

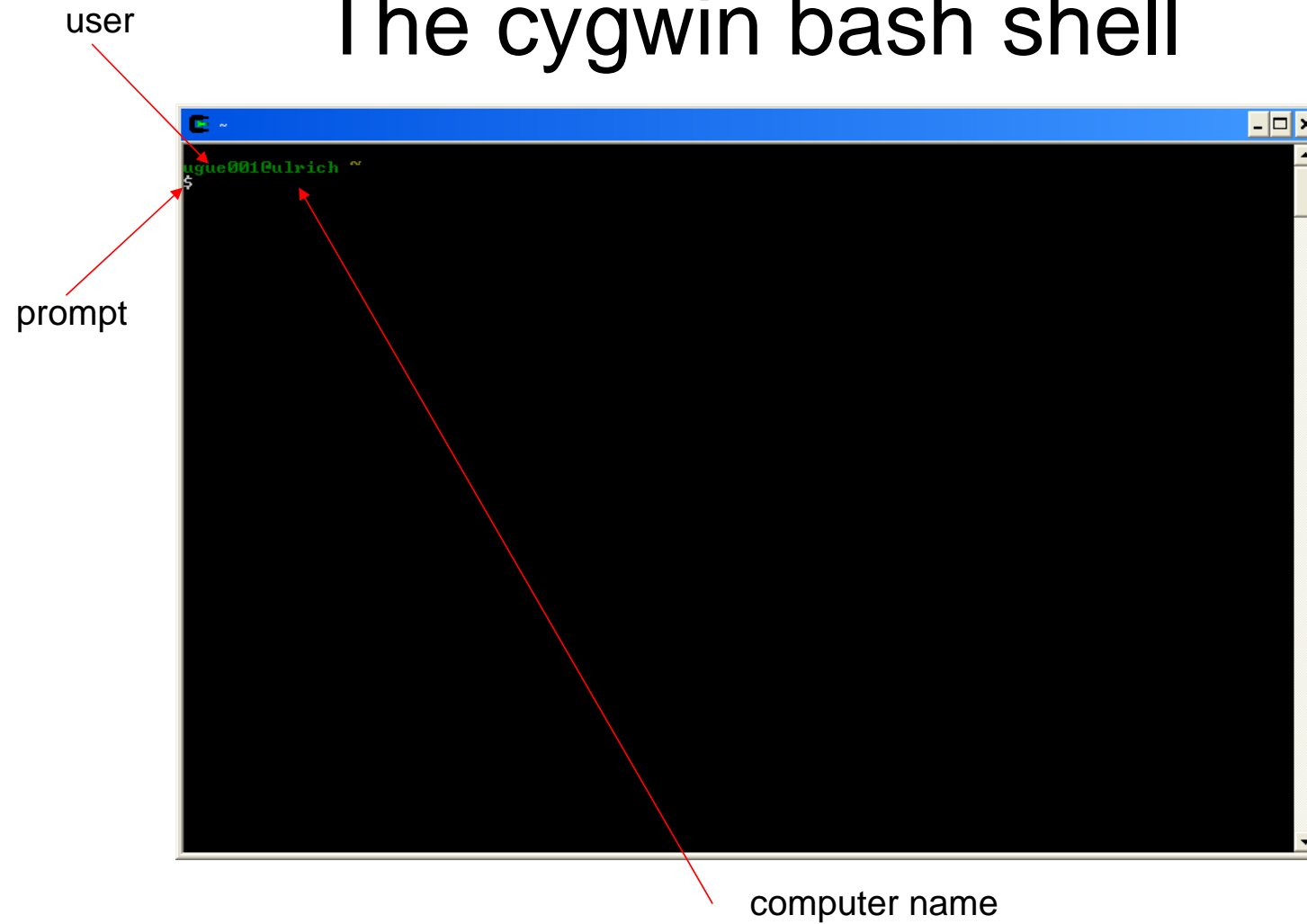
# Compiling C Code with Cygwin and CC

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for  
COMPSCI210

# Compiling C programs under Windows

- Microsoft's standard tool is Visual Studio, but for our small console C programs it's overkill
- You can use Cygwin instead
- Cygwin is a "Unix-like" *bash* shell for Windows
- Get it free from [www.cygwin.com](http://www.cygwin.com) (you will want to install only the minimum suggested configuration plus anything having to do with the GNU C compiler or gcc in name or description)
- To ensure that you can run programs compiled under Cygwin from Windows as well, make sure that the cygwin\bin directory is in your PATH environment variable
- Cygwin is already installed in the labs
- This handout shows you how to use it  
|

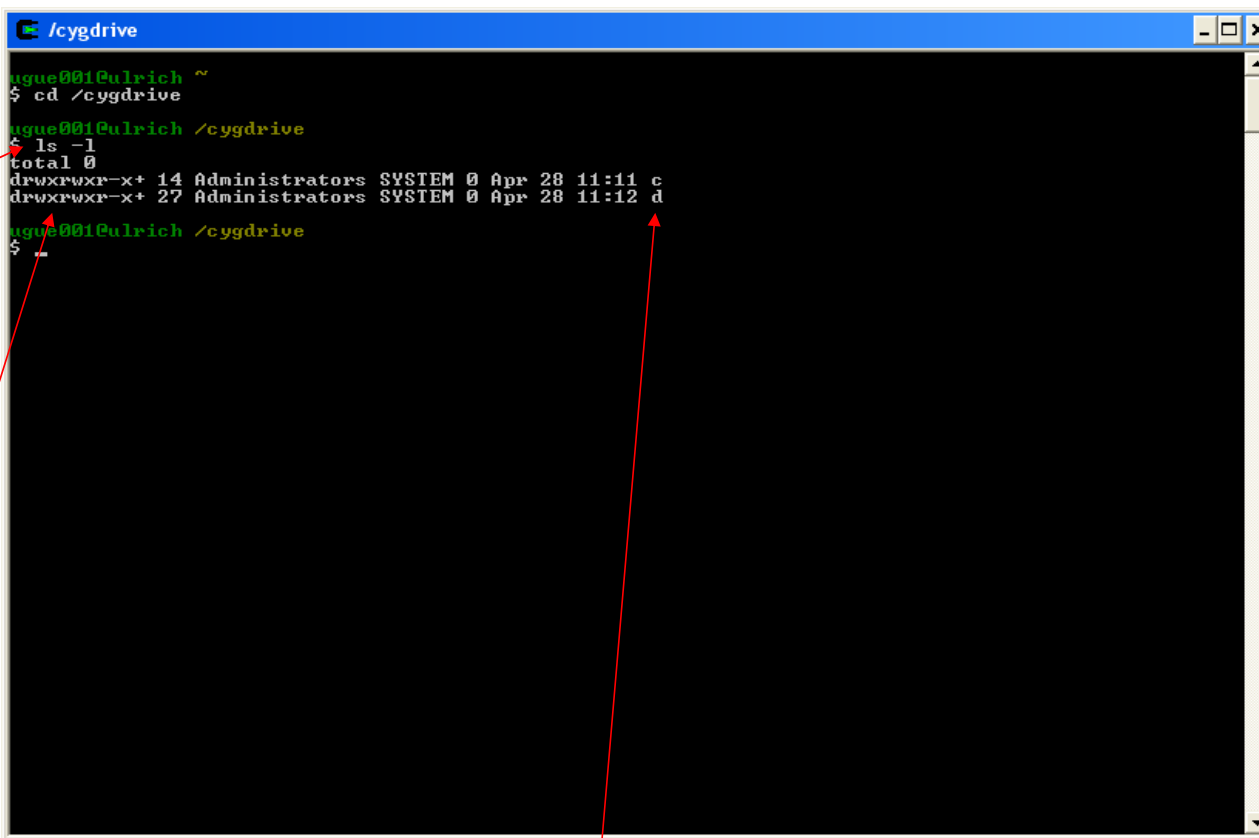
# The cygwin bash shell



# Navigating around your file system

- All files and folders in Unix and cygwin sit under a common root directory, /
- `cd /` gets you there (works much like the `cd` command under DOS / Windows)
- Your Windows drives are simply subdirectories under the `/cygdrive` directory
- `cd /cygdrive` gets you into the `cygdrive` directory
- `ls -l` lists the content of directories

# Navigating around your file system



```

/cygdrive
ugue001@ulrich ~
$ cd /cygdrive

ugue001@ulrich /cygdrive
$ ls -l
total 0
drwxrwxr-x+ 14 Administrators SYSTEM 0 Apr 28 11:11 c
drwxrwxr-x+ 27 Administrators SYSTEM 0 Apr 28 11:12 d
ugue001@ulrich /cygdrive
$
```

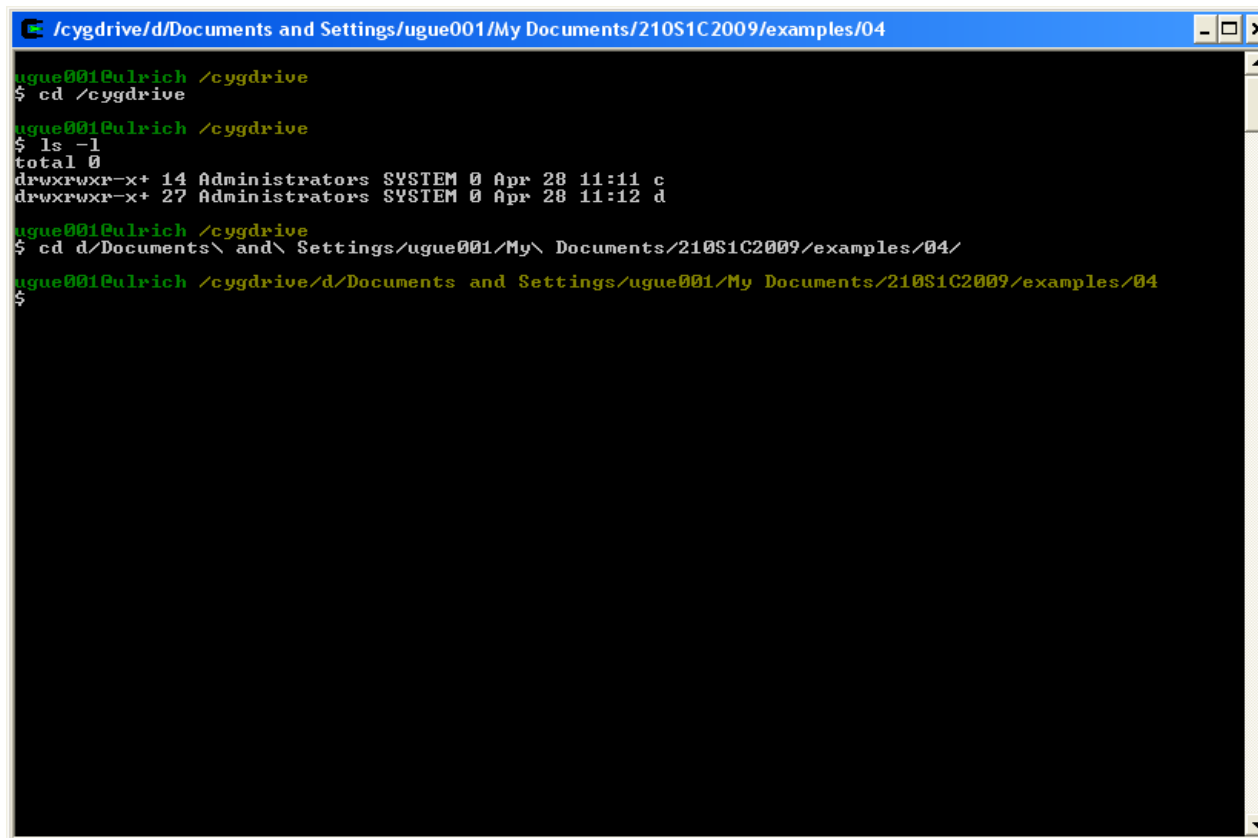
ls works  
like dir in  
Windows  
/ DOS

The “-l”  
adds  
detail

File permissions:  
This is a directory (d) that every user can read (r) and  
change (x) into. Only Administrators and members of the  
SYSTEM group can change it (w)

These are your c: and d: drives!

# Navigating around your file system



```

/cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
ugue001@ulrich /cygdrive
$ cd /cygdrive
ugue001@ulrich /cygdrive
$ ls -l
total 0
drwxrwxr-x+ 14 Administrators SYSTEM 0 Apr 28 11:11 c
drwxrwxr-x+ 27 Administrators SYSTEM 0 Apr 28 11:12 d
ugue001@ulrich /cygdrive
$ cd d/Documents\ and\ Settings\ugue001\My\ Documents\210S1C2009/examples\04\
ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$
```

Forward slashes separate directory names, backslashes escape space characters!

# Listing a directory

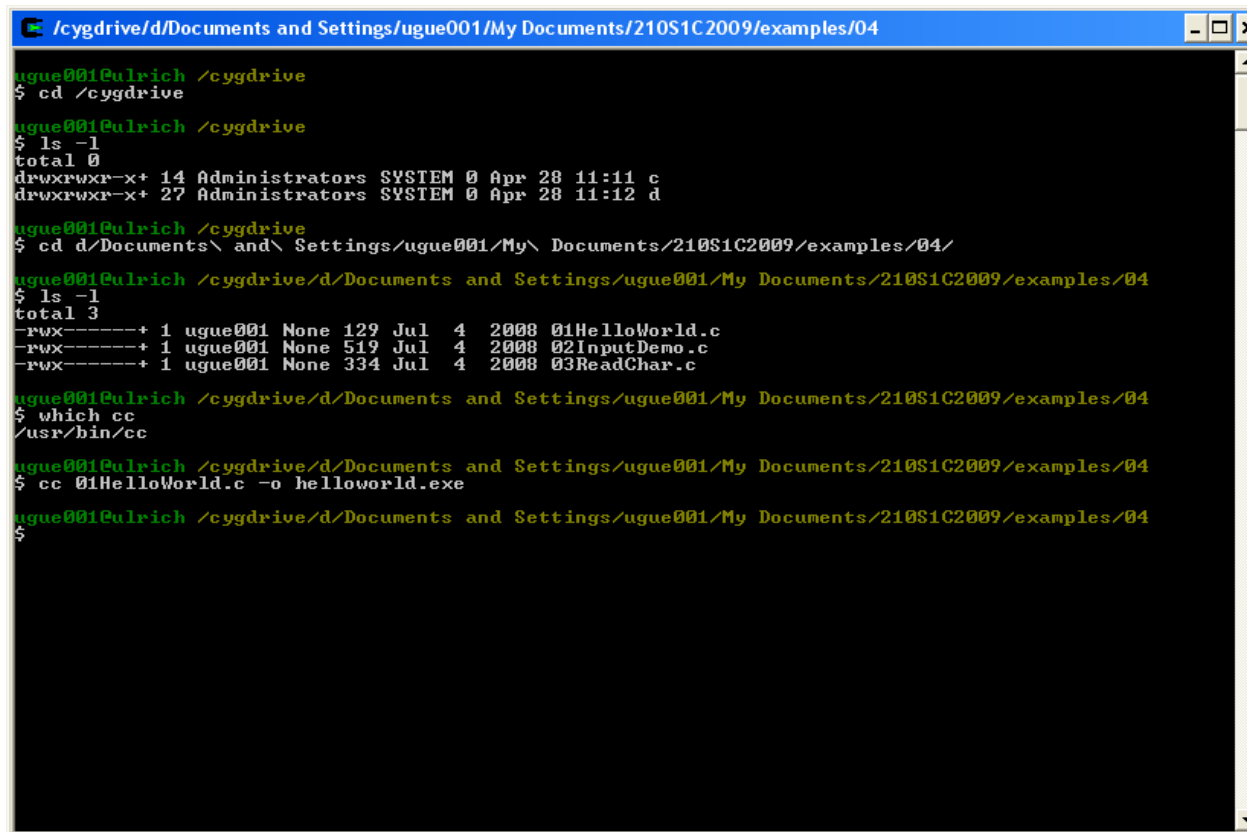
```

C /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
ugue001@ulrich /cygdrive
$ cd /cygdrive
ugue001@ulrich /cygdrive
$ ls -l
total 0
drwxrwxr-x+ 14 Administrators SYSTEM 0 Apr 28 11:11 c
drwxrwxr-x+ 27 Administrators SYSTEM 0 Apr 28 11:12 d
ugue001@ulrich /cygdrive
$ cd d/Documents\ and\ Settings\ugue001\My\ Documents\210S1C2009/examples/04/
ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ ls -l
total 3
-rwx-----+ 1 ugue001 None 129 Jul 4 2008 01HelloWorld.c
-rwx-----+ 1 ugue001 None 519 Jul 4 2008 02InputDemo.c
-rwx-----+ 1 ugue001 None 334 Jul 4 2008 03ReadChar.c
ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ which cc
/usr/bin/cc
ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$
```

Files are under full control of the owner ugue001

"which" lets you check whether you have a particular command in your path, e.g., the C compiler cc

# Compiling a C source program



```
ugue001@ulrich /cygdrive
$ cd /cygdrive

ugue001@ulrich /cygdrive
$ ls -l
total 0
drwxrwxr-x+ 14 Administrators SYSTEM 0 Apr 28 11:11 c
drwxrwxr-x+ 27 Administrators SYSTEM 0 Apr 28 11:12 d

ugue001@ulrich /cygdrive
$ cd d/Documents\ and\ Settings\ugue001\My\ Documents\210S1C2009/examples/04/

ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ ls -l
total 3
-rwx-----+ 1 ugue001 None 129 Jul 4 2008 01HelloWorld.c
-rwx-----+ 1 ugue001 None 519 Jul 4 2008 02InputDemo.c
-rwx-----+ 1 ugue001 None 334 Jul 4 2008 03ReadChar.c

ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ which cc
/usr/bin/cc

ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ cc 01HelloWorld.c -o helloworld.exe

ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$
```

Compile 01HelloWorld.c into output executable helloworld.exe  
Note that cc "knows" that 01HelloWorld.c is in the local directory

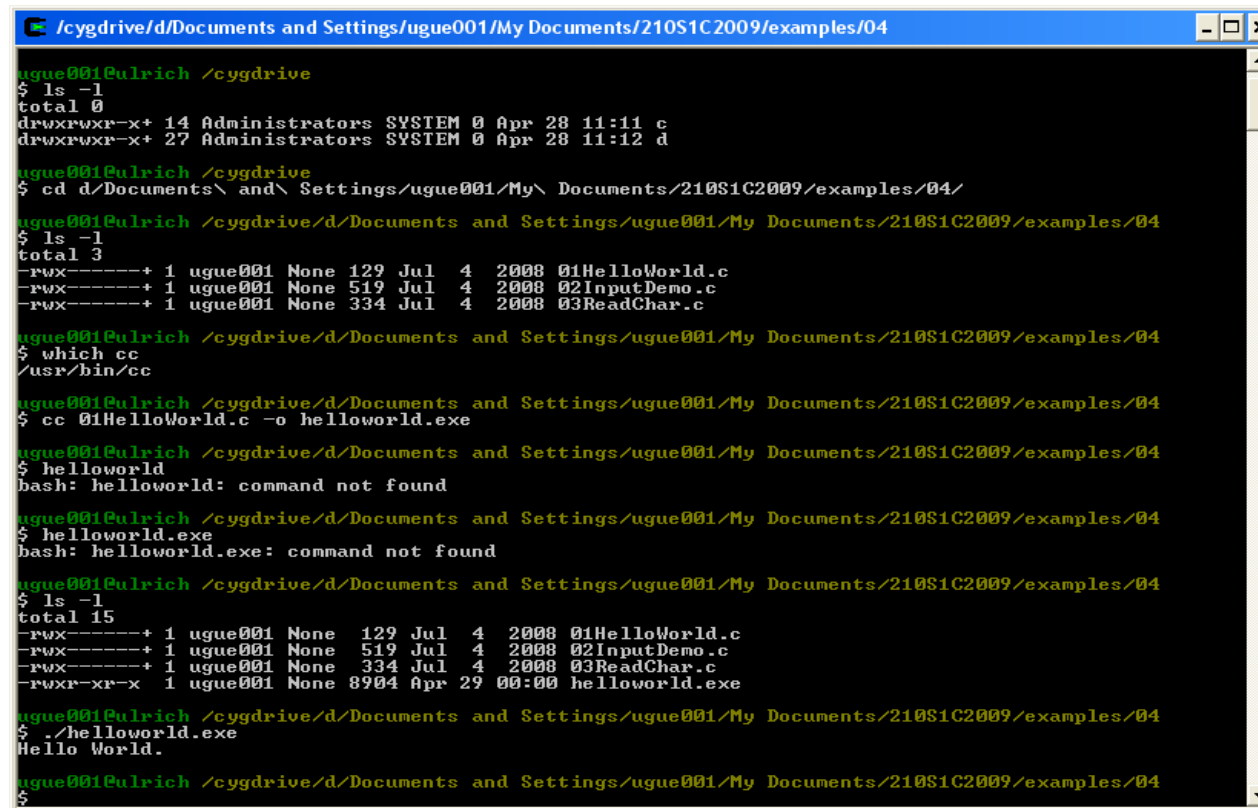


# But it's there!!!

```
/cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
ugue001@ulrich /cygdrive
$ cd /cygdrive
ugue001@ulrich /cygdrive
$ ls -l
total 0
drwxrwxr-x+ 14 Administrators SYSTEM 0 Apr 28 11:11 c
drwxrwxr-x+ 27 Administrators SYSTEM 0 Apr 28 11:12 d
ugue001@ulrich /cygdrive
$ cd d/Documents\ and\ Settings\ugue001\My\ Documents\210S1C2009\examples\04\
ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ ls -l
total 3
-rwx-----+ 1 ugue001 None 129 Jul 4 2008 01HelloWorld.c
-rwx-----+ 1 ugue001 None 519 Jul 4 2008 02InputDemo.c
-rwx-----+ 1 ugue001 None 334 Jul 4 2008 03ReadChar.c
ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ which cc
/usr/bin/cc
ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ cc 01HelloWorld.c -o helloworld.exe
ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ helloworld
bash: helloworld: command not found
ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ helloworld.exe
bash: helloworld.exe: command not found
ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ ls -l
total 15
-rwx-----+ 1 ugue001 None 129 Jul 4 2008 01HelloWorld.c
-rwx-----+ 1 ugue001 None 519 Jul 4 2008 02InputDemo.c
-rwx-----+ 1 ugue001 None 334 Jul 4 2008 03ReadChar.c
-rwxr-xr-x 1 ugue001 None 8904 Apr 29 00:00 helloworld.exe
ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$
```

Just because it's in the local directory, it's not necessarily in the path!

# Executing a file from the local directory



```

/cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
ugue001@ulrich /cygdrive
$ ls -l
total 0
drwxrwxr-x+ 14 Administrators SYSTEM 0 Apr 28 11:11 c
drwxrwxr-x+ 27 Administrators SYSTEM 0 Apr 28 11:12 d

ugue001@ulrich /cygdrive
$ cd d/Documents\ and\ Settings\ugue001\My\ Documents\210S1C2009\examples\04/

ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ ls -l
total 3
-rwx-----+ 1 ugue001 None 129 Jul 4 2008 01HelloWorld.c
-rwx-----+ 1 ugue001 None 519 Jul 4 2008 02InputDemo.c
-rwx-----+ 1 ugue001 None 334 Jul 4 2008 03ReadChar.c

ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ which cc
/usr/bin/cc

ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ cc 01HelloWorld.c -o helloworld.exe

ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ helloworld
bash: helloworld: command not found

ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ helloworld.exe
bash: helloworld.exe: command not found

ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ ls -l
total 15
-rwx-----+ 1 ugue001 None 129 Jul 4 2008 01HelloWorld.c
-rwx-----+ 1 ugue001 None 519 Jul 4 2008 02InputDemo.c
-rwx-----+ 1 ugue001 None 334 Jul 4 2008 03ReadChar.c
-rwxr-xr-x 1 ugue001 None 8904 Apr 29 00:00 helloworld.exe

ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$ ./helloworld.exe
Hello World.

ugue001@ulrich /cygdrive/d/Documents and Settings/ugue001/My Documents/210S1C2009/examples/04
$
```

./ gives you the local directory