

CSCI 2132: Software Development

Unix Shells and Other Basic Concepts

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Shells

Shell = program used by the user to interact with the system

- Used to run programs on the system
- Built-in commands and utilities (external programs)
- Used to automate many tasks (can usually be scripted)

UNIX has many shells:

- **Bourne shell:** sh, bash (Bourne-Again shell)
- Korn shell: ksh
- C shell: csh, tcsh
- Z shell: zsh (the Swiss army knife)

Getting Started with Unix

(Lab)

Mandatory exercise: Log in to bluenose using `ssh`

Options:

- PuTTY, MobaXTerm (Windows)
- Terminal (Mac, Linux)
- Run Linux in a VirtualBox

Main learning objective: Learn to open one or more terminals via `ssh`

Ask TAs, use Learning Centre if necessary.

Logging in to Bluenose

You can choose Mac/Windows machines in lab

- Windows: PuTTY
- Mac/Linux: Open a terminal, type

```
ssh <your csid>@bluenose.cs.dal.ca
```

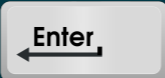

Example: I'd log in using

```
nzeh@bluenose.cs.dal.ca
```

Shell Prompt

- Logging into bluenose starts a shell on bluenose
- The shell presents you with a prompt:

```
<your csid>@bluenose:~$
```

- This prompt may vary depending on the shell
(Could be just \$ or %)
- Prompt can be changed
- Run programs and shell commands by entering them after the prompt and pressing 
- Edit command line before pressing 

Running a Utility

- Enter a command (**built-in** or **utility**)
- A **utility** is a program the shell finds in the file system (E.g., in the `/bin` directory)

Example: The following runs `/bin/who`

```
$ who
```

Example:

```
$ date  
Tue Jan 8 10:00:01 ADT 2019
```

More examples:

- `clear` clears screen
- `passwd` changes your password

Command Line Arguments

- Many utilities take arguments

Example: `date` takes an argument that influences the format of the output:

```
$ date +%Y-%m-%d-%H-%M-%S  
2018-01-08-10-00-33
```

- Explore usage of `date` using

```
$ man date (Use q to exit)
```

Manpages

Manpages (manual pages) provide documentation about every command installed on a Unix system.

Display manpage using `man`:

- Read about `man`:

```
$ man man
```

- Find commands with keyword directory:

```
$ man -k directory  
$ apropos directory
```

- Find the manpage for `rmdir` in Section 2
(Different sections for config files, system commands, user commands, ...)

```
$ man 2 rmdir
```


Special Shell Characters

Some characters, when typed at the prompt are interpreted specially by the shell:

- `^C` (Ctrl-C): End the current process
- `^Z` (Ctrl-Z): Suspend the current process
- `^D` (Ctrl-D): When entering input, signal the end of file
- `^L` (Ctrl-L): Clear screen

`stty -a` shows information about the terminal and the special characters it understands (`man stty` will help you decipher the output)

Standard Input/Output Channels

Every Unix process has three standard files it can read from and write to:

- `stdin` (standard input): Normally the keyboard input of the program
- `stdout` (standard output): The normal output (to screen) of the program
- `stderr` (standard error): The channel error messages are sent to

By default, `stdout`/`stderr` both go to the terminal.

Without arguments, `cat` reads from its standard input and writes the read characters to its standard output.

Example of cat

```
$ cat > hamlet.txt↵  
To be or not to be  
that is the question  
^D
```

```
$ cat hamlet.txt↵  
To be or not be  
that is the question
```

Editors

We can create files using `cat > filename`, but that doesn't allow us to edit (modify) existing files.

A `text editor` allows us to modify files.

Standard UNIX editors:

- `emacs` (main editor used in this course)
- `vi(m)` (another major editor)
- `pico`, `nano`, others (easier to learn, much less powerful)

Editors are covered in labs.

Logging Out

On some shells, typing `^D` is sufficient to log you out.

This may be disabled because it's easy to type by accident, logging you out accidentally.

`logout` and `exit` are commands you can invoke explicitly to log out.