

Using Windows Computers

Operating System

Computers are used extensively in crystallography to operate instruments and to perform the numerous calculations needed to solve and refine a crystal structure. There are two main types of operating systems in use on personal computers today, Windows and Linux. The MacIntosh operating system is a proprietary version of Linux. An operating system is a group of programs and files that perform all low level communications between the user and the computer. All of these operating systems generally perform the same tasks. The main difference between the operating systems at this time is which icon is used to launch a particular type of program. The computers in the Crystallography Laboratory currently use the Windows 7 operating system.

Directory Structure

The directory structure describes the hierarchical arrangement of files as they are arranged in directories and subdirectories. A directory is simply a file with the names and locations of all files contained in that directory.

Windows separates a logical device label from the rest of the directory tree. Device labels are a single letter followed by a colon, e.g., "C:". A directory is separated from the device label and other directories by a backslash, e.g., "C:\Windows\System32". The backslash is also used to separate a directory from a file name.

Each file in a directory must have a unique file name. If you need a duplicate copy of a file you must either give the copied file another name or place the file in another directory.

File manipulations and opening programs can be performed either in a GUI-based file manager or in a Command Prompt Window. Most users are well acquainted with file managers so those programs will not be discussed further.

Command Prompt Window

The Command Prompt program allows you to work in a command-line environment. In the Command Prompt Window, you will only use your keyboard for input. You won't use your mouse unless you open a GUI-based program.

To launch the Command Prompt Window select *Start -> Run* and type **cmd** in the box. You can also go to *Start -> All Programs -> Accessories -> Command Prompt* to open the Command Prompt Window.

The Command Prompt Window appears as a blank terminal window. The actual *command prompt* should look something like:

```
C:\Users\username>
```

Where *username* is your login name. Commands are typed after the “>” prompt. The boldface type below (that follows the command prompt) is what you should type as you work through this tutorial. Note that the current device, in this case “C:”, and the current directory, in this case “\Users*username*”.

The Windows operating system does not care if you use upper or lower case for commands or file names. Thus the command **dir** is the same as **DIR**. Similarly a file name typed as **structure1.res** is the same file as **STRUCTURE1.RES** to a Windows-based computer. This is one of the significant differences between the Windows operating system and Linux or Macintosh systems. In Linux, the case of a command or file name is very important.

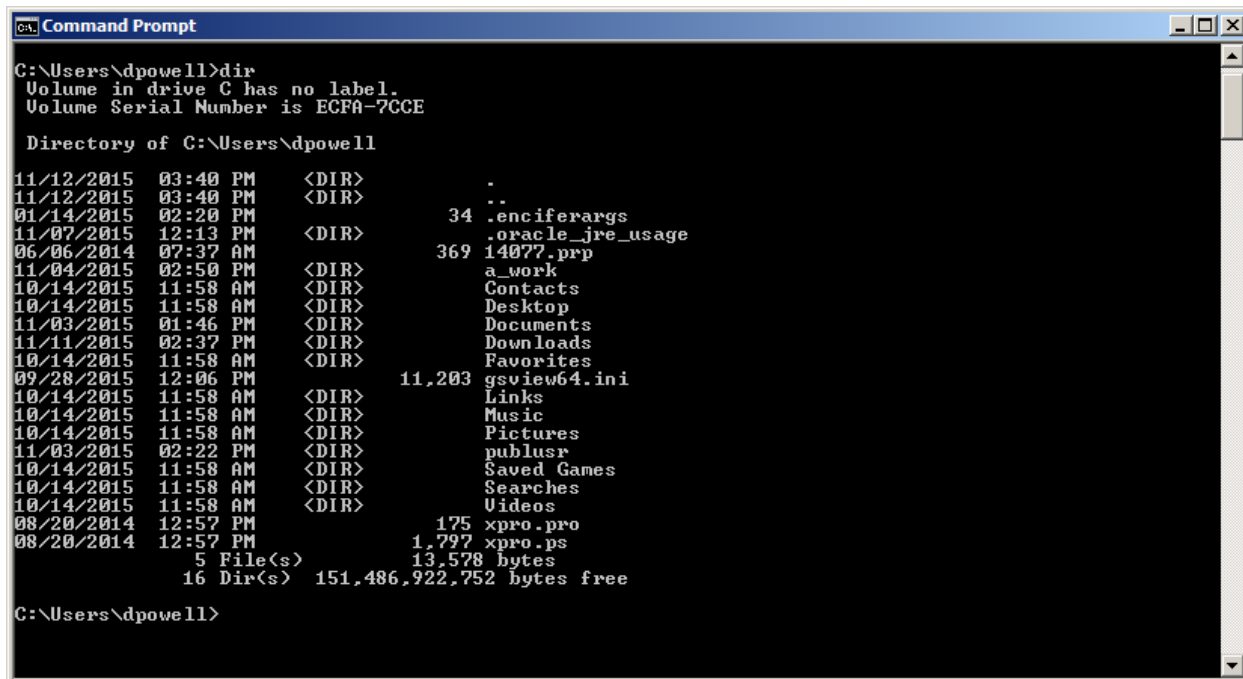
Useful Command-Line Commands

exit The exit command closes the terminal window.

help The help command by itself lists accepted system commands. If the help command is followed by the name of another command, help lists a brief description of that command and the commands more important qualifiers for the command.

L: Sets the current device to the device specified by the letter L. A: and B: are historically low capacity devices such as floppy drives. C: is the main hard disk. Other letters, D: - Z: can be any other physical device or logical partition on a disk. Linux command prompt windows use a forward slash to separate directories.

dir This command will list all files in the current directory.



```
C:\Users\dpowell>dir
Volume in drive C has no label.
Volume Serial Number is ECF8-7CCE

Directory of C:\Users\dpowell

11/12/2015  03:40 PM    <DIR>          .
11/12/2015  03:40 PM    <DIR>          ..
01/14/2015  02:20 PM                34 .enciferargs
11/07/2015  12:13 PM    <DIR>          .oracle_jre_usage
06/06/2014  07:37 AM        369 14077.prp
11/04/2015  02:50 PM    <DIR>          a_work
10/14/2015  11:58 AM    <DIR>          Contacts
10/14/2015  11:58 AM    <DIR>          Desktop
11/03/2015  01:46 PM    <DIR>          Documents
11/11/2015  02:37 PM    <DIR>          Downloads
10/14/2015  11:58 AM    <DIR>          Favorites
09/28/2015  12:06 PM        11,203 gsvie64.ini
10/14/2015  11:58 AM    <DIR>          Links
10/14/2015  11:58 AM    <DIR>          Music
10/14/2015  11:58 AM    <DIR>          Pictures
11/03/2015  02:22 PM    <DIR>          publusr
10/14/2015  11:58 AM    <DIR>          Saved Games
10/14/2015  11:58 AM    <DIR>          Searches
10/14/2015  11:58 AM    <DIR>          Videos
08/20/2014  12:57 PM          175 xpro.pro
08/20/2014  12:57 PM        1,797 xpro.ps
           5 File(s)          13,578 bytes
          16 Dir(s)      151,486,922,752 bytes free

C:\Users\dpowell>
```

The directory above mostly contains other directories. Note that there are two special directories labeled “.” and “..”. The “.” directory refers to the current directory. The “..” directory is one directory lower in the tree, in this case the “c:\users” directory. Finally note that there are two directories that have a first character “.”, “.enciferargs” and “.oracle_jre_usage”. Usually directories whose names begin with “.” are hidden.

cd *directory* This command tells the computer to change the current working directory to a new designated directory. Simply typing the name of a directory that is in the current directory will transfer the command prompt to that directory. This type of a transfer is called a *relative* transfer. Note that the device letter must be set before changing directories.

Thus if the following command was typed:

```
C:\Users\class> cd documents
```

Then the command prompt would become:

```
C:\Users\class\Documents>
```

To return to the previous directory type:

```
C:\Users\class\Documents> cd ..
```

This produces the following command prompt:

```
C:\Users\class>
```

The working directory may be changed to any directory on the current device using an *absolute* transfer by simply typing the full path after the command as in: **cd \directory\path**

copy *file1 file2* The copy command duplicates *file1* in the file or location specified by *file2*.

move *file1 file2* Allows you to move a file from one directory to another.

del *file1 file2 ...* The delete command marks the file(s) so that the it/they can no longer be directly accessed.

mkdir *dir* The mkdir command is used to create (make) a new directory.

rmdir *dir* The rmdir command is used to delete a directory. The directory must be empty before it is deleted.

Editing Files:

Two file editing programs are available through the operating system, WordPad and Notepad. To edit a file from the command prompt with wordpad simply type: **write filename**

To edit a file from the command prompt with notepad simply type: **notepad** *filename*

Running Programs:

To run a program (programs are files named *.exe) from the Command Prompt, simply type the name of the command and any qualifiers at the prompt. If the program is located in the current directory or in the executable path as specified in the path environment variable, then the program will begin. If the program is not in the path, then the absolute path to the program must be specified. Programs may also be opened using the **start** system command followed by the program name and any parameters.