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Concepts and Applications**

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Introduction to Linux

R. Johnson
*University of Pennsylvania
Philadelphia
USA*

Introduction to Linux

Bob Johnson

Institute for Computational Molecular Science

Temple University, Philadelphia, USA



Outline

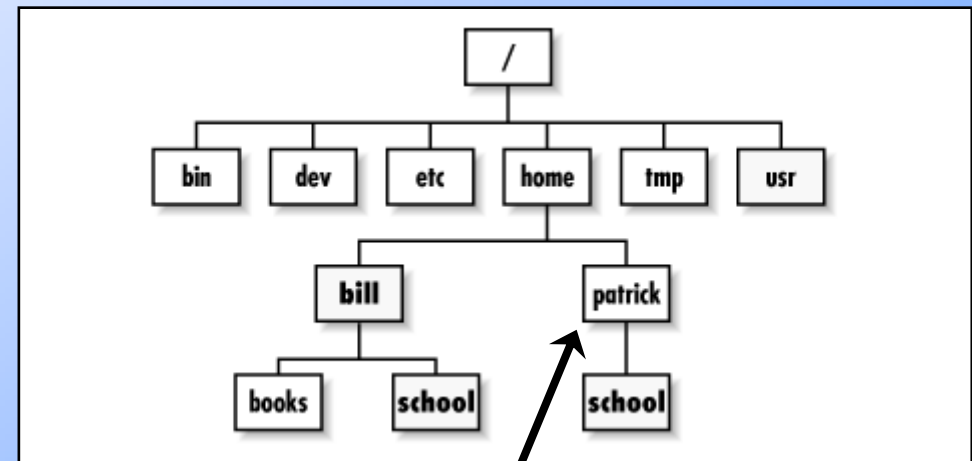
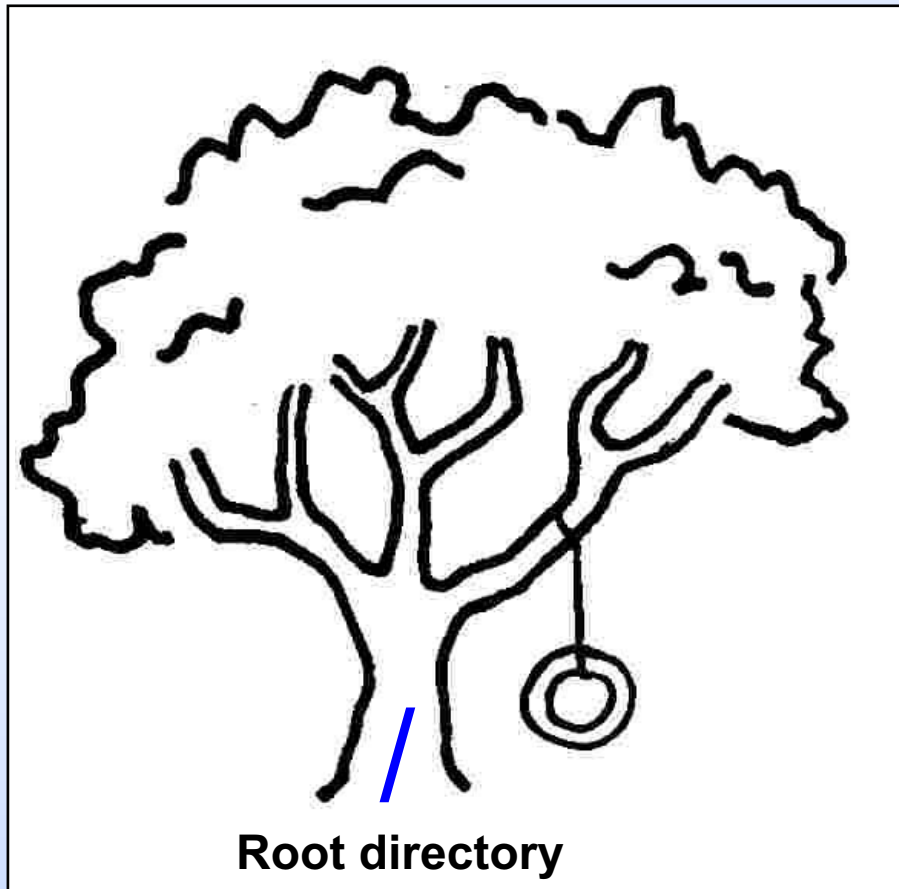
- Preliminaries
- Basic Commands
- Combining/Redirecting
- Scripts



“Linux is user-friendly. It is not ignorant-friendly or idiot-friendly.”

Preliminaries – File Organization

Directory Tree



Patrick's Home Directory

`/home/patrick`

Basic Linux Commands

Commands:

- **What are they?**
Just programs in the directory tree
- **Where are they located?**
`/bin, /usr/bin, /sbin`
- **How do I determine how a command works?**
Manual pages: `man command-name`
- **Anatomy of a command:**
`[DoSomething] [How] [ToFiles/Directories]`
`ls -l /home/bob`

Basic Linux Commands

Basic Navigation

- ls (ls -ltr)
- pwd
- cd

Directory Creation

- mkdir
- rmdir

File Viewing

- more, less
- head, tail
- grep, wc

File Manipulation

- cp
- mv
- rm
- gedit
- rename
- cat, paste
- chmod, chgrp, chown

System Information

- top, ps
- kill
- du, df

Controlling Data Flow

■ Redirection

- Redirect output into a new file: '>'
command > filename
- Append output to an existing file: '>>'
command >> filename
- Direct file as input for command: '<'
command < input_file

■ Piping

- Use output from one command as input for a second: '|'
command1 | command2 | command3...

Shell Variables

- Store numbers, filenames, strings in variable that's accessible to the shell

Local Variables

Variable definition: `VAR=value`

Expand variable: `${VAR}`

Print value of variable: `echo ${VAR}`

Unset variable: `unset VAR`

Environment Variables

Create an environment variable: `export VAR`

User's home directory: `${HOME}`

Search path for executables: `${PATH}`

Shell Scripts

- A series of commands can be incorporated into a script and executed like a program
- Can be used to automate (repetitive) tasks

Scripting Languages

- Bash/Csh/Tcsh/Ksh
- SED – Replace text
 - Syntax similar to that used in VI
- AWK – Manipulate column formatted data
 - Syntax similar to C

Secure Shell (SSH)

- Transfer data from one computer to another over network
- Connect to remote computer:
`ssh user@hostname`
- Export display of remote computer:
`ssh -X user@hostname`
- Transfer files using SSH
`scp <files> user@hostname:<directory>`

AWK Scripts

Very powerful at manipulating files containing data in columns

Anatomy of an AWK Script

`awk 'BEGIN { } { } END { }' file`

↑ ↑ ↑

Processes Processes Processes
that occur applied to that occur
before file is each line of after file is
read file read

Example: Computing an average

Example: Manipulating columns

Example: Combine with Linux commands