

# Introduction to Unix

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## Outline

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- What is Unix? And why Use it?
- Unix Basics
- Unix File Systems
- Editors
- A Few Unix Utilities
- The Shell
- Unix Programming – Shell Scripts

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For more information, see

`http://www.mhpcc.edu/training/vitecbids/  
UnixIntro/UnixIntro.html#GetStart`

## What Is UNIX? And Why Use It?

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- a machine-independent, multi-tasking, multi-user operating system

[Windows is another operating system]

- Advantages: software is mobile, hardware independent, versatile, lots of tools, distributed processing, multi-tasking, availability

- Why not use it?

It's harder to learn than Windows.

## Unix Basics

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- You need to log onto a system somehow (with a username and password), e.g. `ssh ~` → a command window
- Your Home Directory – where YOU start; this is where your files and directories (folders) are
- Examples of UNIX Commands

`mkdir, rmdir, cd, cd .., mv, cp, cat, more, ls, R, xpdf, fg, bg, CTRL-Z, jobs -l, kill, logout, exit`

`R CMD BATCH Rbatch.in Rbatch.out`

`R CMD BATCH Rbatch.in Rbatch.out &`

`nice R CMD BATCH Rbatch.in Rbatch.out &`

## UNIX Filesystems

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- Hierarchical File Structure – Windows is similar
- File Types - ordinary text files, directories, executable files
- File Names - almost anything goes, even spaces but I would avoid those; *case sensitive*
- Pathnames - the address of a file, e.g. `/unix/tmp/collectR` - a file named `collectR` in the `tmp` subdirectory in `unix`
- Access Permissions – **read, write, execute**  
(use `ls -l` to see which files allow these types of access)

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- change permissions with `chmod` for user, group and world: 3 numbers, eg. `chmod 754 unix.tex` allows user to `rwX`, group to `rx` and world to `r`.

## Editors

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- The Standard Display Editor - vi
  - `$ vi file.txt`
  - `i`
  - I will type my text now,  
but I cannot use a mouse to move.  
I can only use the arrow keys.
  - `[Esc]`
  - `:wq`
- pico: a simpler alternative to vi
- gedit: similar to NotePad



## The Shell

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- The program which interprets your commands
- Possibilities: Bourne (sh), C (csh), Korn (ksh), TC (tcsh), Bourne Again (bash)
- Each shell behaves slightly differently
- Type `echo $SHELL` to find out which shell you are using

## A Few UNIX Utilities

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- *Help*, e.g. copy    e.g. `man cp`
- *Find a file containing*, e.g. the word 'BATCH'    `grep BATCH *`
- *Find a file called*, e.g. 'collectR'    `find . -name collectR`

## Unix Programming – Shell Scripts

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- An executable file that contains operating system commands
- Simple Example: Copy the following into a file called `collectR` in a directory called `tmp`:

```
cd ..  
cat *.R > tmp/allfiles.R
```

- At the command line, type

```
$ ls  
$ chmod 744 collectR  
$ ./collectR  
$ ls  
$ cat allfiles.R
```