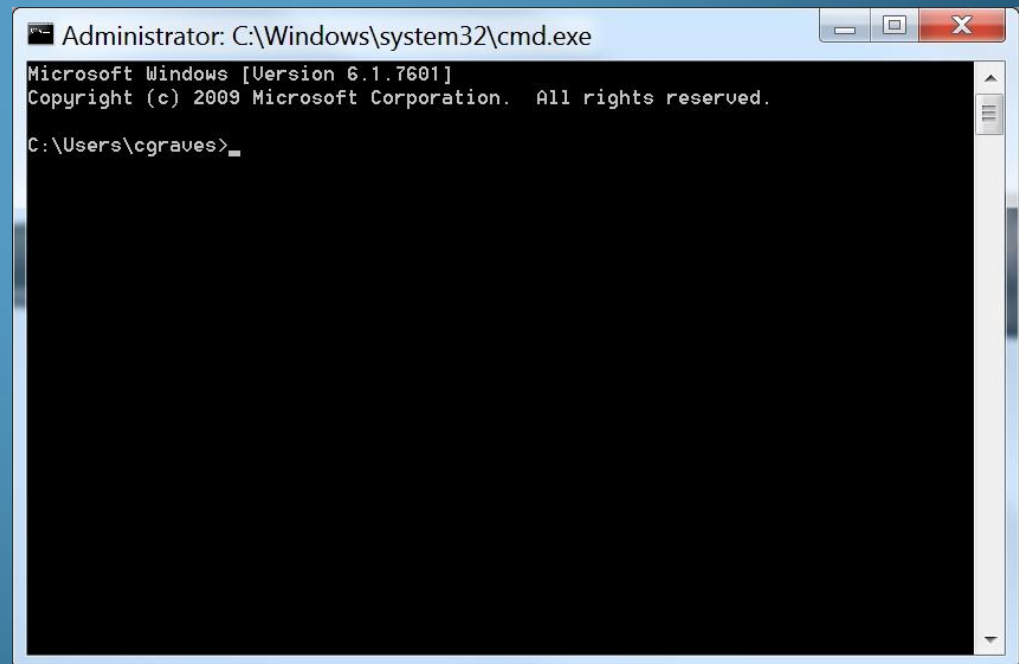


Windows CMD lab command guide



- The windows command line interface (CLI) provides a way to control your computer by typing "English-like" commands instead of clicking on buttons, icons, menus, etc.
- For example you can use the windows CLI to
 - start a program
 - create a folder
 - remove a folder
 - copy a file
 - remove a file
 - rename a file
 - etc.



CLI vs. DOS

- Terminology
 - We will normally refer to the windows command line as “command line”.
 - Sometimes we will simply use the term “DOS” without the word commands.
- The following terms will be used interchangeably
 - Windows CLI
 - Command line
 - DOS commands
 - DOS

Why should you use the command line interface ?

- Most windows users will never have a need for the Command line
- Administrators and programmers are the exception.
- For example, using command line you can write scripts to automate many administrative tasks.

DOS Commands(there are many others)

- Basic DOS commands
 - help
 - help <command name>
 - dir [/w][/s][/?][/od][/o-d][/oe][/o-e] etc.
 - cd
 - md
 - rd [/s][/q]
 - move
 - copy
 - xcopy [/s][/e]
 - del / erase (these are synonyms)
 - ren
 - type
 - tree [/f][/a]
 - cls
 - ver
 - fc
 - find
- File and folder paths
 - dot (.)
 - dot dot (..)
 - full path (absolute path)
 - relative path
- Types of files
 - ASCII files
 - Binary files
 - "type" only works with ASCII files
 - notepad vs. word

DOS Commands

- Redirection
 - > overwrite
 - >> append
 - | pipe
- Filter commands (can use with |)
 - more
 - sort
- Running programs
 - Filename extensions (eg. .txt .doc .xls)
 - executable files (.exe)
 - running a program
 - windows explorer -
 - view | details
 - tools | folder options | view
- Environment variables
 - set
 - set <var name>
 - set <var name> = <value>
 - path
 - %VarName%
 - control panel | system | advanced | environment variables

Scripting Commands

- for
- if
- pause
- echo <message>
- echo on
- echo off
- @
- shift

Command line arguments

%1 %2 %3 ... %9

shift

Programs (“external” DOS commands)

- notepad
- cmd
- Regedit
- 7z

DOS is case in-sensitive

- DOS commands are case in-sensitive.
- This means that you can type the commands in either UPPER CASE, lower case OR a mixture of uPpEr AnD lOwEr CaSe.
- For example the following are all equivalent ways of typing the “dir” command

dir

DIR

dIr

DlR

dIR

ENTER

- You must press the ENTER key after typing any DOS command for it to actually do anything.

Note: for those insulted by this slide it has come up in lab

Conventions for this Guide

- This presentation will use the following conventions when describing the commands:
 - Any part of a command that must be typed exactly will be shown as regular text. (see example below)
 - Words between “angle brackets” are placeholders which you must fill in when you run the command.
 - For example the following command is used to delete a file.

`del <file name>`

The description shows that you must type the word “del” (without the quotes) followed by the name of the file you want to delete. For example to actually delete the file named “myDocument.doc” you would type the following (and then press the ENTER key)

`del myDocument.doc`

More conventions

- This presentation will use the following conventions when describing the commands:
 - If a part of a command is optional it will be shown in square brackets.
 - For example the following command is used to get help about the DOS commands.

```
help [<command name>]
```

- The description above shows that you can type the word “help” alone or type the word “help” followed by the name of a specific DOS command.

If you type the word “help” alone you will see a list of all the DOS commands and a short description of what each command is used for. Example (don’t forget to press the ENTER key):

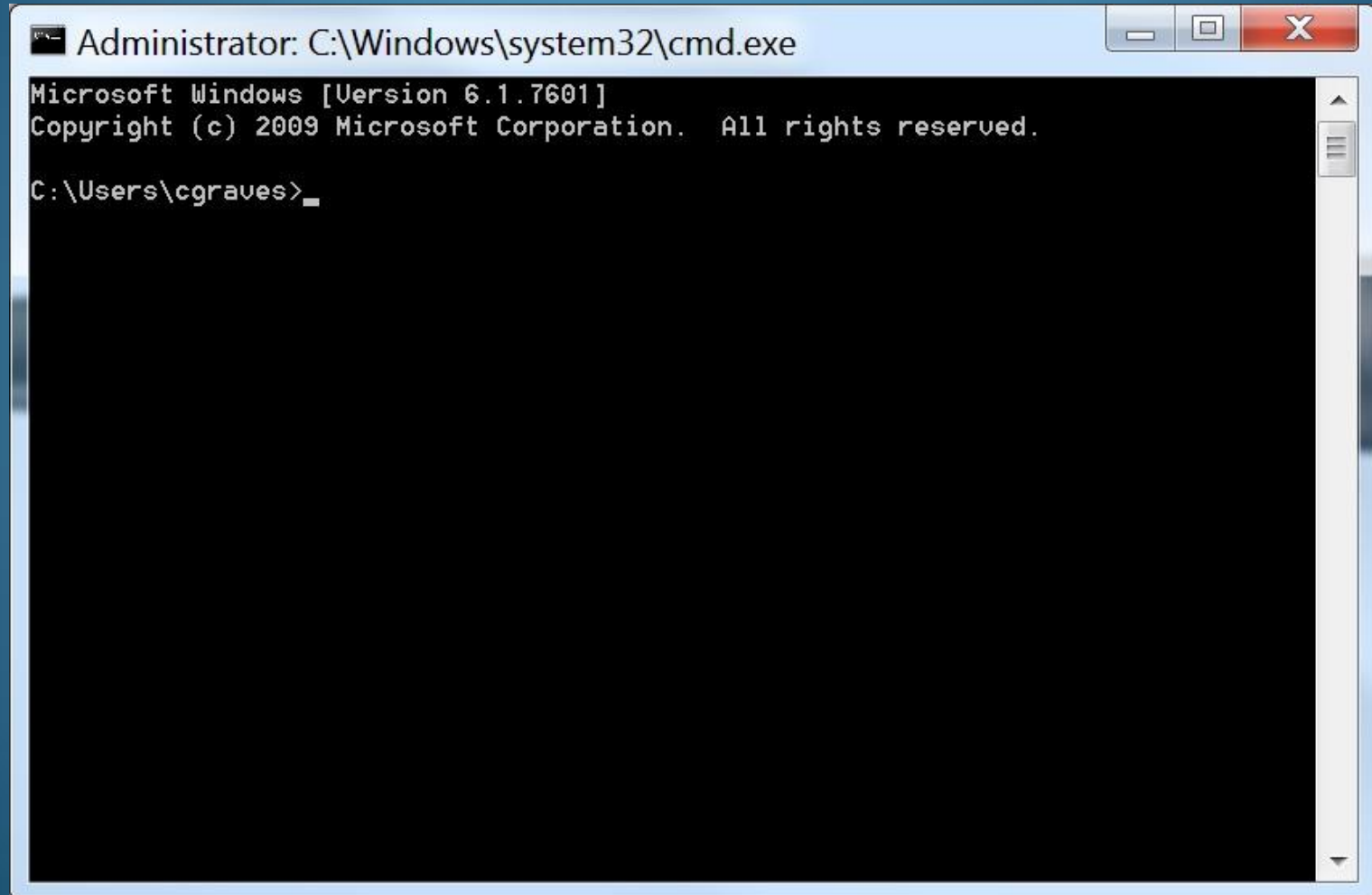
```
help
```

You can also type the word “help” followed by the name of a specific DOS command to get more extensive help on that particular command. Example (don’t forget to press the ENTER key):

```
help dir
```

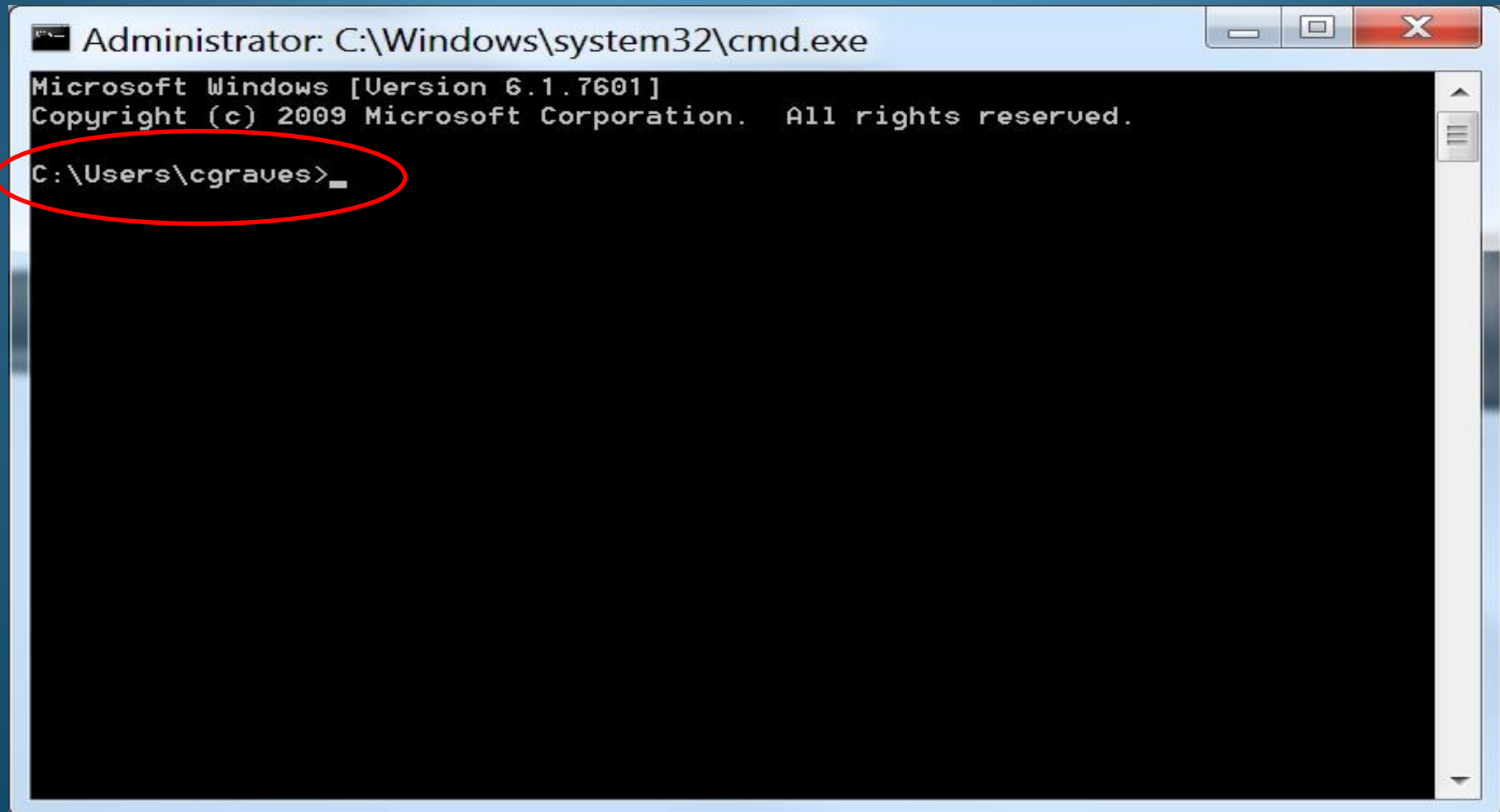
The "command prompt" window

commands are entered in a "command prompt" window:



the prompt

- Shows your drive and directory path
- The prompt is automatically displayed by the computer
- You type your commands after the prompt

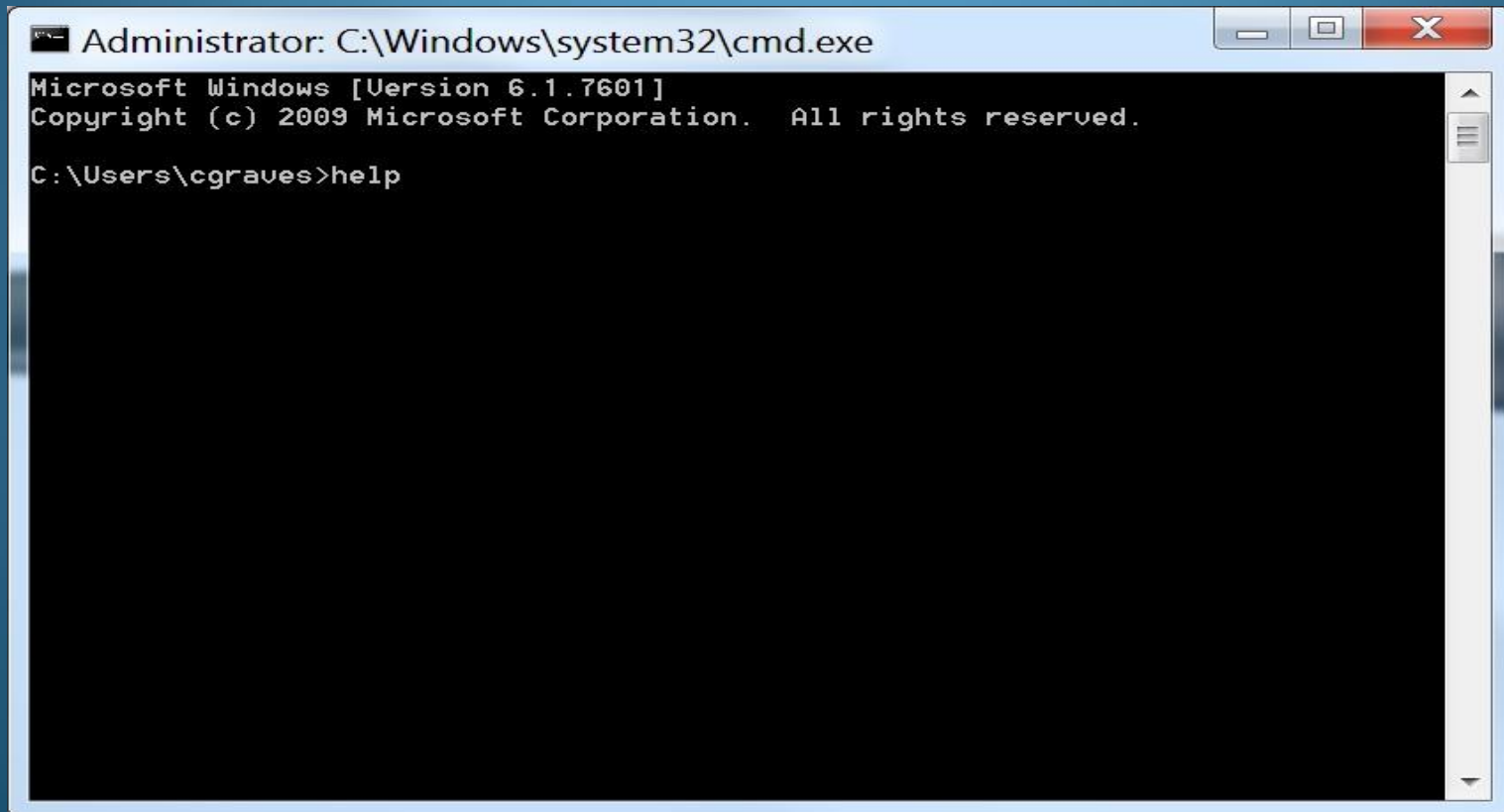


A screenshot of a Windows command prompt window. The title bar reads "Administrator: C:\Windows\system32\cmd.exe". The window contains the following text: "Microsoft Windows [Version 6.1.7601] Copyright (c) 2009 Microsoft Corporation. All rights reserved. C:\Users\cgraves>". The prompt "C:\Users\cgraves>" is circled in red. The window has standard Windows window controls (minimize, maximize, close) in the top right corner.

```
Administrator: C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.
C:\Users\cgraves>
```

help command

- Type "help" followed by the ENTER key to get a list of the valid commands



The screenshot shows a Windows command prompt window titled "Administrator: C:\Windows\system32\cmd.exe". The window has a standard Windows XP-style title bar with minimize, maximize, and close buttons. The command prompt displays the following text:

```
Microsoft Windows [Version 6.1.7601]  
Copyright (c) 2009 Microsoft Corporation. All rights reserved.  
  
C:\Users\cgraves>help
```

The output of the "help" command is not visible in this screenshot, as it is shown on the following slides.

(output of the "help" command is shown on the following slides)

Output of help command



```
Administrator: C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\cgraves>help
For more information on a specific command, type HELP command-name
ASSOC          Displays or modifies file extension associations.
ATTRIB         Displays or changes file attributes.
BREAK          Sets or clears extended CTRL+C checking.
BCDEDIT        Sets properties in boot database to control boot loading.
CACLS          Displays or modifies access control lists (ACLs) of files.
CALL           Calls one batch program from another.
CD             Displays the name of or changes the current directory.
CHCP           Displays or sets the active code page number.
CHDIR          Displays the name of or changes the current directory.
CHKDSK         Checks a disk and displays a status report.
CHKNTFS        Displays or modifies the checking of disk at boot time.
CLS            Clears the screen.
CMD            Starts a new instance of the Windows command interpreter.
COLOR          Sets the default console foreground and background colors.
COMP           Compares the contents of two files or sets of files.
COMPACT        Displays or alters the compression of files on NTFS partitions.
CONVERT        Converts FAT volumes to NTFS. You cannot convert the
               current drive.
COPY           Copies one or more files to another location.
DATE           Displays or sets the date.
DEL            Deletes one or more files.
DIR            Displays a list of files and subdirectories in a directory.
DISKCOMP       Compares the contents of two floppy disks.
DISKCOPY       Copies the contents of one floppy disk to another.
DISKPART       Displays or configures Disk Partition properties.
DOSKEY         Edits command lines, recalls Windows commands, and
               creates macros.
DRIVERQUERY    Displays current device driver status and properties.
ECHO           Displays messages, or turns command echoing on or off.
ENDLOCAL       Ends localization of environment changes in a batch file.
ERASE          Deletes one or more files.
EXIT           Quits the CMD.EXE program (command interpreter).
FC             Compares two files or sets of files, and displays the
               differences between them.
FIND           Searches for a text string in a file or files.
FINDSTR        Searches for strings in files.
FOR            Runs a specified command for each file in a set of files.
FORMAT         Formats a disk for use with Windows.
FSUTIL         Displays or configures the file system properties.
FTYPE          Displays or modifies file types used in file extension
               associations.
GOTO           Directs the Windows command interpreter to a labeled line in
               a batch program.
GPRESULT       Displays Group Policy information for machine or user.
GRAFTABL       Enables Windows to display an extended character set in
               graphics mode.
```

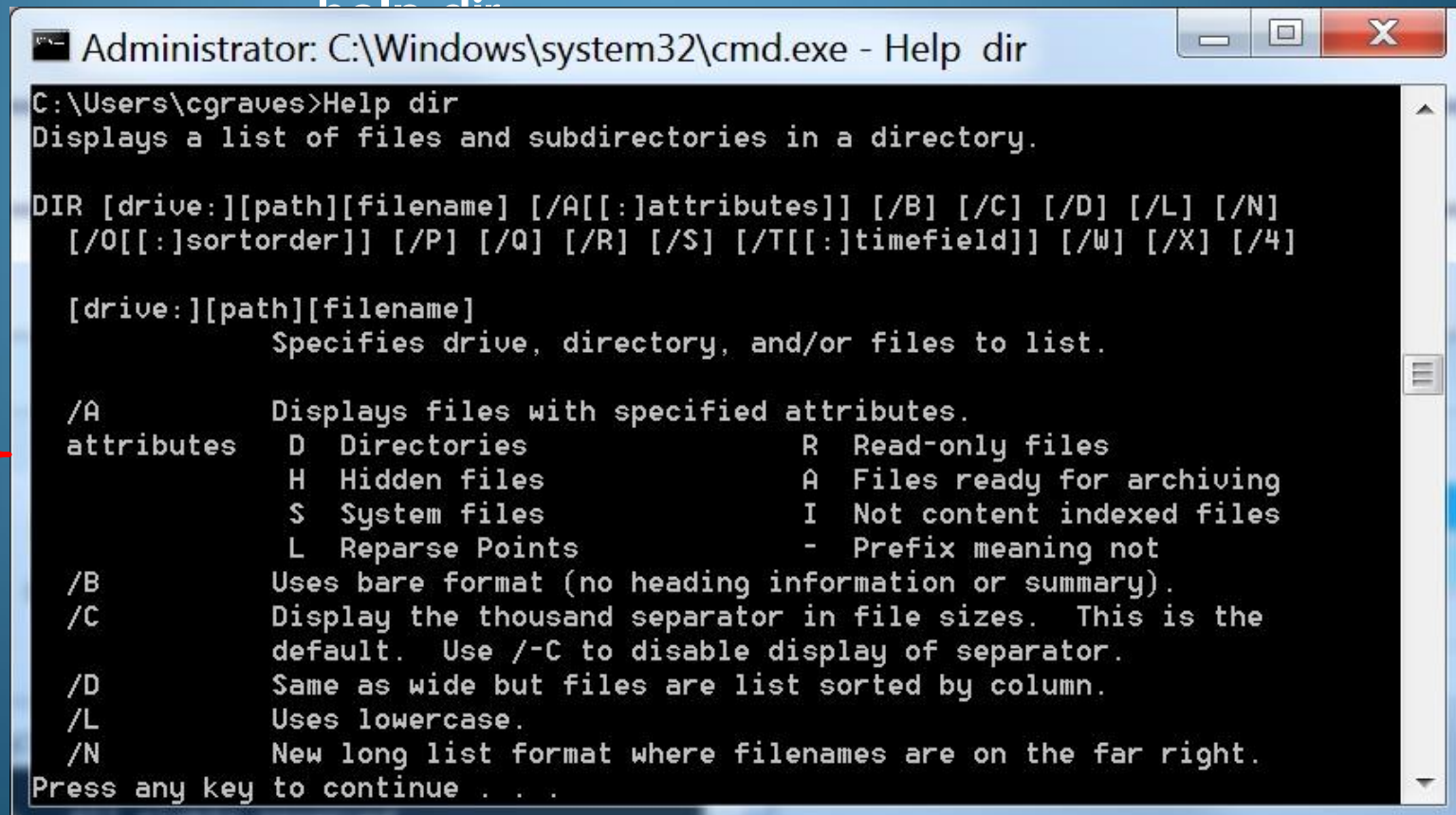
Output of
"help"
command is
very long and
scrolls off the
screen.

You can use
the scroll bar
to move back
up the screen

help <command>

- To get detailed help about a specific command type the word "help" (without the quotes) followed by the name of the command.

Output of
help dir
command



The screenshot shows a Windows command prompt window titled "Administrator: C:\Windows\system32\cmd.exe - Help dir". The command prompt shows the command "C:\Users\cgraves>Help dir" and its output. The output describes the "dir" command and lists various switches and their functions. A red bracket on the left side of the image groups the text "Output of", "help dir", and "command" next to the command prompt window.

```
Administrator: C:\Windows\system32\cmd.exe - Help dir
C:\Users\cgraves>Help dir
Displays a list of files and subdirectories in a directory.

DIR [drive:][path][filename] [/A[[:]attributes]] [/B] [/C] [/D] [/L] [/N]
  [/O[[:]sortorder]] [/P] [/Q] [/R] [/S] [/T[[:]timefield]] [/W] [/X] [/4]

[drive:][path][filename]
    Specifies drive, directory, and/or files to list.

/A      Displays files with specified attributes.
attributes  D Directories                R Read-only files
              H Hidden files              A Files ready for archiving
              S System files              I Not content indexed files
              L Reparse Points            - Prefix meaning not

/B      Uses bare format (no heading information or summary).
/C      Display the thousand separator in file sizes. This is the
        default. Use /-C to disable display of separator.
/D      Same as wide but files are list sorted by column.
/L      Uses lowercase.
/N      New long list format where filenames are on the far right.
Press any key to continue . . .
```

| more

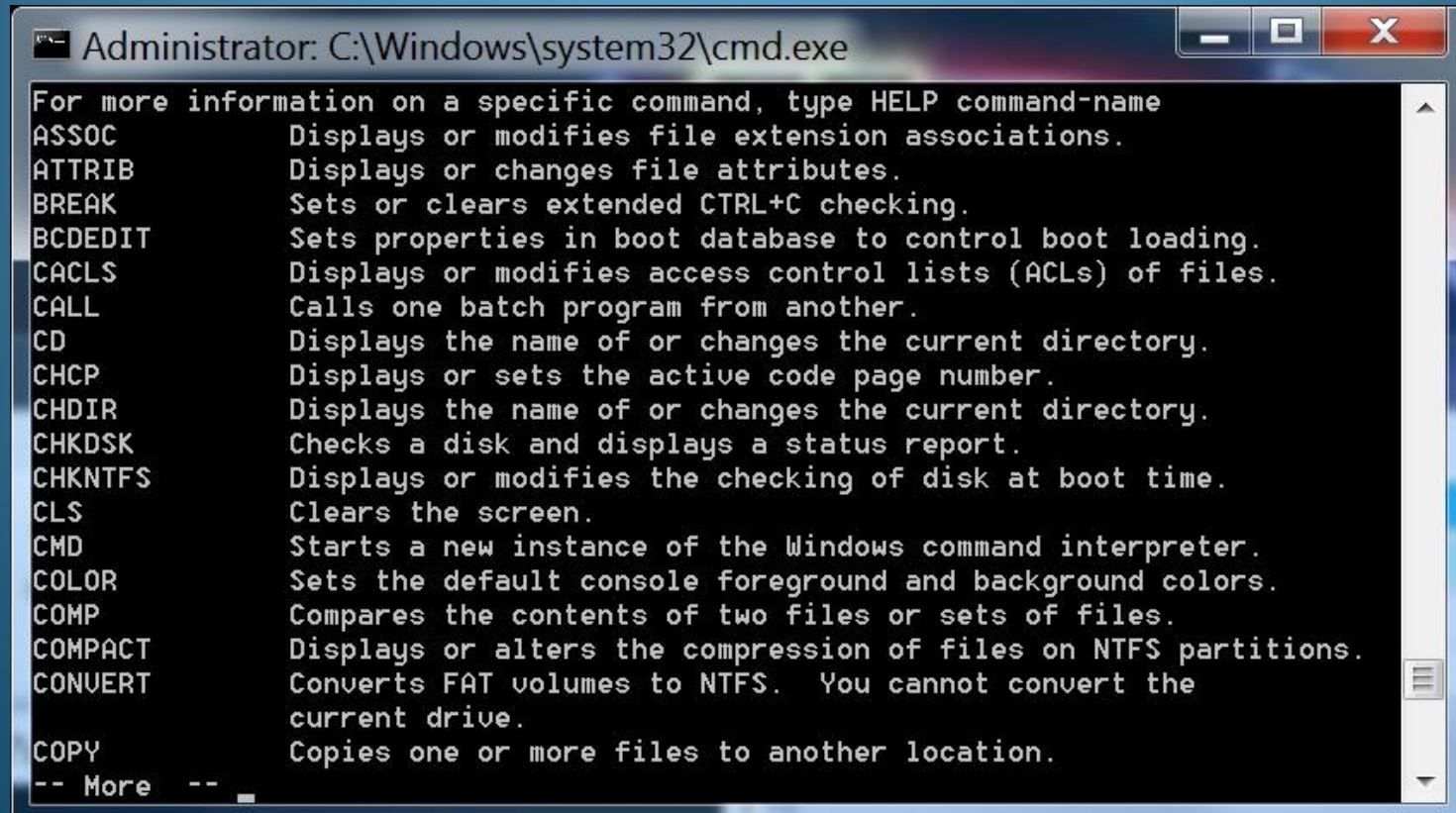
- To view a lot of output, instead of using the scroll bar, you can force the output of most commands to be displayed one screen at a time.
- Type the command followed by "| more" (without the quotes), for example:

```
c:\> help | more
```

- The vertical bar symbol (also called a pipe symbol) is located on the keyboard above the backslash (\) character. On the keyboard it looks like a vertical line with a break in the middle`

output of "help | more"

- When you use "`| more`", the output from the command is displayed one screenfull at a time
- Below is the output of the command "`help | more`"
- Press the spacebar to see the next **screenfull** of output.
- Press the ENTER key to see the next **line** of output.
- To quit seeing the output type "`q`" (for quit) or Ctrl-C (I'll explain more about Ctrl-C soon)



```
Administrator: C:\Windows\system32\cmd.exe

For more information on a specific command, type HELP command-name
ASSOC          Displays or modifies file extension associations.
ATTRIB         Displays or changes file attributes.
BREAK          Sets or clears extended CTRL+C checking.
BCDEDIT        Sets properties in boot database to control boot loading.
CACLS          Displays or modifies access control lists (ACLs) of files.
CALL           Calls one batch program from another.
CD             Displays the name of or changes the current directory.
CHCP           Displays or sets the active code page number.
CHDIR          Displays the name of or changes the current directory.
CHKDSK         Checks a disk and displays a status report.
CHKNTFS        Displays or modifies the checking of disk at boot time.
CLS            Clears the screen.
CMD            Starts a new instance of the Windows command interpreter.
COLOR          Sets the default console foreground and background colors.
COMP           Compares the contents of two files or sets of files.
COMPACT        Displays or alters the compression of files on NTFS partitions.
CONVERT        Converts FAT volumes to NTFS.  You cannot convert the
               current drive.
COPY           Copies one or more files to another location.
-- More --
```

Using “ | more” with other commands

- You can add “ | more” (without the quotes) to the end of most commands to have the output of that command displayed one page at a time.
- For example, we will learn about both the “dir” and “type” commands later, both of which can be combined with “ | more”. The following are both legal:

```
dir | more
```

```
type myfile.txt | more
```

(for this to work, there must be a file named myfile.txt)

- We will learn more about what the “ | ” later.

Stopping programs with Control-C (i.e. Ctrl-c)

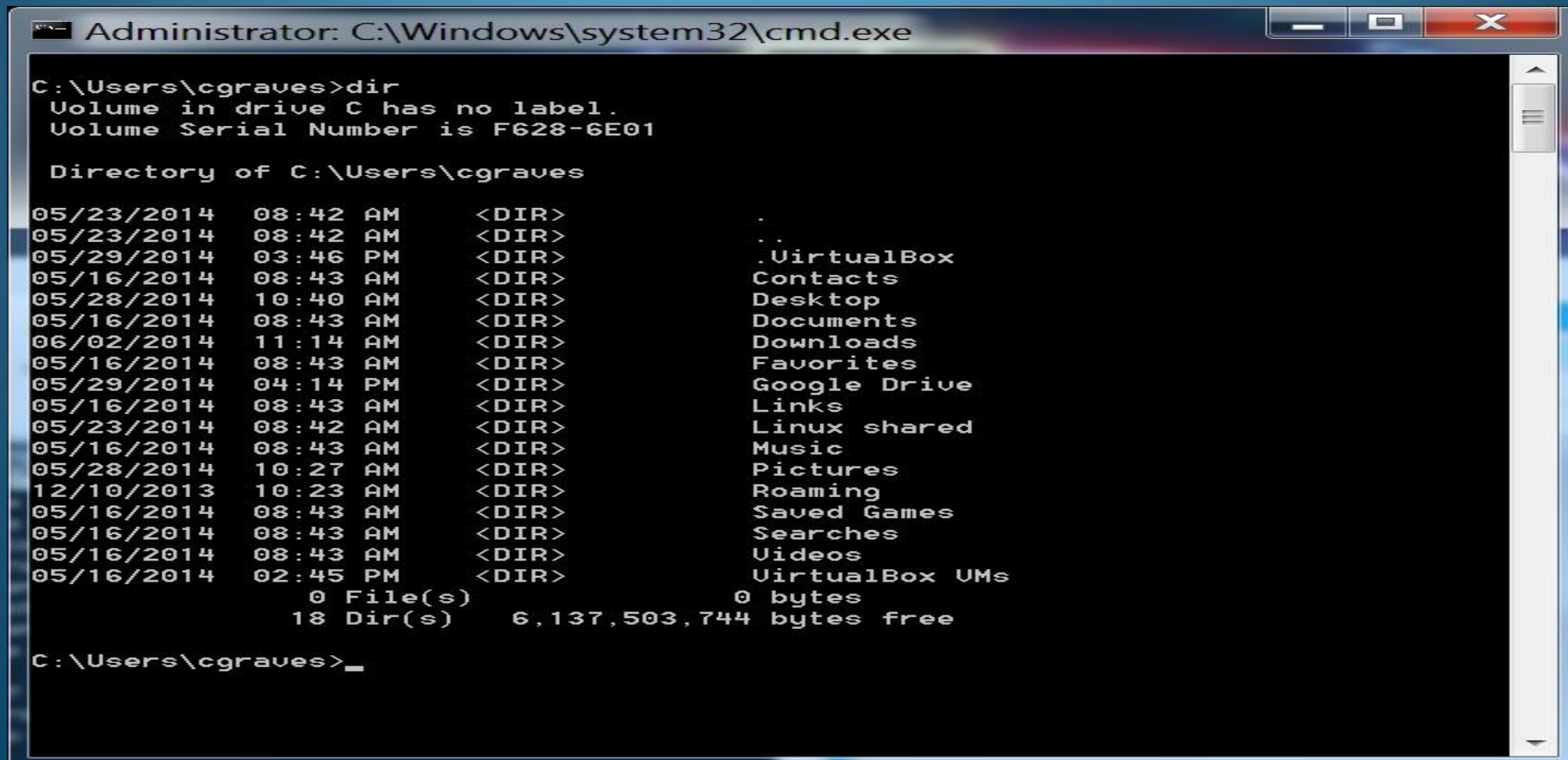
- To terminate any hanging DOS program or command you can press the "Cntrl" key and the "c" key at the same time while the program is running.
- This key sequence is known as "Control-C" or "Ctrl-C"
- For example you can use Ctrl-C to terminate the "more" program instead of typing "q"

Directories (Folders)

- In DOS, a "folder" is called a "directory"
- A folder and a directory are exactly the same thing - the words are interchangeable.

DIR command

- The DIR command shows the contents of a directory (AKA folder).
- This is the same information that you can see in Windows Explorer
- Simply type the word "dir" followed by the ENTER key



The screenshot shows a Windows command prompt window titled "Administrator: C:\Windows\system32\cmd.exe". The user has entered the command "C:\Users\cgraves>dir". The output displays the directory contents of C:\Users\cgraves, including a list of files and folders with their dates, times, and attributes. The output also shows the total number of files and bytes, and the amount of free space on the drive.

```
Administrator: C:\Windows\system32\cmd.exe

C:\Users\cgraves>dir
Volume in drive C has no label.
Volume Serial Number is F628-6E01

Directory of C:\Users\cgraves

05/23/2014  08:42 AM    <DIR>          .
05/23/2014  08:42 AM    <DIR>          ..
05/29/2014  03:46 PM    <DIR>          .VirtualBox
05/16/2014  08:43 AM    <DIR>          Contacts
05/28/2014  10:40 AM    <DIR>          Desktop
05/16/2014  08:43 AM    <DIR>          Documents
06/02/2014  11:14 AM    <DIR>          Downloads
05/16/2014  08:43 AM    <DIR>          Favorites
05/29/2014  04:14 PM    <DIR>          Google Drive
05/16/2014  08:43 AM    <DIR>          Links
05/23/2014  08:42 AM    <DIR>          Linux shared
05/16/2014  08:43 AM    <DIR>          Music
05/28/2014  10:27 AM    <DIR>          Pictures
12/10/2013  10:23 AM    <DIR>          Roaming
05/16/2014  08:43 AM    <DIR>          Saved Games
05/16/2014  08:43 AM    <DIR>          Searches
05/16/2014  08:43 AM    <DIR>          Videos
05/16/2014  02:45 PM    <DIR>          VirtualBox VMs
               0 File(s)                0 bytes
             18 Dir(s)      6,137,503,744 bytes free

C:\Users\cgraves>
```

Files and Directories

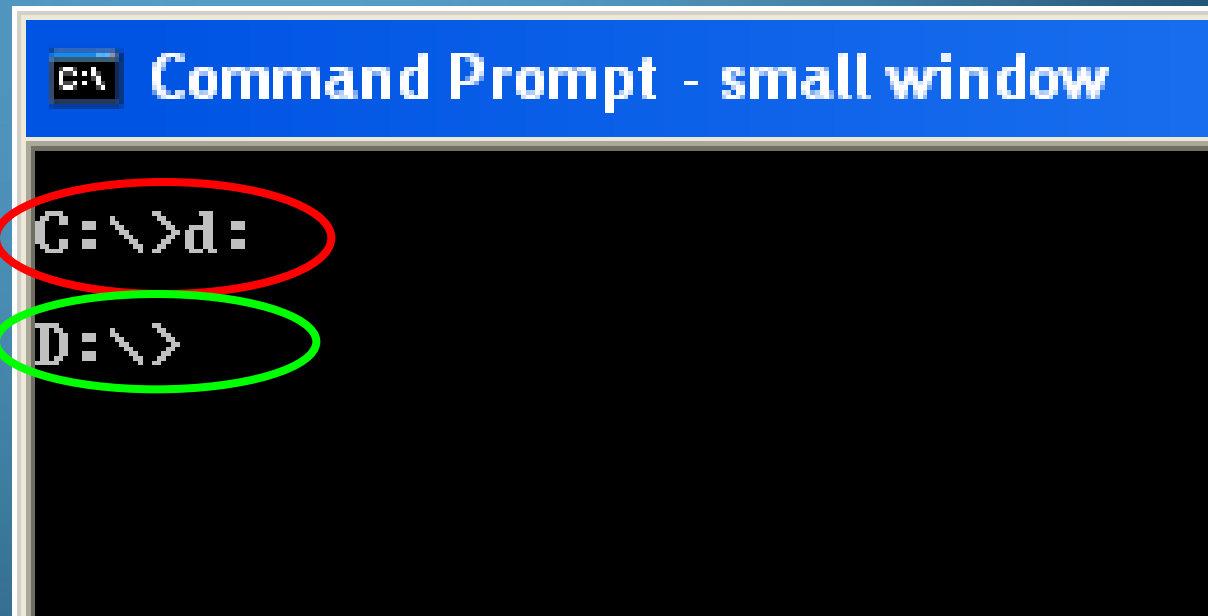
- The output of the DIR command shows a list of files and directories
- The date/time at the start of each line is the last time that file or folder was modified.
- The names that are preceded by "<DIR>" are directory names.
- Names without <DIR> are names of files.

Switching Drives

- To switch the disk drive that you are working with, type the letter for the disk drive followed by a colon (e.g. d:)

You type d:

The prompt changes to show the new drive name

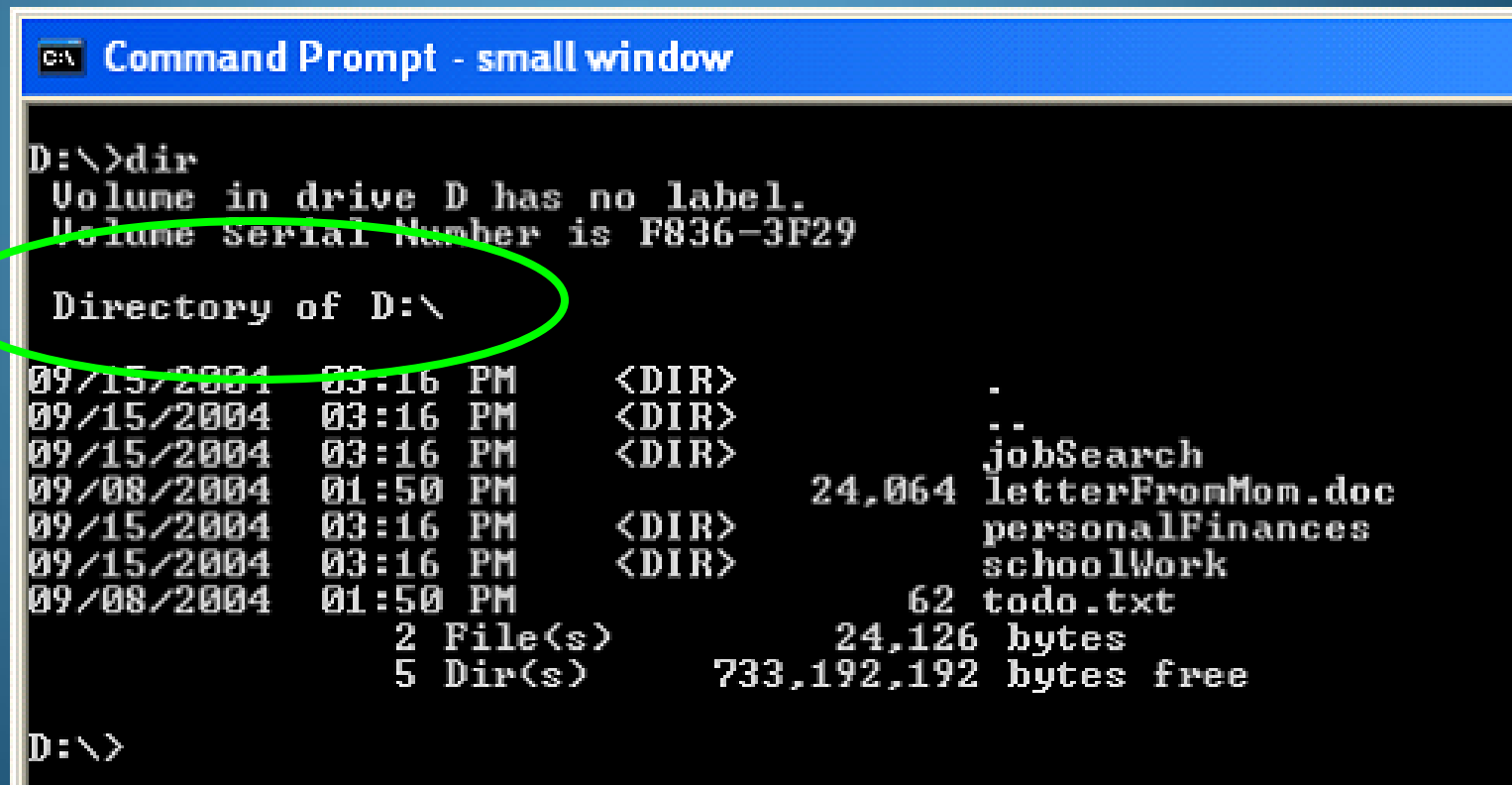


```
C:\>d:
D:\>
```

Directory of D:

- The DIR command will now show the contents of the folder at the top of the D: drive (i.e. the “root” of D:)

files and
directories in
the “root”
directory of
the D: drive



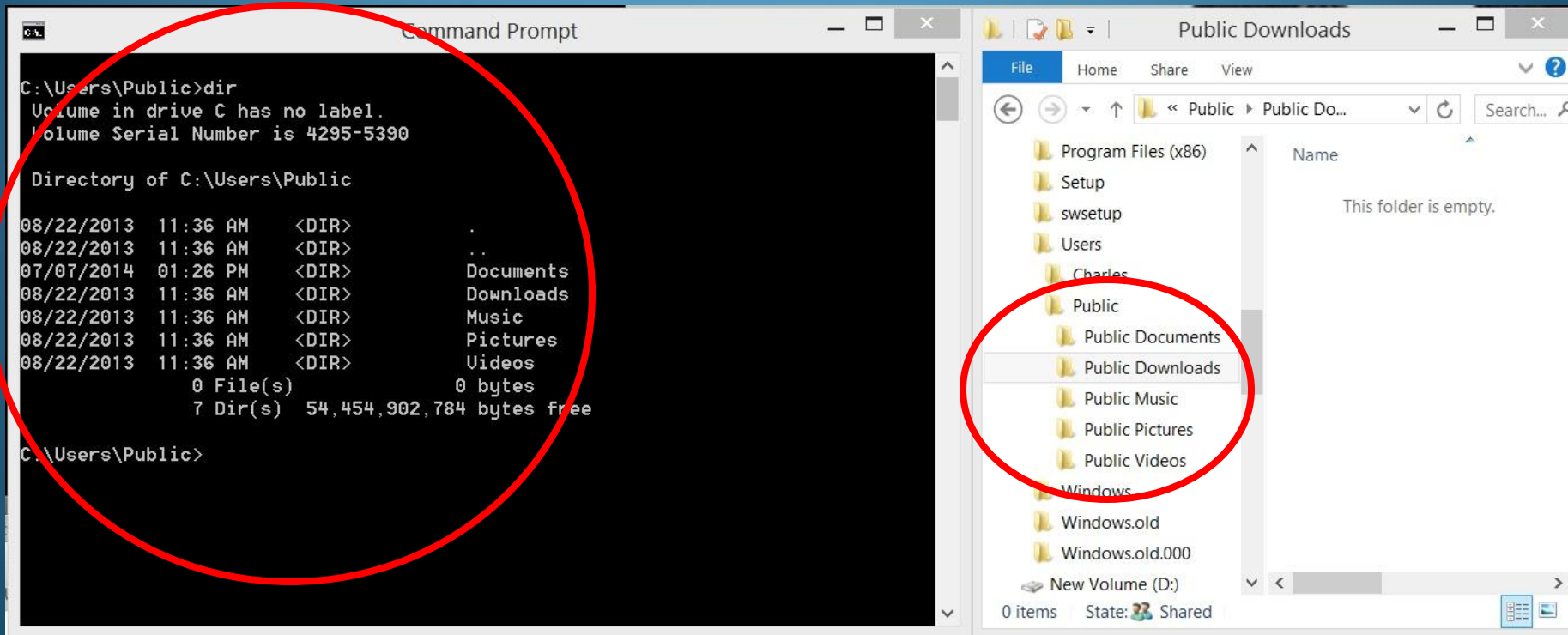
```
Command Prompt - small window

D:\>dir
Volume in drive D has no label.
Volume Serial Number is F836-3F29

Directory of D:\
09/15/2004  03:16 PM    <DIR>          .
09/15/2004  03:16 PM    <DIR>          ..
09/15/2004  03:16 PM    <DIR>          jobSearch
09/08/2004  01:50 PM             24,064 letterFromMom.doc
09/15/2004  03:16 PM    <DIR>          personalFinances
09/15/2004  03:16 PM    <DIR>          schoolWork
09/08/2004  01:50 PM             62 todo.txt
                2 File(s)                24,126 bytes
                5 Dir(s)              733,192,192 bytes free

D:\>
```

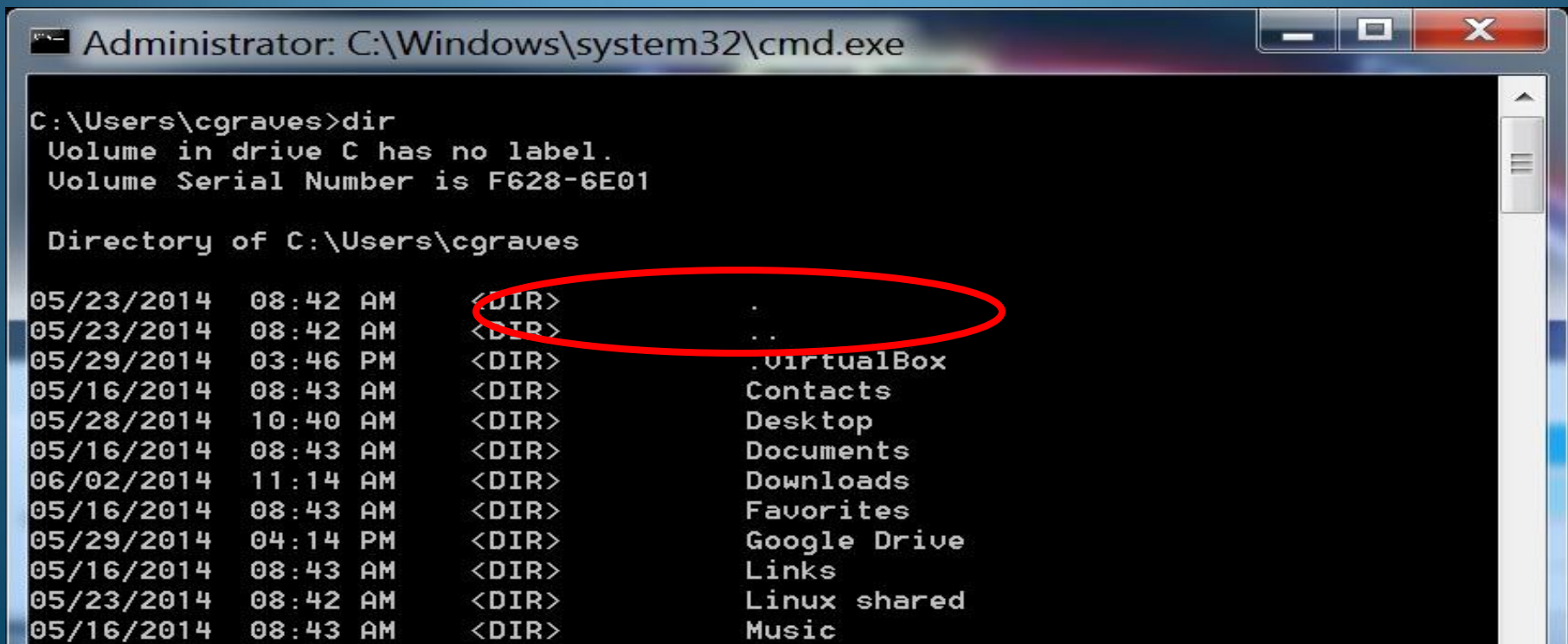
DOS vs. File Explorer



DOS shows the same files and folders as File Explorer does

dot (.) and dot dot (..)

- DOS uses two special directories, dot (.) and dot dot (..), that don't appear in File Explorer.
- . Represents the current directory
- .. Represents the parent directory for the current directory
- For example `cd..` moves you up one directory



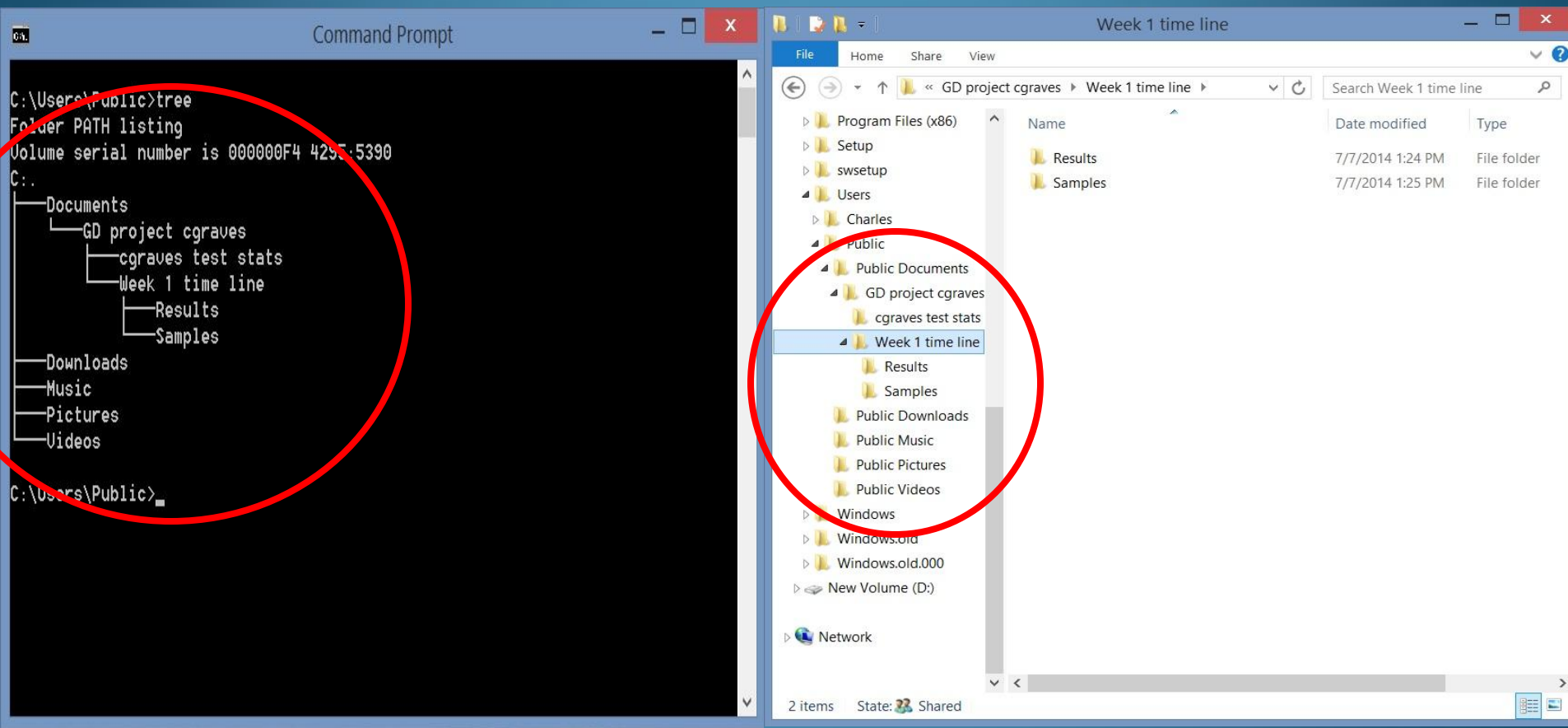
```
Administrator: C:\Windows\system32\cmd.exe

C:\Users\cgraves>dir
Volume in drive C has no label.
Volume Serial Number is F628-6E01

Directory of C:\Users\cgraves

05/23/2014  08:42 AM    <DIR>          .
05/23/2014  08:42 AM    <DIR>          ..
05/29/2014  03:46 PM    <DIR>          .VirtualBox
05/16/2014  08:43 AM    <DIR>          Contacts
05/28/2014  10:40 AM    <DIR>          Desktop
05/16/2014  08:43 AM    <DIR>          Documents
06/02/2014  11:14 AM    <DIR>          Downloads
05/16/2014  08:43 AM    <DIR>          Favorites
05/29/2014  04:14 PM    <DIR>          Google Drive
05/16/2014  08:43 AM    <DIR>          Links
05/23/2014  08:42 AM    <DIR>          Linux shared
05/16/2014  08:43 AM    <DIR>          Music
```

TREE command



- The `TREE` command shows the hierarchy of directories

You can see the same info from File Explorer

DIR <path>

- To display the contents of a different folder with DIR, you must specify the name of the directory.
- EXAMPLE: The following shows the contents of the “accounting” directory that is in the “schoolwork” directory that is in the root of the D: drive:

```
DIR d:\schoolwork\accounting
```

- See next below ...

Example

- To see the contents of the accounting directory type
dir d:\schoolwork\accounting

```
D:\>dir d:\schoolwork\accounting
Volume in drive D has no label.
Volume Serial Number is F836-3E29

Directory of d:\schoolwork\accounting

10/17/2004    04:34 PM    <DIR>          .
10/17/2004    04:34 PM    <DIR>          ..
09/19/2004    12:11 PM                24,064 accountingHW1.doc
09/19/2004    12:06 PM                42,496 accountingHW2.xls
09/19/2004    12:08 PM                19,968 accountingHW3.doc
09/19/2004    12:12 PM                13,824 accountingHW4.xls
09/19/2004    12:45 PM                47,104 caseStudy.doc
09/19/2004    12:28 PM    <DIR>          classNotes
               5 File(s)                147,456 bytes
               3 Dir(s)           127,934,464 bytes free
```

```
D:\>
```

Command Line Arguments

- The information that is specified after the name of the command are called **command line arguments**
- Example: In the following command:

```
dir d:\schoolWork\accounting
```

"dir" is the name of the command and "d:\schoolWork\accounting" is a command line argument

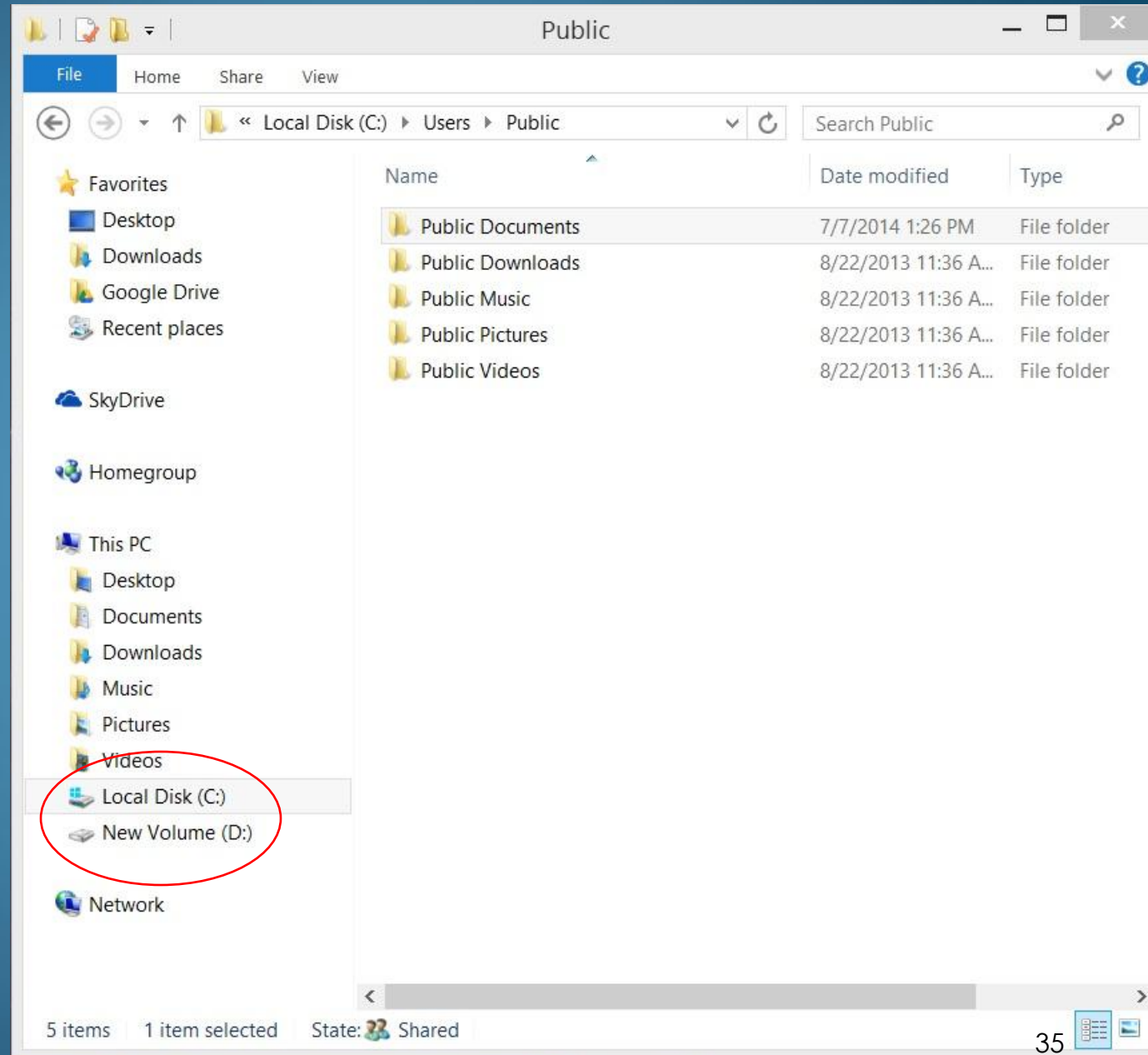
Accessing the hierarchy from DOS

- The hierarchy of disk drives, folders and files that is accessible from File Explorer is also accessible from DOS
- However you must know how to name the following from DOS
 - disk drives
 - directories
 - files

Disk drive names

- DOS uses a single letter followed by a colon to name each disk drive.
- These are the same names that Windows Explorer shows in parentheses (see next slide).
 - A: & B: are traditionally reserved for the floppy drive
 - C: reserved for a local hard drive
 - Other drive letters are either for
 - other local hard drives
 - drives that are on another computer but which are accessible over the network
 - Other types of drives such as removable USB drives, CD-ROM or DVD drives.

Lets see Windows Explorer again



Drive letters

Path to a file or folder

- The location of a particular file or directory is specified in DOS using a "path"
- A "full path" (or "absolute" path) is comprised of
 - the name of a disk drive that the file or folder is on, backslash (\) characters, folder names and an optional file name.

- Example

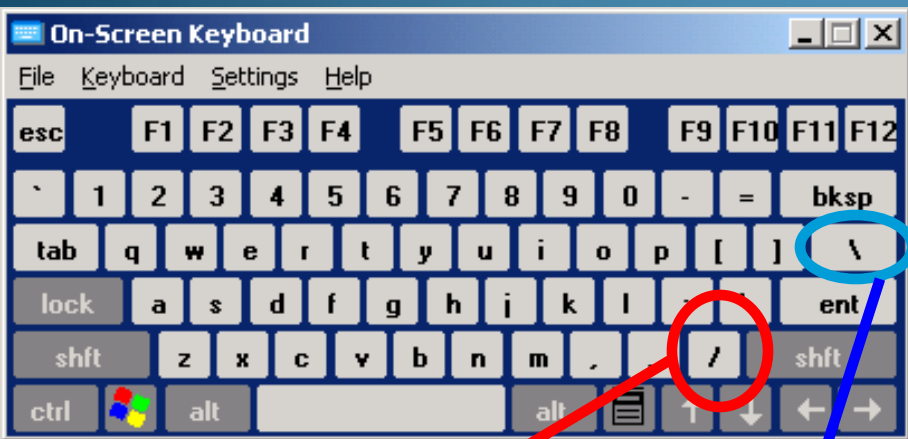
D:\public\documents\readme.txt

drive letter

folder
names

file name

Backslash (\) vs. Forward slash (/)



forward slash

backslash

- Don't confuse the backslash (\) with the forward slash (/) !
- On standard keyboards:
 - the **backslash (\)** is located directly above the ENTER key.
 - the **forward slash (/)** is located next to the shift key on the right hand side of the keyboard

backslash in file names forward slash for command options

- backslash is used for naming files and directories
- forward slash is used to provide options to DOS commands (we'll cover this later)

spaces in filenames

- If any folder or filename in a path contains spaces, you must surround the entire path with quotes when using it in a DOS command.
- Example

```
dir "c:\my folder\my file.txt"
```

The root

- The top level of any disk drive is called the "root" of the disk drive.
- The root is indicated by a single backslash ("\") character. For example:
 - the root of the C: drive is C:\
 - the root of the A: drive is A:\
 - the root of the D: drive is D:\
 - etc.

Which directory is the working directory?

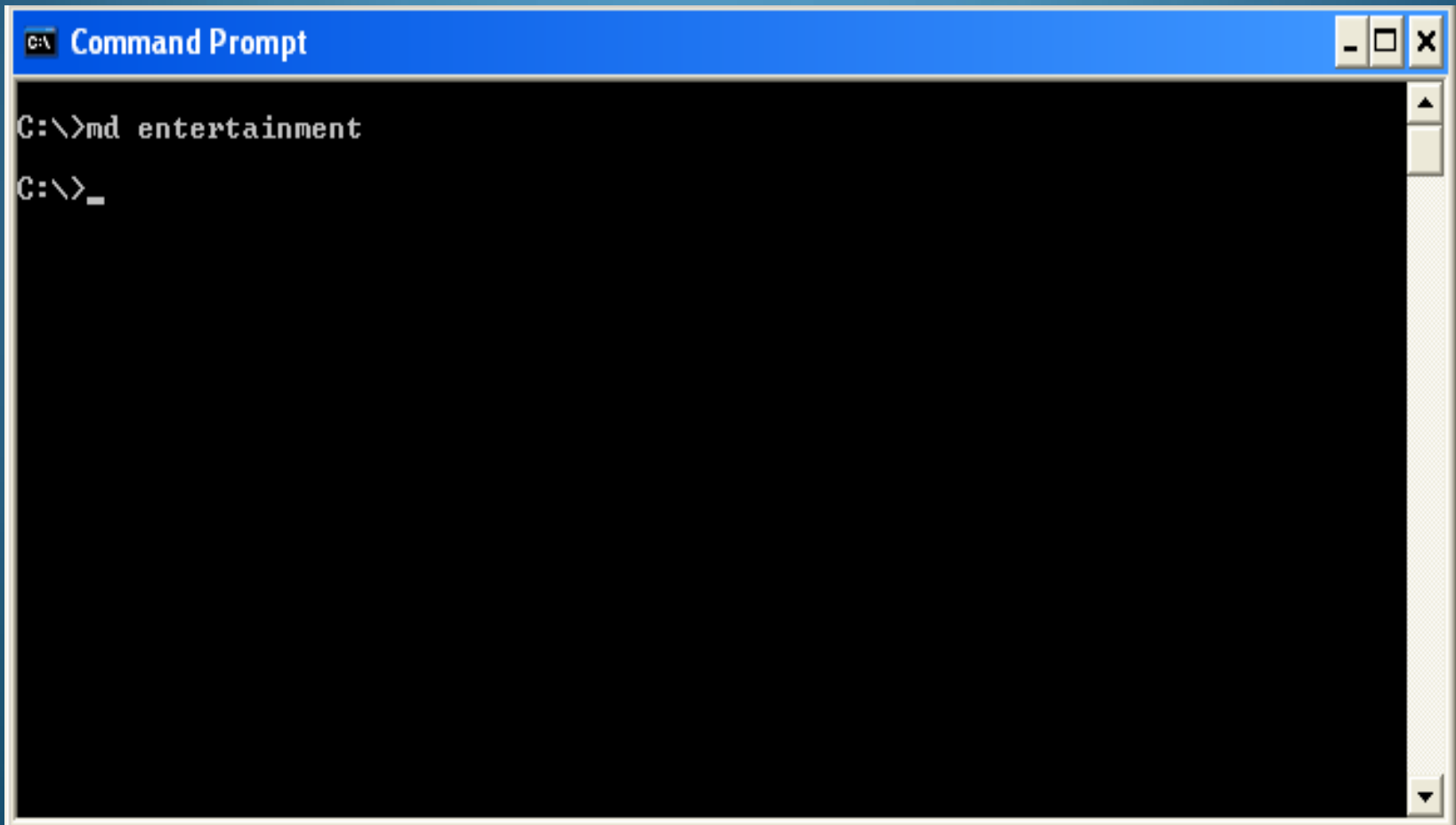
- By default, the DOS prompt indicates which directory is the current directory, also known as the “working” directory.
- The prompt in the slides looked like: **C:\>**
 - "C:" indicates that the current directory is on the C: drive.
 - "\" after the colon indicates that the current directory is the top level directory (on the C: drive).
 - ">" is not part of the name of the current directory. It is simply indicates the end of the prompt.

DOS command options and switches

- Most DOS commands can be run in different ways by specifying “options” (also known as “switches”).
- You specify an option by typing a forward slash (/) after the command name followed by one or more letters or characters that specify which option you want to use.

MD command has no output

- If the MD command is successful it does not display any output



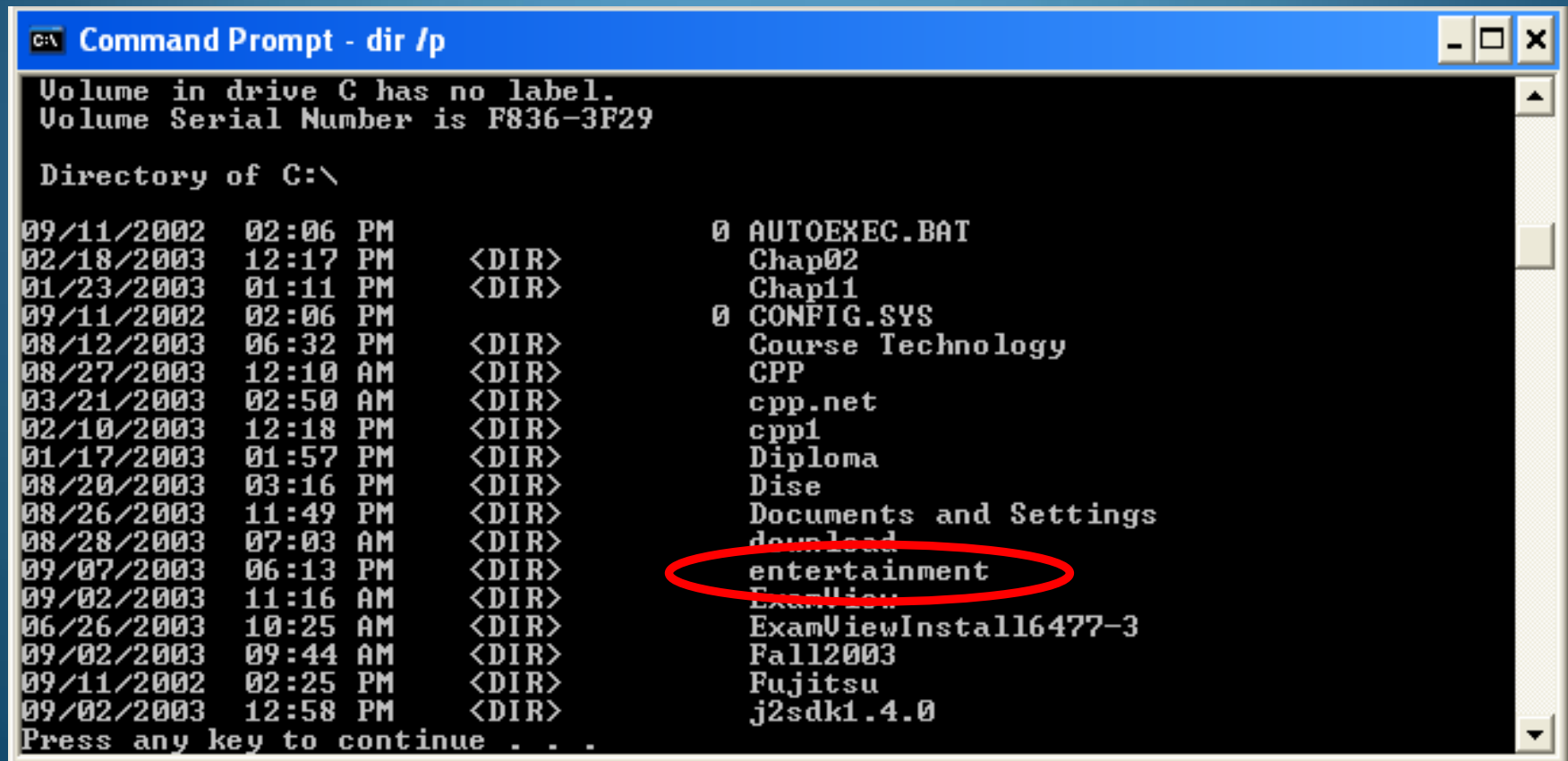
A screenshot of a Windows Command Prompt window. The title bar is blue and reads "C:\ Command Prompt". The window has standard Windows window controls (minimize, maximize, close) in the top right corner. The command prompt shows the command "C:\>md entertainment" being entered, followed by a new line "C:\>_" indicating the command was executed successfully. There is no output displayed on the screen.

```
C:\>md entertainment
C:\>_
```

See the new directory

- To see the new directory run the DIR command

(output of DIR command)



```
C:\ Command Prompt - dir /p

Volume in drive C has no label.
Volume Serial Number is F836-3F29

Directory of C:\

09/11/2002  02:06 PM                0 AUTOEXEC.BAT
02/18/2003  12:17 PM                0 Chap02
01/23/2003  01:11 PM                0 Chap11
09/11/2002  02:06 PM                0 CONFIG.SYS
08/12/2003  06:32 PM                0 Course Technology
08/27/2003  12:10 AM                0 CPP
03/21/2003  02:50 AM                0 cpp.net
02/10/2003  12:18 PM                0 cpp1
01/17/2003  01:57 PM                0 Diploma
08/20/2003  03:16 PM                0 Dise
08/26/2003  11:49 PM                0 Documents and Settings
08/28/2003  07:03 AM                0 download
09/07/2003  06:13 PM                0 entertainment
09/02/2003  11:16 AM                0 ExamView
06/26/2003  10:25 AM                0 ExamViewInstall16477-3
09/02/2003  09:44 AM                0 Fall2003
09/11/2002  02:25 PM                0 Fujitsu
09/02/2003  12:58 PM                0 j2sdk1.4.0

Press any key to continue . . .
```

CD command (change the current directory)

- Use the CD command to change the current directory.
- The syntax is

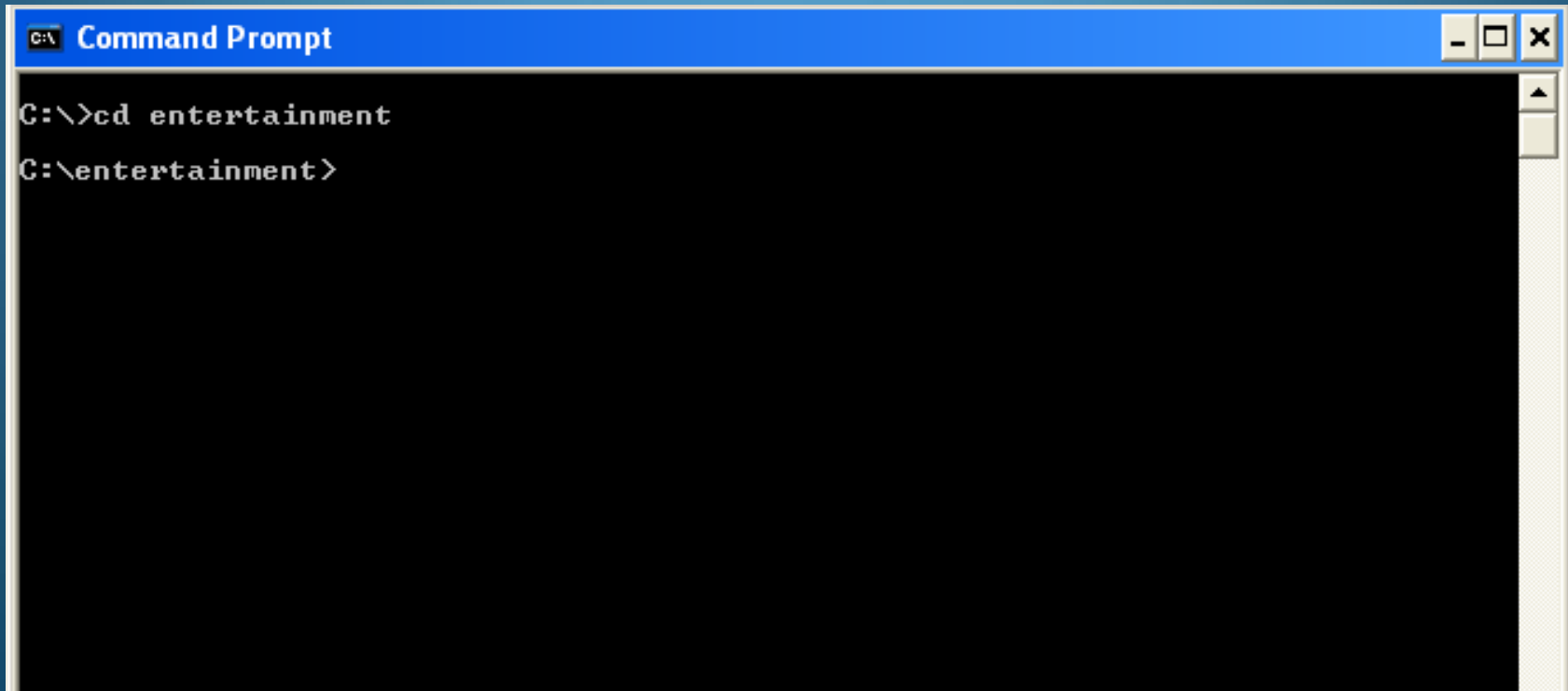
CD <directory name>

- For example the following will change the current directory to the new "entertainment" directory.

```
cd entertainment
```

CD command - changes the prompt

- If the CD command is successful it does not display any output
- However the prompt changes to reflect the new "current directory"



```
C:\>cd entertainment  
C:\entertainment>
```

The screenshot shows a Windows Command Prompt window with a blue title bar labeled "C:\ Command Prompt". The window has standard minimize, maximize, and close buttons. The command prompt shows the user entering the command `cd entertainment` at the `C:\>` prompt. The prompt then changes to `C:\entertainment>`, indicating the current directory has been successfully changed. The command prompt window has a vertical scrollbar on the right side.

Control characters

- Control-C is an example of a “control character”
- There are 26 control characters, one for each letter.
- There is no distinction between capital and lowercase letters: Ctrl-C (capital “C”) is the same as Ctrl-c (lowercase “c”)
- Some control characters have special meaning. For example:
 - Ctrl-H is another way of typing a backspace character (try it out in a command window)
 - Ctrl-M is another way of typing the ENTER key (try typing “dir” followed by ctrl-M)
- Sometimes control characters are shown with a ^ character followed by the letter. For example control-A can be shown as ^A