to it the name of a nonexistent file. This is how we can create a new file with vi:

```
$ rm -f foo.txt
$ vi foo.txt
```

- If all goes well, we should get a screen like this->
- The leading tilde characters (~) indicate that no text exists on that line. This shows that we have an empty file. Do not type anything yet!

Entering Insert Mode

- To add some text to our file, we must first enter insert mode. To do this, we press the `i` key. Afterward, we should see the following at the bottom of the screen if vim is running
- in its usual enhanced mode (this will not appear in vi compatible mode):

  ```
  -- INSERT --
  ```

- Now we can enter some text. Try this:

  The quick brown fox jumps over the lazy dog.

- To exit insert mode and return to normal mode, press the `Esc` key.

Saving Our Work

- To save the change we just made to our file, we must enter an command mode. This is done by pressing the `:` key while in normal mode. After doing this, a colon character should appear at the bottom of the screen.

  ```
  :
  ```

- To write our modified file, we follow the colon with a w and then press Enter.

  ```
  :w
  ```

- The file will be written to the hard drive, and we should get a confirmation message at the bottom of the screen, like this:

  ```
  "foo.txt" [New] 1L, 45C written
  ```

- Note: While vim calls the three primary editing modes, *normal, insert*, and *command*. Real `vi` (and its documentation) calls these modes *command, insert,* and *ex*, respectively. Many online `vi` resources will refer to them that way, and it can be confusing.

Moving the Cursor Around

- Many commands in vi can be prefixed with a number, as with the “G” command listed above.
- By prefixing a command with a number, we may specify the number of times a command is to be carried out.
- For example, the command “5j” causes vi to move the cursor down five lines.

Table 12-1: Cursor Movement Keys

Key	Moves The Cursor
`l` or right arrow	Right one character.
`h` or left arrow	Left one character.
`j` or down arrow	Down one line.
`k` or up arrow	Up one line.
`0` (zero)	To the beginning of the current line.
`^`	To the first non-whitespace character on the current line.
`$`	To the end of the current line.
`w`	To the beginning of the next word or punctuation character.
`W`	To the beginning of the next word, ignoring punctuation characters.
`b`	To the beginning of the previous word or punctuation character.
`B`	To the beginning of the previous word, ignoring punctuation characters.
`Ctrl-f` or `Page Down`	Down one page.
`Ctrl-b` or `Page Up`	Up one page.
`number``G`	To line *number*. For example, `1G` moves to the first line of the file.
`G`	To the last line of the file.

Basic Editing

- Most editing consists of a few basic operations such as inserting text, deleting text, and moving text around by cutting and pasting.
- `vi`, of course, supports all of these operations in its own unique way. vi also provides a limited form of undo.
- If we press the “u” key while in normal mode, `vi` will undo the last change that you made

Appending Text

- `vi` has several different ways of entering insert mode. We have already used the `i` command to insert text.
- Let's go back to our foo.txt file for a moment.

  The quick brown fox jumps over the lazy dog.
- If we wanted to add some text to the end of this sentence, we would discover that the I command will not do it, since we can't move the cursor beyond the end of the line.
- `vi` provides a command to append text, the sensibly named a command. If we move the cursor to the end of the line and type `a`, the cursor will move past the end of the line and `vi` will enter insert mode. This will allow us to add some more text.

  The quick brown fox jumps over the lazy dog. It was cool.
- Remember to press the `Esc` key to exit insert mode.
- Since we will almost always want to append text to the end of a line, vi offers a shortcut to move to the end of the current line and start appending. It's the A command. Let's try it and add some more lines to our file.
- First, we'll move the cursor to the beginning of the line using the “0” (zero) command.
- Now we type A and add the following lines of text:

  The quick brown fox jumps over the lazy dog. It was cool.
  Line 2
  Line 3
  Line 4
  Line 5
- Press the `Esc` key to exit insert mode.

Opening a Line

- Another way we can insert text is by “opening” a line. This inserts a blank line between two existing lines and enters insert mode. This has two variants as described in Table 12-2.

Table 12-2: Line Opening Keys

Command	Opens
o	The line below the current line
O	The line above the current line

- We can demonstrate this as follows: place the cursor on “Line 3” then type o.

```
The quick brown fox jumps over the lazy dog. It was cool.
Line 2
Line 3

Line 4
Line 5
```

- A new line was opened below the third line and we entered insert mode. Exit insert mode by pressing the Esc key. Press the u key to undo our change.

- Press the O key to open the line above the cursor:

```
The quick brown fox jumps over the lazy dog. It was cool.
Line 2

Line 3
Line 4
Line 5
```

- Exit insert mode by pressing the Esc key and undo our change by pressing u.

Deleting Text

- vi offers a variety of ways to delete text, all of which contain one of two keystrokes.
- First, the x command will delete a character at the cursor location. x may be preceded by a number specifying how many characters are to be deleted.
- The d command is more general purpose. Like x, it may be preceded by a number specifying the number of times the deletion is to be performed. In addition, d is always followed by a movement command that controls the size of the deletion. Table 12-3 provides some examples.
- Place the cursor on the word It on the first line of our text.
- Press the x key repeatedly until the rest of the sentence is deleted. Next, press the u key repeatedly until the deletion is undone.

Table 12-3: Text Deletion Commands

Command	Deletes
x	The current character
3x	The current character and the next two characters
dd	The current line
5dd	The current line and the next four lines
dW	From the current cursor position to the beginning of the next word
d$	From the current cursor location to the end of the current line
d0	From the current cursor location to the beginning of the line
d^	From the current cursor location to the first non-whitespace character in the line
dG	From the current line to the end of the file
d20G	From the current line to the twentieth line of the file

Note: Real vi supports only a single level of undo. vim supports multiple levels.

- Let's try the deletion again, this time using the `d` command. Again, move the cursor to the word `It` and type `dW` to delete the word.

```
The quick brown fox jumps over the lazy dog. was cool.
Line 2
Line 3
Line 4
Line 5
```

- Type `d$` to delete from the cursor position to the end of the line.

```
The quick brown fox jumps over the lazy dog.
Line 2
Line 3
Line 4
Line 5
```

- Press `dG` to delete from the current line to the end of the file.

```
~
~
~
~
~
```

- Press `u` three times to undo the deletion.

Cutting, Copying, and Pasting Text

- The d command not only deletes text, it also “cuts” text. Each time we use the d command, the deletion is copied into a paste buffer (think clipboard) that we can later recall with the p command to paste the contents of the buffer after the cursor or with the P command to paste the contents before the cursor.
- The y command is used to “yank” (copy) text in much the same way the d command is used to cut text.
- Table 12-4 provides some examples of combining the y command with various movement commands:

Table 12- 4: Yanking Commands

Command	Copies
`yy`	The current line
`5yy`	The current line and the next four lines
`yW`	From the current cursor position to the beginning of the next word
`y$`	From the current cursor location to the end of the current line
`y0`	From the current cursor location to the beginning of the line
`y^`	From the current cursor location to the first non-whitespace character in the line
`yG`	From the current line to the end of the file
`y20G`	From the current line to the twentieth line of the file

- Let's try some copy-and-paste. Place the cursor on the first line of the text and type yy to copy the current line. Next, move the cursor to the last line (G) and type p to paste the line below the current line.

```
The quick brown fox jumps over the lazy dog. It was cool.
Line 2
Line 3
Line 4
```

```
Line 5
The quick brown fox jumps over the lazy dog. It was cool.
```

- Just as before, the u command will undo our change. With the cursor still positioned on the last line of the file, type P to paste the text above the current line.

```
The quick brown fox jumps over the lazy dog. It was cool.
Line 2
Line 3
Line 4
The quick brown fox jumps over the lazy dog. It was cool.
Line 5
```

- Try some of the other y commands in the Table 12-4 and get to know the behavior of both the p and P commands. When you are done, return the file to its original state.

Joining Lines

- `vi` is rather strict about its idea of a line. Normally, it is not possible to move the cursor to the end of a line and delete the end-of-line character to join one line with the one below it.
- Because of this, `vi` provides a specific command, `J` (not to be confused with j, which is for cursor movement), to join lines together.
- If we place the cursor on Line 3 and type the `J` command, here's what happens:

```
The quick brown fox jumps over the lazy dog. It was cool.
Line 2
Line 3 Line 4
Line 5
```

Search-and-Replace

- `vi` has the ability to move the cursor to locations based on searches. It can do this either on a single line or over an entire file. It can also perform text replacements with or without confirmation from the user.

Searching Within a Line

- The `f` command searches a line and moves the cursor to the next instance of a specified character.
- For example, the command `fa` would move the cursor to the next occurrence of the character a within the current line. After performing a character search within a line, the search may be repeated by typing a semicolon.

Searching the Entire File

- To move the cursor to the next occurrence of a word or phrase, the / command is used.
- This works the same way as we learned earlier in the `less` program. When you type the / command, a / will appear at the bottom of the screen.
- Next, type the word or phrase to be searched for, followed by the `Enter` key. The cursor will move to the next location containing the search string.
- A search may be repeated using the previous search string with the n command. Here's an example:

```
The quick brown fox jumps over the lazy dog. It was cool.
Line 2
Line 3
Line 4
Line 5
```

- Place the cursor on the first line of the file. Type followed by the `Enter` key.

  ```
  /Line
  ```

- The cursor will move to line 2.
- Next, type `n` and the cursor will move to line 3.
- Repeating the `n` command will move the cursor down the file until it runs out of matches.
- While we have so far used only words and phrases for our search patterns, `vi` allows the use of regular expressions, a powerful method of expressing complex text patterns.

Global Search-and-Replace

- `vi` uses command mode to perform search-and-replace operations (called substitution in vi) over a range of lines or the entire file. To change the word Line to line for the entire file, we would enter the following command:

  `:%s/Line/line/g`

- Let's break down this command into separate items and see what each one does (see Table 12-5).

Table 12- 5:An Example of Global Search-and-Replace Syntax

Item	Meaning
`:`	The colon character enters command mode.
`%`	This specifies the range of lines for the operation. `%` is a shortcut meaning from the first line to the last line. Alternately, the range could have been specified `1,5` (since our file is five lines long) or `1,$`, which means "from line 1 to the last line in the file." If the range of lines is omitted, the operation is performed only on the current line.
`s`	This specifies the operation. In this case, it's substitution (search-and-replace).
`/Line/line/`	This specifies the search pattern and the replacement text.
`g`	This means "global" in the sense that the search-and-replace is performed on every instance of the search string in the line. If omitted, only the first instance of the search string on each line is replaced.

- After executing our search-and-replace command, our file looks like this:

```
The quick brown fox jumps over the lazy dog. It was cool.
line 2
line 3
line 4
line 5
```

- We can also specify a substitution command with user confirmation. This is done by adding a c to the end of the command. Here's an example:

  `:%s/line/Line/gc`

- This command will change our file back to its previous form; however, before each substitution, vi stops and asks us to confirm the substitution with this message:

```
replace with Line (y/n/a/q/l/^E/^Y)?
```

- Each of the characters within the parentheses is a possible choice, as described in Table 12-6.
- If you type `y`, the substitution will be performed, `n` will cause `vi` to skip this instance and move on to the next one.

Table 12-6: Replace Confirmation Keys

Key	Action
`y`	Perform the substitution.
`n`	Skip this instance of the pattern.
`a`	Perform the substitution on this and all subsequent instances of the pattern.
`q` or `Esc`	Quit substituting.
`l`	Perform this substitution and then quit. This is short for "last."
`Ctrl-e, Ctrl-y`	Scroll down and scroll up, respectively. This is useful for viewing the context of the proposed substitution.

Editing Multiple Files

- It's often useful to edit more than one file at a time. You might need to make changes to multiple files or you may need to copy content from one file into another.
- With vi we can open multiple files for editing by specifying them on the command line.

```
vi file1 file2 file3...
```

- Let's exit our existing vi session and create a new file for editing. Type `:wq` to exit `vi`, saving our modified text. Next, we'll create an additional file in our home directory that we can play with.
- We'll create the file by capturing some output from the ls command.

```
$ ls -l /usr/bin > ls-output.txt
```

- Let's edit our old file and our new one with `vi`.

```
$ vi foo.txt ls-output.txt
```

- `vi` will start, and we will see the first file on the screen.

```
The quick brown fox jumps over the lazy dog. It was cool.
Line 2
Line 3
Line 4
Line 5
```

Switching Between Files

- To switch from one file to the next, use this ex command:

  `:bn`

- To move back to the previous file use the following:

  `:bp`

- While we can move from one file to another, `vi` enforces a policy that prevents us from switching files if the current file has unsaved changes.
- To force vi to switch files and abandon your changes, add an exclamation point (`!`) to the command.

- In addition to the switching method described above, vim (and some versions of `vi`) provides some command mode commands that make multiple files easier to manage.
- We can view a list of files being edited with the `:buffers` command. Doing so will display a list of the files at the bottom of the display.

```
:buffers
  1 %a   "foo.txt"                      line 1
  2      "ls-output.txt"                line 0
Press ENTER or type command to continue
```

- To switch to another buffer (file), type `:buffer` followed by the number of the buffer we want to edit.
- For example, to switch from buffer 1 containing the file foo.txt to buffer 2 containing the file ls-output.txt we would type this:

  `:buffer 2`

- Our screen now displays the second file. Another way we can change buffers is to use the `:bn` (short for buffer next) and `:bp` (short for buffer previous) commands mentioned earlier.

Opening Additional Files for Editing

- It's also possible to add files to our current editing session. The command mode command `:e` (short for “edit”) followed by a filename will open an additional file.
- Let's end our current editing session and return to the command line.
- Start vi again with just one file.

```
$ vi foo.txt
```

- To add our second file, enter the following:

```
:e ls-output.txt
```

- It should appear on the screen. The first file is still present as we can verify.

```
:buffers
  1 #    "foo.txt"                          line 1
  2 %a   "ls-output.txt"                    line 0
Press ENTER or type command to continue
```

Copying Content from One File into Another

- Often while editing multiple files, we will want to copy a portion of one file into another file that we are editing.
- This is easily done using the usual yank and paste commands we used earlier. We can demonstrate as follows.
- First, using our two files, switch to buffer 1 (foo.txt) by entering this:

  :buffer 1
- That should give us this:

```
The quick brown fox jumps over the lazy dog. It was cool.
Line 2
Line 3
Line 4
Line 5
```

- Next, move the cursor to the first line, and type yy to yank (copy) the line.
- Switch to the second buffer by entering the following:

  `:buffer 2`

- The screen will now contain some file listings like this (only a portion is shown here):

```
total 343700
-rwxr-xr-x 1 root root      31316 2017-12-05 08:58 [
-rwxr-xr-x 1 root root       8240 2017-12-09 13:39 411toppm
-rwxr-xr-x 1 root root     111276 2018-01-31 13:36 a2p
-rwxr-xr-x 1 root root      25368 2016-10-06 20:16 a52dec
-rwxr-xr-x 1 root root      11532 2017-05-04 17:43 aafire
-rwxr-xr-x 1 root root       7292 2017-05-04 17:43 aainfo
```

- Move the cursor to the first line and paste the line we copied from the preceding file by typing the p command.

```
total 343700
The quick brown fox jumps over the lazy dog. It was cool.
-rwxr-xr-x 1 root root       31316 2017-12-05 08:58 [
-rwxr-xr-x 1 root root        8240 2017-12-09 13:39 411toppm
-rwxr-xr-x 1 root root      111276 2018-01-31 13:36 a2p
-rwxr-xr-x 1 root root       25368 2016-10-06 20:16 a52dec
-rwxr-xr-x 1 root root       11532 2017-05-04 17:43 aafire
-rwxr-xr-x 1 root root        7292 2017-05-04 17:43 aainfo
```

Inserting an Entire File into Another

- It's also possible to insert an entire file into one that we are editing. To see this in action, let's end our `vi` session and start a new one with just a single file.

```
$ vi ls-output.txt
```

- We will see our file listing again.

```
total 343700
-rwxr-xr-x 1 root root     31316 2017-12-05 08:58 [
-rwxr-xr-x 1 root root      8240 2017-12-09 13:39 411toppm
-rwxr-xr-x 1 root root    111276 2018-01-31 13:36 a2p
-rwxr-xr-x 1 root root     25368 2016-10-06 20:16 a52dec
-rwxr-xr-x 1 root root     11532 2017-05-04 17:43 aafire
-rwxr-xr-x 1 root root      7292 2017-05-04 17:43 aainfo
```

- Move the cursor to the third line, and then enter the following command mode command:

  `:r foo.txt`

- The `:r` command (short for “read”) inserts the specified file below the cursor position.
- Our screen should now look like this:

```
total 343700
-rwxr-xr-x 1 root root       31316 2017-12-05 08:58 [
-rwxr-xr-x 1 root root        8240 2017-12-09 13:39 411toppm
The quick brown fox jumps over the lazy dog. It was cool.
Line 2
Line 3
Line 4
Line 5
-rwxr-xr-x 1 root root      111276 2018-01-31 13:36 a2p
-rwxr-xr-x 1 root root       25368 2016-10-06 20:16 a52dec
-rwxr-xr-x 1 root root       11532 2017-05-04 17:43 aafire
-rwxr-xr-x 1 root root        7292 2017-05-04 17:43 aainfo
```

Saving Our Work

- Like everything else in vi, there are several different ways to save our edited files.
- We have already covered the `:w` command, but there are some others we may also find helpful.
- In normal mode, typing `ZZ` will save the current file and exit vi. Likewise, the command mode command `:wq` will combine the :w and :q commands into one that will both save the file and exit.
- The `:w` command may also specify an optional filename. This acts like "Save As..."
- For example, if we were editing `foo.txt` and wanted to save an alternate version called `foo1.txt`, we would enter the following:

```
:w foo1.txt
```

Note: While this command saves the file under a new name, it does not change the name of the file we are editing. As we continue to edit, we will still be editing `foo.txt`, not `foo1.txt`.

Bash Does `vi` Too

- In chapter 8, “Advanced Keyboard Tricks” we looked at the various ways we could edit the contents of the command line.
- The particular editing commands that bash uses are not arbitrary. They are inspired by the emacs text editor.
- This is the default in bash, but bash also supports vi-style command line editing too. This feature is easily activated with the following command:

```
$ set -o vi
```

- Once this done, we can use many of the vi-style editing commands we have learned.
- Let’s try it. At the command prompt type the following example text:

```
$ the quick brown fox jumps over the lazy dog
```

- We can move the cursor with the arrow keys as before and we can type characters in the normal way.
- It behaves this way is because when we start a new command line, the editor is in insert mode and behaves just as vim does.
- To get to the cool stuff, we have to switch to normal mode. We exit insert mode by pressing the `ESC` key.
- All the movement commands, yank, delete, and paste work just as if we editing a one-line text file in `vim`.
- To return to insert mode we use the appropriate normal mode command such as `i` or `A`.
- Setting bash to use vi-style command line editing is a good way to reinforce our vi keyboard skills and it has the added benefit of reducing the number of editing commands we have to remember. Give it a try. To make it permanent, we can add the `set -o vi` command to our `.bashrc` file.
- To return to the emacs-style editing mode, enter this command:

```
$ set -o emacs
```

Note: There are many online tutorials available for this feature, but be aware that most will use the traditional vi mode names command, insert and ex rather than vim's normal, insert, and command.
