

CS1101: Lecture 4

Files: Basic Concepts

Dr. Barry O'Sullivan
b.osullivan@cs.ucc.ie



Course Homepage

<http://www.cs.ucc.ie/~osullb/cs1101>

•Department of Computer Science, University College Cork •

- What is a file?
- Files & Directories
- A Simple File Hierarchy
- Pathnames
 - Absolute Pathnames
 - Relative Pathnames
 - Summary: Pathnames
- Your Home Directory
- Changing Directory
- What Directory am I in?
- Abbreviation for Home Directories
- Abbreviation for Parent Directory

•Department of Computer Science, University College Cork •

1

CS1101: Systems Organisation

What is a file?

- The *file* is the basis unit of the UNIX operating system;
- Almost everything in UNIX is treated as a file:
 - *Documents*: these include text files, such as letters, source code for computer programs, or anything else you write;
 - *Commands*: Most commands are *executable* files – that is they are files you can run;
 - *Devices*: The UNIX operating system treats everything as file – the terminal, printer, disk drives;
 - *Absolutely nothing*: There is a special file which is a “black-hole” – /dev/null
 - *Directories*: A directory is a file that contains other files.

•Department of Computer Science, University College Cork •

2

CS1101: Systems Organisation

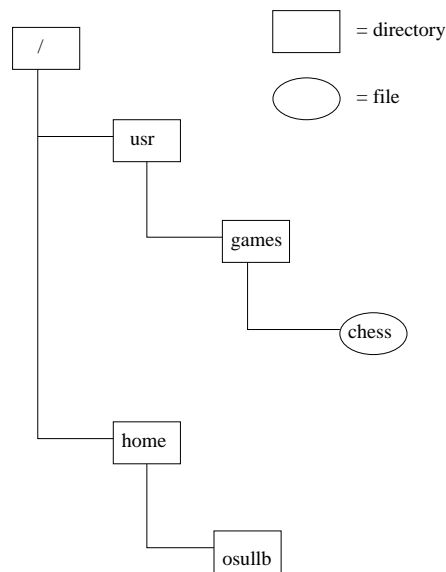
Files & Directories

- A directory is a file that holds other files;
- Directories can also contain other directories, that can contain other directories, and so on;
- You move around from directory to directory in order to manipulate the files they contain;
- It is convenient to visualise directory structure as a hierarchy

•Department of Computer Science, University College Cork •

3

A Simple File Hierarchy



Pathnames

- The name of the chess program is `chess`;
- The *pathname* of the chess program is `/usr/games/chess`;
- In other words, it's the name of the file (`chess`) plus its location (`/usr/games`);
- If `chess` were located in `/usr/lib` (a different directory), its pathname would be:

`/usr/lib/chess`

- To run the chess program, you would type:
- ```
wisdom.ucc.ie:%> /usr/games/chess
```
- Pathnames are important because you can't use a file unless you can find it.

## Absolute Pathnames

- `/usr/games/chess` is an *absolute pathname*;
- This means that it gives the location of the file `chess` in terms of its overall position in the whole UNIX file hierarchy;
- To find `chess`, you go up to `/` and then back down through `usr` and `games`;
- We say that `chess` is located in the directory `/usr/games`

## Relative Pathnames

- It's inconvenient to give the full, absolute pathname every time you want to access a file;
- A *relative pathname* describes the file's location not in terms of the whole UNIX hierarchy, but *relative to your location in that hierarchy*;
- Suppose you're in the directory `/usr` – we'll talk about how you would get there later!
- Since this directory contains the directory `games`, which contains the chess program, you don't need to specify the `/usr` part – you're already there;
- All you need to type is:

```
wisdom.ucc.ie%> games/chess
```

- If you're located in `/usr/games`:

```
wisdom.ucc.ie%> chess
```

| If you're located in... | ...the command is:            |
|-------------------------|-------------------------------|
| <i>anywhere</i>         | <code>/usr/games/chess</code> |
| <code>/</code>          | <code>usr/games/chess</code>  |
| <code>/usr</code>       | <code>games/chess</code>      |
| <code>/usr/games</code> | <code>chess</code>            |

We have assumed that “.”, the current directory, is on our path.

- You have a home directory that you go to when you log in;
- This is the starting point for your own filesystem (directory structure), containing your own files;
- To find out the absolute pathname for your home directory, login and type the following:

```
wisdom.ucc.ie%> cd
wisdom.ucc.ie%> pwd
<your home directory
 will be displayed here>
wisdom.ucc.ie%>
```

- You can create files and directories in your home directory.

**Changing Directory**

- In order to manipulate files, you need to be able to get to them;
- The `cd` command moves you from directory to directory;
- Its syntax is

```
cd <directory path>
```

where <directory path> is the name of the directory to which you want to go;

- Here is how you would go to the directory `/usr/games`:

```
wisdom.ucc.ie%> cd /usr/games
```

- The `cd` command by itself moves you to your home directory:

```
wisdom.ucc.ie%> cd
```

**What Directory am I in?**

- The `pwd` (for print working directory) command tells you where you are in the directory hierarchy;
- In the example below assume that your home directory is `/home/osullb`:

```
wisdom.ucc.ie%> pwd
/home/osullb
wisdom.ucc.ie%> cd /usr/games
wisdom.ucc.ie%> pwd
/usr/games
wisdom.ucc.ie%> cd
wisdom.ucc.ie%> pwd
/home/osullb
wisdom.ucc.ie%>
```

## Abbreviation for Home Directories

- Your home directory can be abbreviated as `~`
- The notation  
`~/<filename>`  
refers to a file called `<filename>` in your home directory – also true for directories in your home directory;
- The notation  
`~<username>`  
refers to the home directory of a user called `<username>`
- Therefore, the notation  
`~<username>/<filename>`  
refers to a file called `<filename>` in the home directory of the user called `<username>`.

## Abbreviation for the Current Directory

- The abbreviation `./` refers to the current directory – the one you're in;
- However, to use this abbreviation a `/` needs to be placed between the `.` and the file/directory name.
- Example: to refer to the file `MyLetter` in the current directory, you could refer to it as:  
`./MyLetter`  
or just  
`MyLetter`
- Please note that there are other issues here regarding search paths – we will revisit this at a later stage;

## Abbreviation for the Current Directory

- **Note:** there is a difference between the following:  
`./MyLetter`  
and  
`.MyLetter`
- The file referred to as `.MyLetter` is a *hidden file* while the file `./MyLetter` is the file `MyLetter` in the current directory.
- The abbreviation `./` is a *relative pathname*.

## Abbreviation for the Parent Directory

- The abbreviation `..` refers to the directory just above the one you're in – known as the *parent directory*;
- Suppose that you've moved into `/home/osullb`, if you want to move up one directory, simply type `cd ..` as follows:  

```
wisdom.ucc.ie%> pwd
/home/osullb
wisdom.ucc.ie%> cd ..
wisdom.ucc.ie%> pwd
/home
wisdom.ucc.ie%>
```
- You're now in `/home`
- The abbreviation `..` is a *relative pathname*.