

Computer Programming 1 Lab

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Outline

- Unix Command Review
- Vim Tips
- Simple C Program
- Compile Your Program
- How to Copy Your C Program?
- Data Type
- Operators in C
- Exercise 1

Unix Command Review

`cd` -> change directory

```
cd ~  
cd ~s109xx/test  
cd public_html  
cd /usr/share  
cd ..  
cd ../test
```

Unix Command Review

`ls` -> list files in current directory

```
ls
ls -l    -> list files details in current directory
ls -a    -> list all files (include hidden files) in current directory
ls -la   -> list all files with details in current directory
```

Unix Command Review

How to create/delete/copy files or directory?

- `mkdir test`

Create a directory named "test" in current directory.

- `cp fileX dirY/dirZ`

Copy fileX from current directory to `./dirY/dirZ`.

- `cp fileX dirY/fileZ`

Copy fileX from current directory to dirY and rename to fileZ.

- `cp -r dirX dirY`

Copy dirX from current directory to dirY.

Unix Command Review

How to create/delete/copy files or directory?

- `mv fileA dirB`

Move fileA to dirB.

- `mv dirA dirB`

- If dirB exists, then move dirA under dirB.
- If dirB doesn't exist, dirA is renamed to dirB.

- `rm x`

Remove file x or remove directory x if x is an empty directory.

- `rm -rf x`

Remove directory x and all its contents regardless the file is write-protect or not.

Unix Command Review

- The path used on `cd`, `mkdir`, `cp`, `mv`, and `rm` can be absolute path or relative path.
- Type `pwd` to see what the current directory is.
- Type `whoami` to see your account's name.
- Type `logout` to logout the system, or you can press `Ctrl+D`.
- Type `Ctrl+L` to clean your screen.
- Type `Ctrl+C` to stop the program which is running.

Unix Command Review

- Remember, whenever you have problems using Unix, try `man` command.

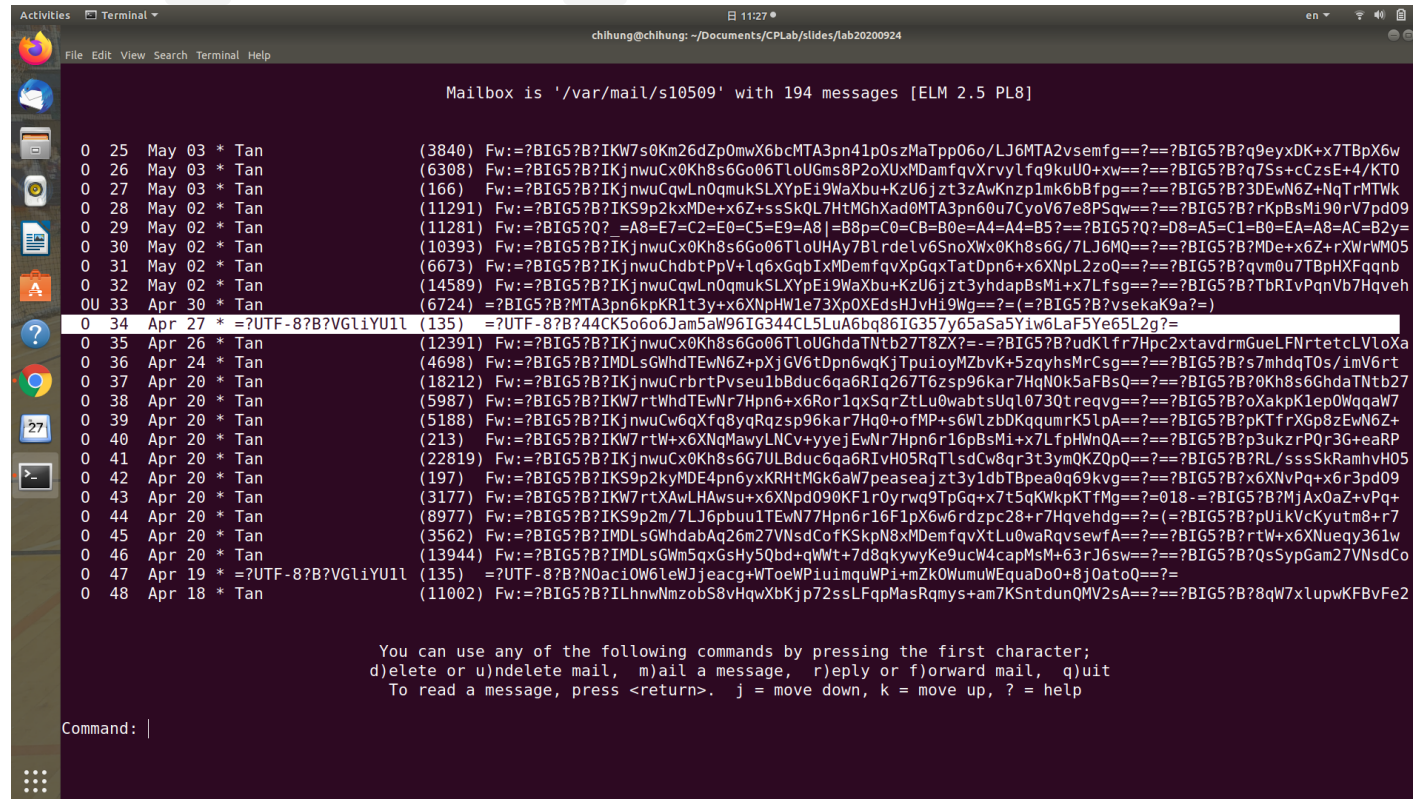
```
man ls  
man cp
```

- `man` stands for manual.

Unix Command Review

Start Ghost account elm

- Type `/usr/local/bin/elm`
- Enter `y` 3 times and `q` 1 time



```
Mailbox is '/var/mail/s10509' with 194 messages [ELM 2.5 PL8]

0 25 May 03 * Tan (3840) Fw:=?BIG5?B?IKW7s0Km26dZp0mwX6bcMTA3pn41p0szMaTpp06o/LJ6MTA2vsemfg=?=?BIG5?B?q9eyxDK+x7TbPwX6w
0 26 May 03 * Tan (6308) Fw:=?BIG5?B?IKj nWuCX0Kh8s6Go06TLoUGms8P2oXUxMDamfvXrvylf9kuU0+xw=?=?BIG5?B?q7Ss+cCzsE+4/KTO
0 27 May 03 * Tan (166) Fw:=?BIG5?B?IKj nWuCqWLn0qmukSLXYpEi9WaXbu+KzU6jzt3zAwKnzp1mk6bBfpg=?=?BIG5?B?3DEwN6Z+NqTrMTWk
(11291) Fw:=?BIG5?B?IKS9p2kxMDe+x6Z+ssSkQL7HtMGhXad0MTA3pn60u7CyoV67e8PSqww=?=?BIG5?B?rKpBsMi90rV7pd09
(11281) Fw:=?BIG5?Q? =A8=E7=C2=E0=C5=E9=A8j=B8p=C0=CB=B0e=A4=A4=B5=?=?BIG5?Q?D8=A5=C1=B0=EA=A8=AC=B2y=
(10393) Fw:=?BIG5?B?IKj nWuCX0Kh8s6Go06TLoUHAY7BlrdeLv6SnoXWx0Kh8s6G/7LJ6MQ=?=?BIG5?B?MDe+x6Z+rXWfWM05
(6673) Fw:=?BIG5?B?IKj nWuChdbtPpV+Lq6xGqbIXMdemfvXpGqXatDpn6+x6XNpL2zoQ=?=?BIG5?B?qvm0u7TbPHXFqgnb
(14589) Fw:=?BIG5?B?IKj nWuCqWLn0qmukSLXYpEi9WaXbu+KzU6jzt3yhdapBsMi+x7Lfsq=?=?BIG5?B?TbRiVpqnVb7Hqveh
(6724) =?BIG5?B?MTA3pn6kpkR1t3y+x6XNpHW1e73Xp0XEdsHJvHi9Wg=?=(=?BIG5?B?vsekaK9a?)

0 34 Apr 27 * =?UTF-8?B?VGLiYU1l (135) =?UTF-8?B?44CK5o6o6Jam5aW96IG344CL5LuA6bq86IG357y65aSa5Y1w6LaF5Ye65L2g?=?
(12391) Fw:=?BIG5?B?IKj nWuCX0Kh8s6Go06TLoUGhdaTntb27T8ZX?=-?BIG5?B?udKlfr7Hpc2xtavdrmfGueLFNrtetclVLoXa
(4698) Fw:=?BIG5?B?IMDLsGWhdTEwN6Z+pXjGV6tDpn6wGKjTpuioyMZbvK+5zqyhsMrCsg=?=?BIG5?B?s7mhdqT0s/imV6rt
(18212) Fw:=?BIG5?B?IKj nWuCrbrtPvseulbDduc6qa6RIq267T6zsp96kar7HqN0k5aFBsQ=?=?BIG5?B?0Kh8s6GhdaTntb27
(5987) Fw:=?BIG5?B?IKW7rtWhdTEwNr7Hpn6+x6Ror1qxSqrZtLu0wabtsUgl0730treqvg=?=?BIG5?B?oXakp1lep0Wqqaw7
(5188) Fw:=?BIG5?B?IKj nWuCW6qXf8yqRqzsp96kar7Hq0+ofMP+s6WlzbDKqumrK5lpA=?=?BIG5?B?pKtfrXGp8zEwN6Z+
(213) Fw:=?BIG5?B?IKW7rtW+x6XNqMawyLNCv+yyejEwNr7Hpn6r16pBsMi+x7LfpHwNQA=?=?BIG5?B?p3ukzrPQr3G+eaRP
(22819) Fw:=?BIG5?B?IKj nWuCX0Kh8s6G7ULBduc6qa6RIvH05RqTLsdCw8qr3t3ymQKZQpQ=?=?BIG5?B?RL/ssSkRamhvH05
(197) Fw:=?BIG5?B?IKS9p2kyMDE4pn6yXKRhtMGk6aW7peaseajzt3y1dbTBpea0q69kvg=?=?BIG5?B?x6XNvPq+x6r3pd09
(3177) Fw:=?BIG5?B?IKW7rtXAwLHAwsu+x6XNpd090KF1r0yrwq9Tpgq+x7t5qKwkpKtfgm=?018-=?BIG5?B?MjAx0aZ+vPq+
(8977) Fw:=?BIG5?B?IKS9p2m/7LJ6pbu1TEwN77Hpn6r16F1pX6w6rdzpc28+r7Hqvehdgm=?=(=?BIG5?B?pu1kVcKyutm8+r7
(3562) Fw:=?BIG5?B?IMDLsGWhdabAq26m27VnsdCofKSkpN8xMDemfvXtLu0waRqvsewfa=?=?BIG5?B?rtW+x6XNueqy361w
(13944) Fw:=?BIG5?B?IMDLsGWh5qXGShy5Qbd+qWt+7d8qkyvyKe9ucW4capMsm+63rJ6sw=?=?BIG5?B?QsSypGam27VnsdCo
(135) =?UTF-8?B?N0aci0W61eWJjeacg+WT0eWPiuiimqWPI+mZk0WumuWEquaDo0+8jOatoQ=?=
(11002) Fw:=?BIG5?B?ILhnmNmbzS8vHqwXbKjP72sLlFqpMasRmqys+am7KSntdunQMv2sA=?=?BIG5?B?8qW7xlupwKFBvFe2

You can use any of the following commands by pressing the first character;
d)delete or undelete mail, m)ail a message, r)eply or f)orward mail, q)uit
To read a message, press <return>. j = move down, k = move up, ? = help

Command: |
```

Vim Tips

- `i`, `o`, `a`, `R` -> change to insert mode
- `Esc` -> back to normal mode
- `:`, `/` -> enter command-line mode
- `:w` -> save your work
- `:q` -> quit vim
- `:wq`, `:x` -> save and quit
- `:q!` -> quit without saving
- `:xxx` -> go to line xxx
- `/xxx` -> search "xxx" in this file

Vim Tips

- `v` -> character visual
- `V` -> line visual
- `y` -> copy
- `p` -> paste
- `d` -> delete (cut)
- `u` -> undo
- `:nohl` -> no highlight
- `gg=G` -> auto indent

Simple C Program

- `main()` is a entry point of program

```
#include <stdio.h>

int main(){
    int x;
    scanf("%d", &x);
    x = x + 2;
    printf("%d\n", x);
    return 0;
}
```

- `#include <stdio.h>` is for preprocessor
- `int main(){...}` -> main function
- `scanf` -> input
- `printf` -> output
- `return 0` -> no error

Compile Your Program

How to compile your program?

- `make` if you have `Makefile`.
 - Like a script. It runs `gcc` automatically.
- `gcc`, GNU compiler.

```
gcc xxxxx.c
```

- It will compile `xxxxx.c` and generate the executable file `a.out`.
- Or dump a lot of errors.

Compile Your Program

```
#include <stdio.h>

int main(){
    int a;
    printf("%d", a)
    return 0;
}
```

```
[ge10919@ghost]~ gcc test.c
test.c: In function 'main':
test.c:5: error: expected ';' before 'return'
```

Compile Your Program

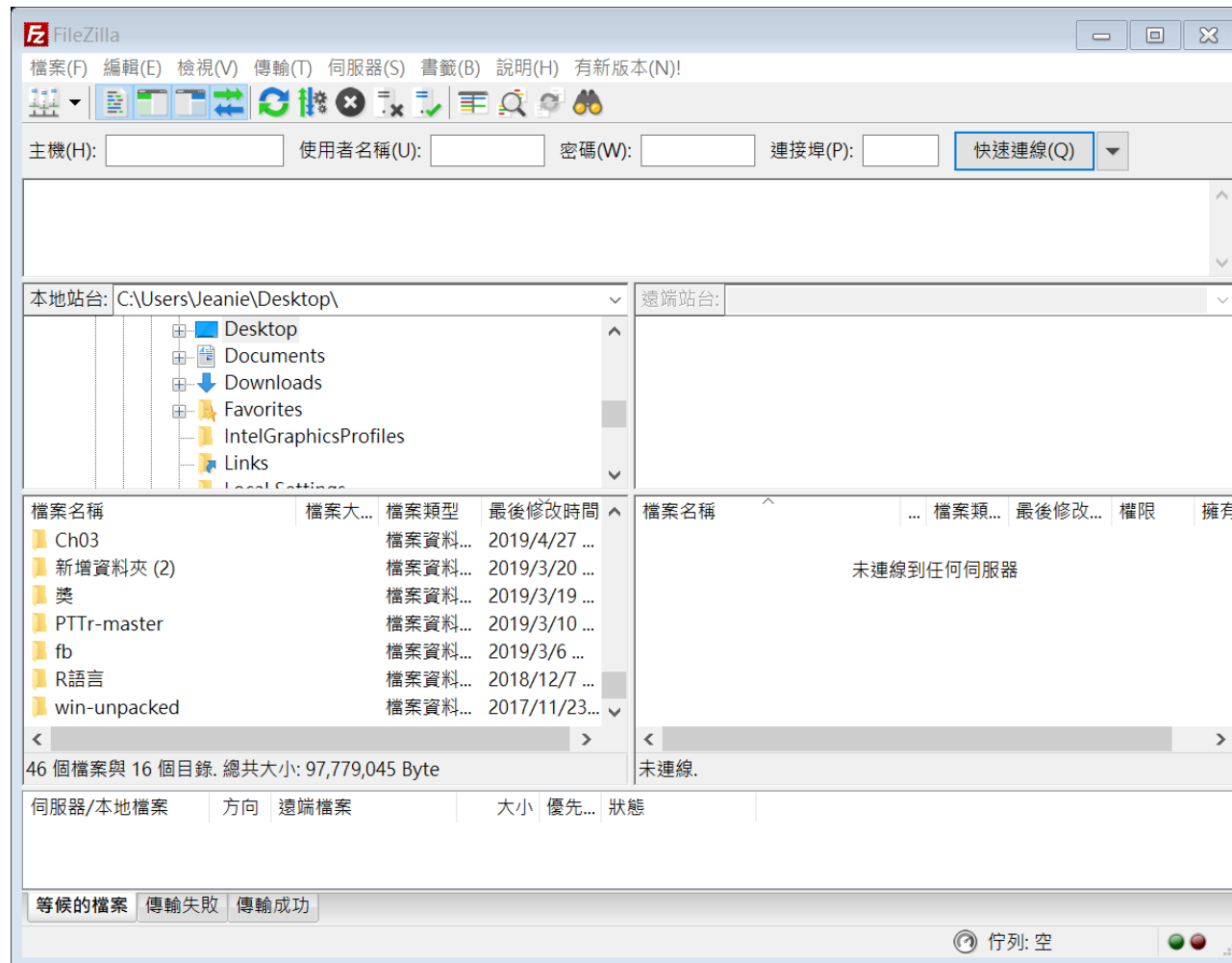
Type `./a.out` to run the program.

```
[ge10919@ghost]~ ./a.out  
134511260
```

- Here is a "initialization" problem.

How to Copy Your C Script?

- filezilla



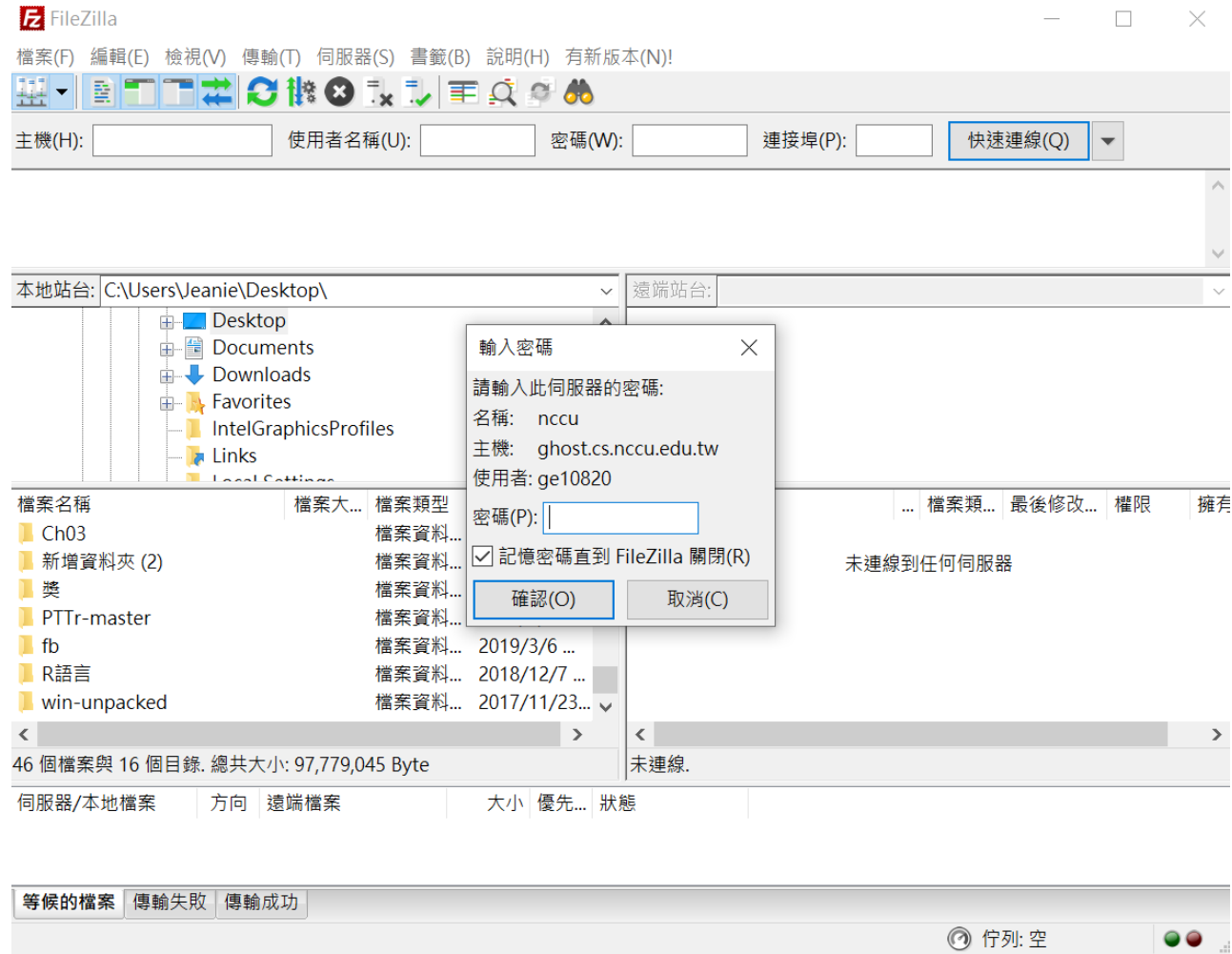
How to Copy Your C Script?

- filezilla
 - ghost.cs.nccu.edu.tw
 - Your Ghost account



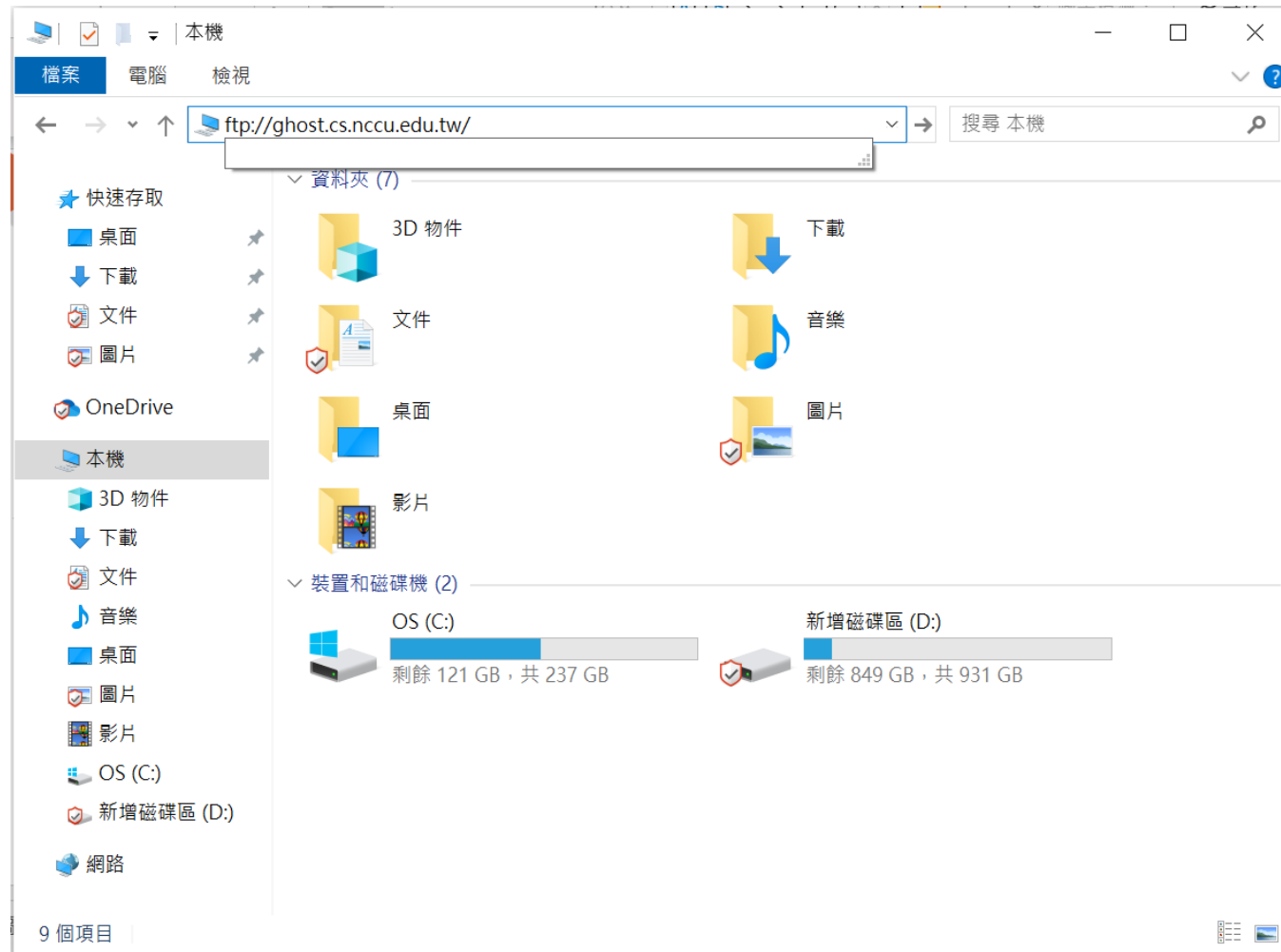
How to Copy Your C Script?

- filezilla
 - Your Ghost password



How to Copy Your C Script?


- <ftp://ghost.cs.nccu.edu.tw> (Windows UI)



How to Copy Your C Script?

- <ftp://ghost.cs.nccu.edu.tw> (Windows UI)

登入身分


 該伺服器不允許以匿名方式登入或電子郵件地址不被接受。

FTP 伺服器: ghost.cs.nccu.edu.tw

使用者名稱(U):

密碼(P):

登入之後，您可以將這個伺服器加到我的最愛，以便快速回到此伺服器。

 FTP 在將密碼或資料傳送至伺服器之前，並不會將其加密或編碼。若要保護密碼及資料的安全，請改用 WebDAV。

匿名登入(A) 儲存密碼(S)

How to Copy Your C Script?

- `ftp ghost.cs.nccu.edu.tw` **(command line)**
 - `ls` -> list files or directories on server
 - `pwd` -> see what the current directory is on server
 - `cd` -> change directory on server
 - `lls` -> list files or directories on local
 - `lcd` -> change directory on local
 - `get` -> copy the file from server to local
 - `mget` -> copy more files from server to local
 - `put` -> copy the file from local to server
 - `mput` -> copy more files from local to server

[more source](#)

How to Copy Your C Script?

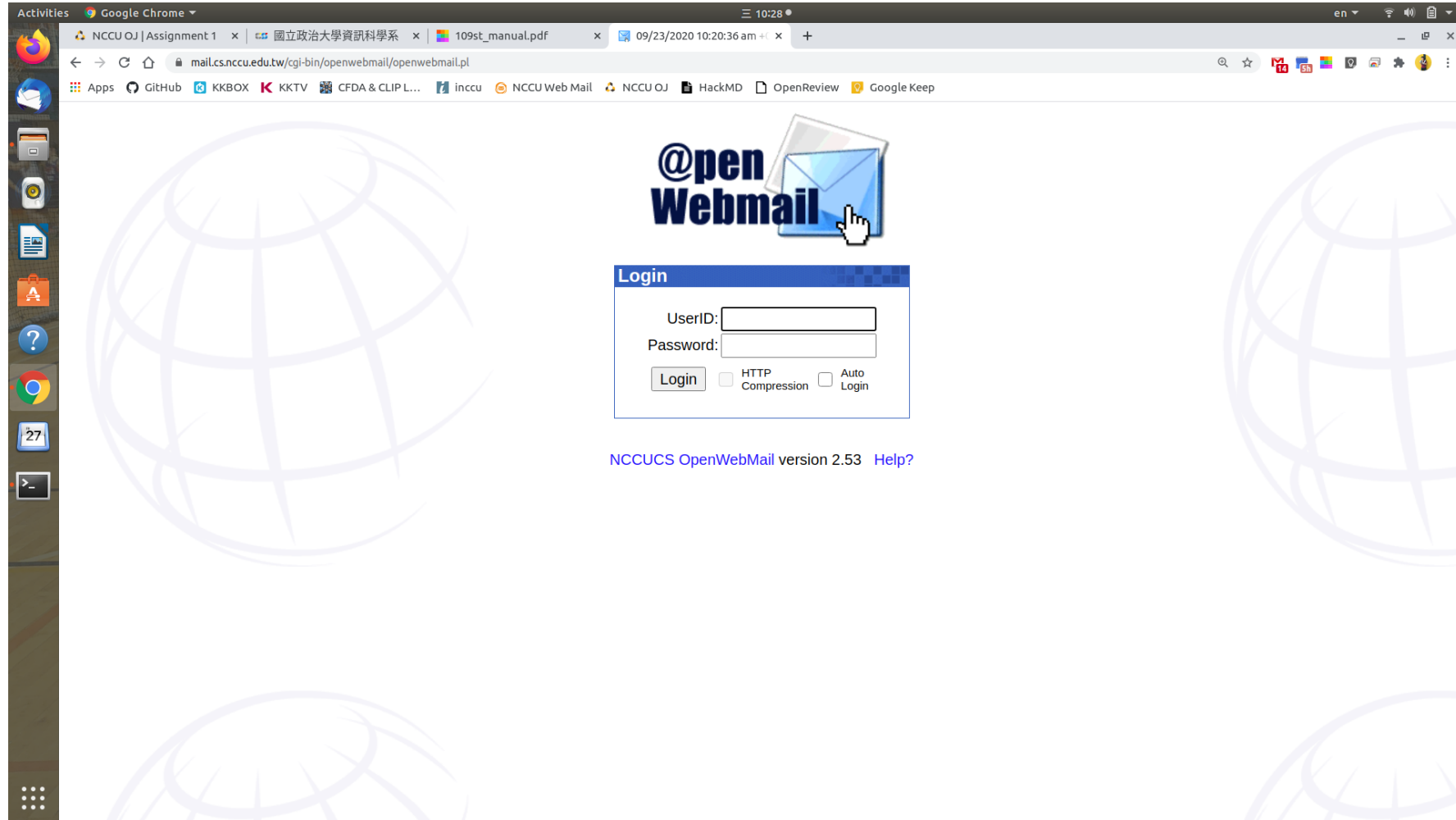
- `cat` is a standard Unix utility that reads files sequentially, writing them to standard output.

```
[ge10919@ghost]~ cat hello_world.c
#include <stdio.h>

int main(){
    printf("Hello World!\n");
    return 0;
}
[ge10919@ghost]~
```

How to Copy Your C Script?

- NCCUCS Web Mail
 - Login



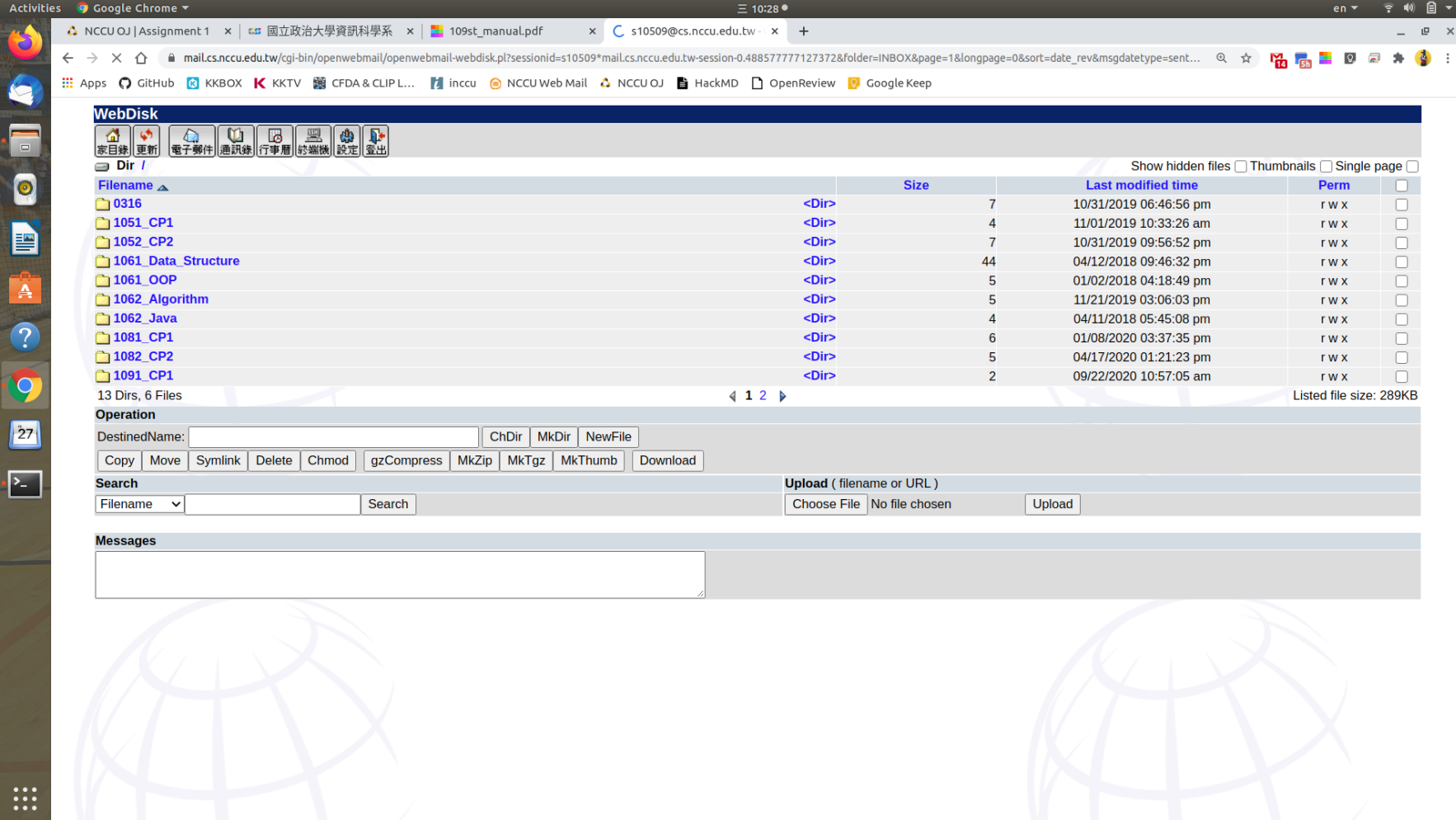
How to Copy Your C Script?

- NCCUCS Web Mail
 - WebDisk

	Sent Date	Sender	Subject	Size
1	08/25/2020 04:25:06 pm	[UTF-8?]TibaMeá,çç'ç'ç'	[UTF-8?]æ—©é'¥á,,æf áç'æ',ä,ï%œPower BI [UTF-8?]ä~'æ°ç'æ'ä...	9KB
2	07/20/2020 08:35:58 pm	[UTF-8?]TibaMeá,çç'ç'ç'	[UTF-8?]äç TibaMeé™ æ™,ä,€€±äç'ä,äøç¥Zi%çç'™äøšä°ï%çè³%è°ç ...	6KB
3	07/08/2020 08:19:47 pm	[UTF-8?]TibaMeá,çç'ç'ç'	[UTF-8?]äç TibaMeá'ç%çæ—¥äç'7/8æç-æ— ¥é™ äøšç'çæ~÷æç'8è™Yäç'ä¥%e...	15KB
4	06/05/2020 12:08:08 am	[UTF-8?]TibaMeá,çç'ç'ç'	[UTF-8?]æççä%çä, çä'ï%çé-ç÷äç'æ',ï%çä ä,«é-çè~ï%çè²çæ-™ä^tæž...	3KB
5	05/26/2020 09:38:14 pm	[UTF-8?]TibaMeá,çç'ç'ç'	[UTF-8?]äç TibaMe [UTF-8?]5æç'æ±j'ä°äç...äç'ç±é-çæ-°è³è^é^ä^ä...	39KB
6	05/15/2020 01:16:44 am	[UTF-8?]TibaMeá,çç'ç'ç'	[UTF-8?]äç TibaMe [UTF-8?]5æç'æ±j'ä°äç...äç'ç±é-çæ-°è³è^é^ä^ä...	

How to Copy Your C Script?

- NCCUCS Web Mail
 - Ghost



The screenshot shows the NCCUCS WebMail WebDisk interface. The browser address bar displays the URL: mail.cs.nccu.edu.tw/cgi-bin/openwebmail/openwebmail-webdisk.pl?sessionid=s10509@mail.cs.nccu.edu.tw-session-0.488577777127372&folder=INBOX&page=1&longpage=0&sort=date_rev&msgdatatype=sent... The interface includes a navigation bar with icons for home, refresh, email, communication, calendar, mobile, settings, and logout. Below this is a table listing the contents of the 'Dir /' directory.

Filename	Size	Last modified time	Perm	
0316	<Dir>	10/31/2019 06:46:56 pm	rwx	<input type="checkbox"/>
1051_CP1	<Dir>	11/01/2019 10:33:26 am	rwx	<input type="checkbox"/>
1052_CP2	<Dir>	10/31/2019 09:56:52 pm	rwx	<input type="checkbox"/>
1061_Data_Structure	<Dir>	04/12/2018 09:46:32 pm	rwx	<input type="checkbox"/>
1061_OOP	<Dir>	01/02/2018 04:18:49 pm	rwx	<input type="checkbox"/>
1062_Algorithm	<Dir>	11/21/2019 03:06:03 pm	rwx	<input type="checkbox"/>
1062_Java	<Dir>	04/11/2018 05:45:08 pm	rwx	<input type="checkbox"/>
1081_CP1	<Dir>	01/08/2020 03:37:35 pm	rwx	<input type="checkbox"/>
1082_CP2	<Dir>	04/17/2020 01:21:23 pm	rwx	<input type="checkbox"/>
1091_CP1	<Dir>	09/22/2020 10:57:05 am	rwx	<input type="checkbox"/>

13 Dirs, 6 Files Listed file size: 289KB

Operation

DestinedName: ChDir Mkdir NewFile

Copy Move Symlink Delete Chmod gzCompress MkZip MKTgz MkThumb Download

Search Search **Upload (filename or URL)** No file chosen

Messages

Data Type

- Integer types:

Name	Size (in bits, on x86)	Range	Notes
bool	8 (top 7 bits are ignored)	0 or 1	C++ only
char	8	-128 to 127(signed) or 0-255(unsigned)	standard issue "byte"
short	16	-32768 to 32767(signed) or 0-65536(unsigned)	just like a char , only twice as large
int	32	-2147483648 to 2147483647(signed) or 0-4294967296(unsigned)	standard-issue integer number type
long	32 (can be 64 on other architectures)	same as int	ditto
long long	64 (this is a non-standard GNU extension)	-9223372036854775808 to 9223372036854775807(signed) or 0-18446744073709551616(unsigned)	For very huge integers

- Floating Point types:

Name	Size (in bits, on x86)	Range	Notes
float	32	+/- 1.4023x10 ⁻⁴⁵ to 3.4028x10 ⁺³⁸	general purpose real-number
double	64	+/- 4.9406x10 ⁻³²⁴ to 1.7977x10 ³⁰⁸	higher-precision real number
long double	96 (this is a non-standard GNU extension)	???	For numbers with very large ranges and high precision

Data Type

- printf / scanf format specifier

<code>%c</code>	以字元 方式輸出
<code>%d</code>	10 進位整數輸出
<code>%o</code>	以8進 位整數方式輸出
<code>%u</code>	無號整數輸出
<code>%x, %X</code>	將整 數以16進位方式輸出
<code>%f</code>	浮點 數輸出
<code>%e, %E</code>	使用科學記號顯示浮點數
<code>%g, %G</code>	浮點數輸出，取% <code>f</code> 或% <code>e</code> （% <code>f</code> 或% <code>E</code> ），看哪個表示精簡
<code>%%</code>	顯示 %
<code>%s</code>	字串輸出

Data Type

- Type Conversion
 - Implicit type conversion

```
double number = 10;  
printf("%f\n", number/3);
```

- Conversion

```
int num = 3;  
float fnum = 3.5;  
float sum;  
sum = (float)num + fnum;
```

Data Type

- Print float or double number
 - Number of digits

```
double pi = 3.14159;
printf("%f\n", pi);
// 3.14159

// What if I want to print "3.14"?
printf("%.2f\n", pi);
// 3.14

printf("%d\n", pi);
// 1293080650
```

Operator in C

- Arithmetic Operator

- `+`, `-`, `*`, `/`

- Example: `x = a + b`

- `%`

- Module Operator and remainder of after an integer division.

- Example: `z = x % y`

- `++`, `--`

- Increase/Decrease operator increases/decreases the integer value by one

- Example: `i++`, `j--`

Operator in C

- Relational Operator

- `==` , `!=`
 - Checks if the values of two operands are equal or not.
 - Example: `a == b` , `x != y`
- `>` , `<`
 - Checks if the value of left operand is greater/less than the value of right operand.
 - Example: `a > b` , `c < d`
- `>=` , `<=`
 - Checks if the value of left operand is greater/less than or equal to the value of right operand.
 - Example: `a >= b` , `c <= d`

Operator in C

- Logical Operator
 - `&&`
 - Called Logical AND operator.
 - Example: `A && B`
 - `||`
 - Called Logical OR operator.
 - Example: `A || B`
 - `!`
 - Called Logical NOT operator.
 - Example: `!(A && B)`

Exercise 1

There is a rectangle in plane coordinates. Give you the coordinates of the upper-left and bottom-right points of the given rectangle. Please calculate the area of the rectangle.

- Input:

Two lines. Each line contains two numbers.

The two numbers in the first line are the coordinate of the upper-left point (x_1, y_1) .

The two numbers in the second line are the coordinate of the bottom-right point (x_2, y_2) .

- Output:

The area of the rectangle.

Any Questions?