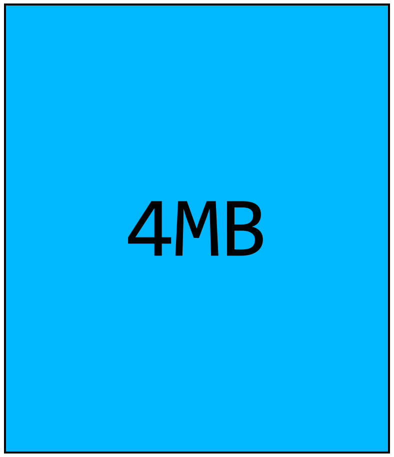
ECE 190
Programming Studio #2

Spring 2010

Outline

- Review of memory addressing
- Linux I/O redirection and pipelining
- Vim editor
- Vimdiff tool
- Exercises

Memory Addressing Review



If memory block addressability is 16 bits,

Questions:
What’s the address space?

$$\frac{4MB}{2B} = 2^{21}$$

How many bits are needed to represent the address?

$$\log_2 2^{21} = 21$$

Linux Outputs Redirection

- Many commands print the outputs to the standard output (the screen).
  - For example:

```
remlnx2 % ls
Desktop    ece190.work
remlnx2 %
```

- What if we want to save the outputs into a file instead?

Linux Outputs Redirection – cont.

- Symbol “>” tells Linux to print the outputs into a file instead of the standard output.
  - For example:

```
remlnx2 % ls > myhome
remlnx2 %
```

  - Check “myhome” using “cat”

```
remlnx2 % cat myhome
Desktop
ece190.work
remlnx2 %
```

Linux Iuputs Redirection

- Some commands require user inputs from the standard input (your keyboard).
  - For example: use “bc” to calculate 1+10

```
remlnx2 % bc
Bc 1.06
...
For details type `warranty’.
1+10
11
Quit
remlnx2 %
```

Linux Iuputs Redirection – cont.

- Save the inputs into a file called “mycal”

```
remlnx2 % echo 1+10 > mycal
remlnx2 %
```

- Symbol “<“ tells Linux to receive inputs from a file.

```
remlnx2 % bc < mycal
11
remlnx2 %
```

Linux I/O Redirection

- Combine I/O redirections

```
remlnx2 % bc < mycal > myres
remlnx2 % cat myres
11
remlnx2 %
```

- Append outputs to a file

```
remlnx2 % uname >> myres
remlnx2 % cat myres
11
Linux
remlnx2 %
```

Linux Pipelining

- One command wants to receive the inputs that are the standard outputs of another command
- Use “|” to pipeline the I/Os

```
remlnx2 % echo 1+10 | bc
11
remlnx2 %
```

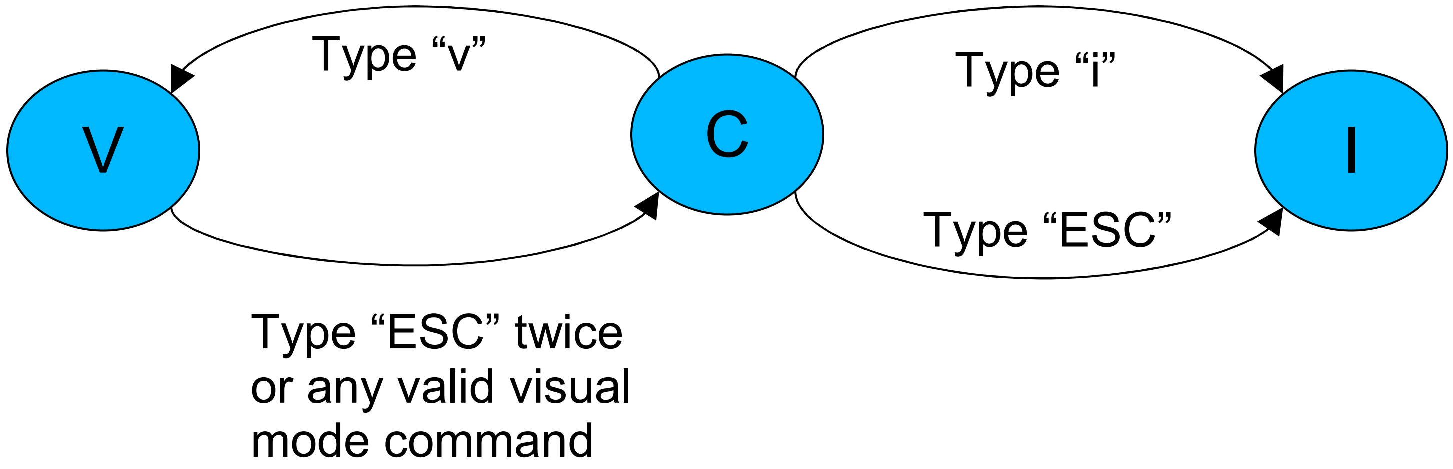
Introducing VIM

- Standard text editor on every Unix/Linux platform.
- Open a file in VIM

```
remlnx2 % vim myfile
```

Modes in VIM

- Three primary modes
  - Command mode : default starting mode
  - Insert mode : insert texts
  - Visual mode : text selections
- Mode switching:



Basic VIM Commands

- Save a file: “:w”
- Quit without saving: “:q!”
- Quit and save: “:wq”
- Insert: “i”
- Append: “a”
- Delete a character: “x”
- Delete a whole line: “dd”
- Undo: “u”
- Redo: “Ctrl+r”
- Search: “/<search string>”
- There are many others.

VimDiff

- Text file comparison tool
- Useful for all MPs
- Syntax: “vimdiff file1 file2”
- Color coding
  - Black – this line is the same in all the files being compared
  - Pink – this line contains some differences
  - Red – the highlighted text is different in the other files
  - Blue – the other files have extra lines at this location in the file

Exercise

1. Enter the following content into a file called “mydata” using vim

```
23
2
15
6
9
```

2. Try the following commands

```
remlnx2 % cat mydata | sort -n | head -n 3 > mysort
remlnx2 % vimdiff mydata mysort
```