

**TRƯỜNG ĐẠI HỌC KHOA  
HỌC TỰ NHIÊN**



**CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT  
NAM**

**Độc lập - Tự do - Hạnh phúc**

*Ngày..26..tháng..5...năm 2018....*

## **BÁO CÁO**

### **ĐỒ ÁN FTP CLIENT BỘ MÔN MẠNG MÁY TÍNH**

- Giáo viên hướng dẫn: Nguyễn Thanh Quân
- Lớp CQ2016/2
- Danh sách nhóm:
  - Nguyễn Thành Đạt (1612088)
  - Tôn Thất Đạt (1612097)
  - Nguyễn Công Đạt (1612094)
- Phân công công việc:
  - Nguyễn Thành Đạt: code các hàm put, get, main, send\_port, passive, ls, dir.
  - Nguyễn Công Đạt: code các hàm mput, mget, mdelete, đăng nhập, quit, exit.
  - Tôn Thất Đạt: code các hàm delete, cd, mkdir, rmdir, pwd, help, ls\_client.
- Các hàm chính và các biến toàn cục:
  - char buffer[2000]; //buffer để đọc và ghi dữ liệu
  - bool isActive = true; //true -> active, false -> passive
  - void recv\_mess(SOCKET s, char \*mess = buffer);  
//đọc data vào buffer thông qua socket s
  - void send\_mess(SOCKET s, char \*mess = buffer);  
//gửi data từ buffer thông qua socket s
  - SOCKET sendPort(SOCKET s, int port\_num = 0);  
//gửi lệnh port cho server, trả về socket đã kết nối với server

- SOCKET sendPasv(SOCKET s);  
//gửi lệnh passive cho server, trả về socket đã kết nối với server

- Bảng đánh giá:

Chức năng	Mức độ hoàn thiện
Login	100%
Ls, dir	100%
Put	100%
Get	100%
Mput	100%
Mget	100%
Cd	100%
Lcd	100%
Delete	100%
Mdelete	100%
Mkdir	100%
Rmdir	100%
Pwd	100%
Passive	100%
Quit, exit	100%
<b>Chương trình</b>	<b>100%</b>

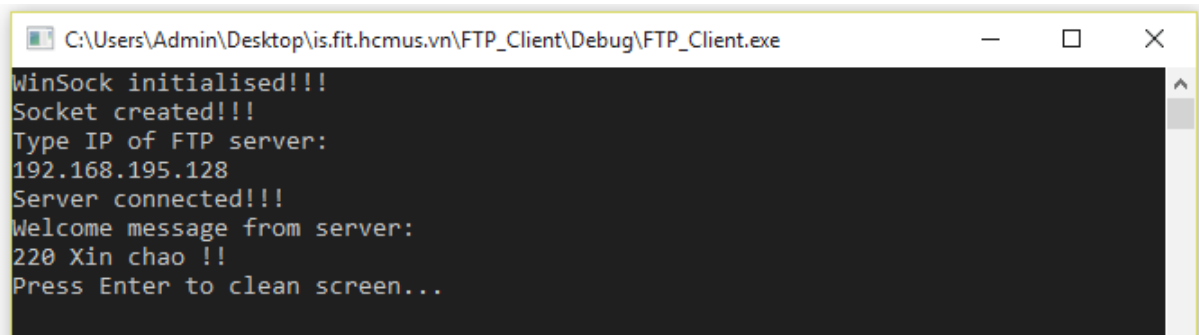
- Hình minh hoạ cho chương trình (FTP server là vsftpd server trên hệ điều hành Ubuntu 16.04 LTS, FTP client chạy trên Win 10):

Khởi tạo FTP server trên Ubuntu:

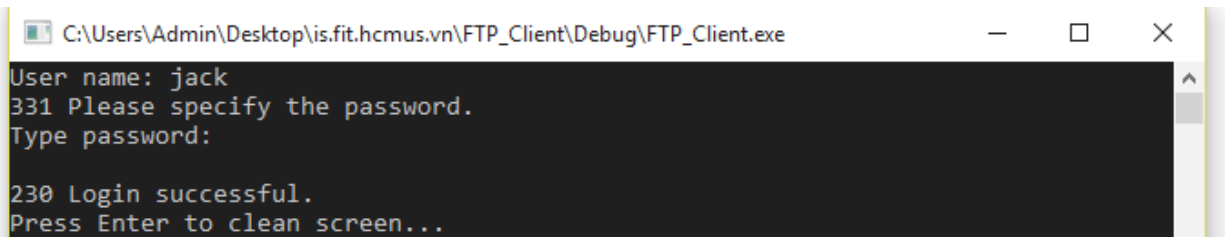
```
bacbia@ubuntu:~$ sudo systemctl restart vsftpd
bacbia@ubuntu:~$ sudo systemctl status vsftpd
● vsftpd.service - vsftpd FTP server
   Loaded: loaded (/lib/systemd/system/vsftpd.service; enabled; vendor preset: e
   Active: active (running) since Fri 2018-05-25 16:42:55 +07; 2s ago
     Process: 4414 ExecStartPre=/bin/mkdir -p /var/run/vsftpd/empty (code=exited, s
    Main PID: 4416 (vsftpd)
      CGroup: /system.slice/vsftpd.service
              └─4416 /usr/sbin/vsftpd /etc/vsftpd.conf

May 25 16:42:55 ubuntu systemd[1]: Starting vsftpd FTP server...
May 25 16:42:55 ubuntu systemd[1]: Started vsftpd FTP server.
bacbia@ubuntu:~$
```

Đăng nhập vào FTP-server:



A screenshot of a Windows command prompt window titled "C:\Users\Admin\Desktop\is.fit.hcmus.vn\FTP\_Client\Debug\FTP\_Client.exe". The text inside shows the following sequence of events: "WinSock initialised!!!", "Socket created!!!", "Type IP of FTP server:", "192.168.195.128", "Server connected!!!", "Welcome message from server:", "220 Xin chao !!", and "Press Enter to clean screen...".



A screenshot of a Windows command prompt window titled "C:\Users\Admin\Desktop\is.fit.hcmus.vn\FTP\_Client\Debug\FTP\_Client.exe". The text inside shows the following sequence of events: "User name: jack", "331 Please specify the password.", "Type password:", "230 Login successful.", and "Press Enter to clean screen...".

Test lệnh ls, dir:

```
C:\Users\Admin\Desktop\is.fit.hcmus.vn\FTP_Client\Debug\FTP_Client.exe
You entered working mode, type in ur command (type ? to list all command)

ftp> ?
List of all commands that being supported is:
ls, dir, rmdir, put, mput, get, mget, lcd, delete, mdelete, cd, pwd, passive, mk
dir, quit, exit, ls_client

ftp> ls
200 PORT command successful. Consider using PASV.
150 Here comes the directory listing.
examples.desktop
images.jpeg
new
neww
upload
226 Directory send OK.

ftp> dir
200 PORT command successful. Consider using PASV.
150 Here comes the directory listing.
-rw-rw-rw-  1 1001    1001           8980 Apr 20  2016 examples.desktop
-rw-r--r--  1 1000    1000        12012 May 23  22:58 images.jpeg
drwxr-xr-x  2 1001    1001         4096 May 23  22:53 new
drwx----- 2 1001    1001         4096 May 25  16:42 neww
drwxrwxrwx  2 0       0          4096 May 23  23:54 upload
226 Directory send OK.

ftp> _
```

Tải file images.jpeg và file examples.desktop:

```
ftp> mget images.jpeg examples.desktop
File images.jpeg:
200 PORT command successful. Consider using PASV.
150 Opening BINARY mode data connection for images.jpeg (12012 bytes).
226 Transfer complete.

File examples.desktop:
200 PORT command successful. Consider using PASV.
150 Opening BINARY mode data connection for examples.desktop (8980 bytes)
226 Transfer complete.

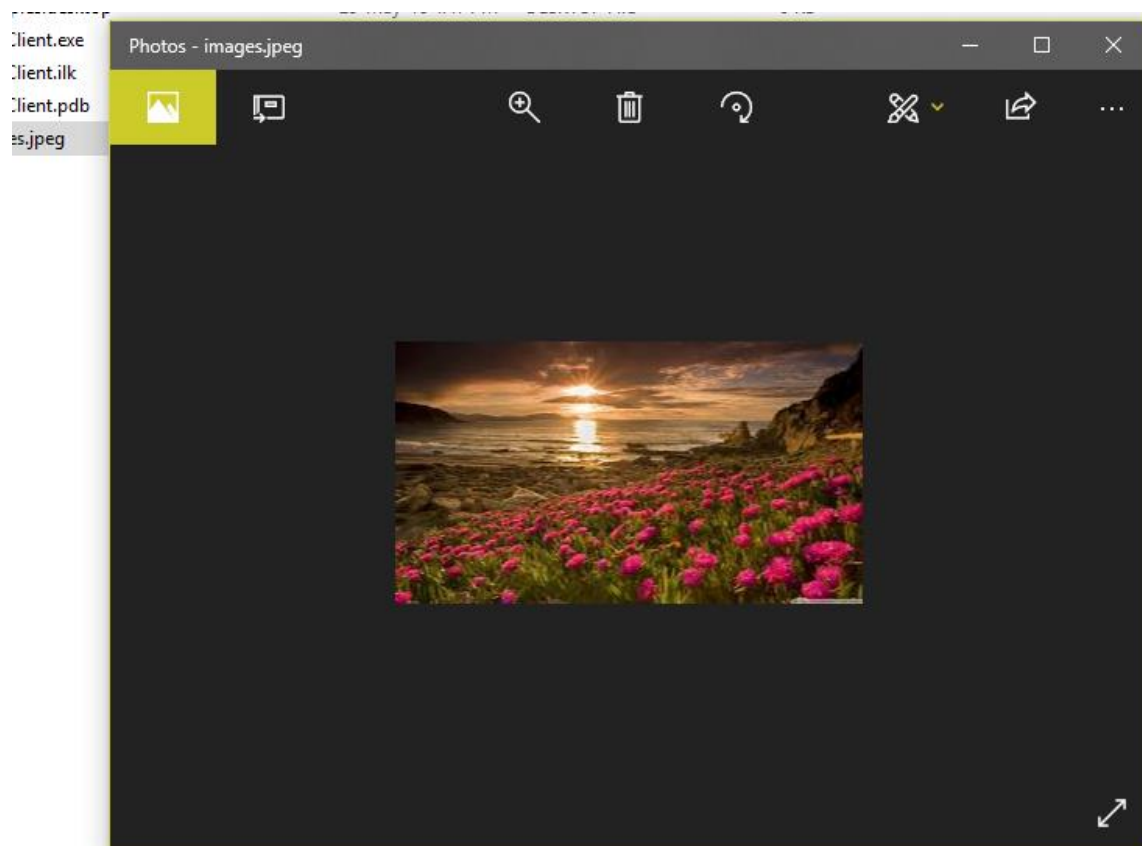
ftp> ls_client
Volume in drive C is Windows 10
Volume Serial Number is 0C3D-9ADF

Directory of C:\Users\Admin\Desktop\is.fit.hcmus.vn\FTP_Client\Debug
25-May-18  04:47 PM      <DIR>          .
25-May-18  04:47 PM      <DIR>          ..
25-May-18  04:47 PM                8,980 examples.desktop
23-May-18  11:47 PM            45,056 FTP_Client.exe
23-May-18  11:47 PM           370,040 FTP_Client.ilc
23-May-18  11:47 PM           633,856 FTP_Client.pdb
25-May-18  04:47 PM            12,012 images.jpeg
                5 File(s)      1,069,944 bytes
                2 Dir(s)  19,416,227,840 bytes free
```

So sánh kích thước file tải lên server: 8980 và 12012

```
ftp> dir\n200 PORT command successful. Consider using PASV.\n150 Here comes the directory listing.\n-rw-rw-rw-   1 1001   1001   8980 Apr 20  2016 examples.desktop\n-rw-r--r--   1 1000   1000  12012 May 23  22:58 images.jpeg\n-drwxr-xr-x   2 1001   1001   4096 May 23  22:53 new\n-drwx-----  2 1001   1001   4096 May 25  16:42 neww\n-drwxrwxrwx   2  0      0      4096 May 23  23:54 upload\n226 Directory send OK.
```

Mở file trên win10 file images.jpeg:



Chuyển sang chế độ passive, gửi file FTP\_Client.pdb lên server:

```

ftp> passive
You are working on passive mode

ftp> Passive
You are working on active mode

ftp> PASSIVE
You are working on passive mode

ftp> put FTP_Client.pdb
227 Entering Passive Mode (192,168,195,128,70,134).
150 Ok to send data.
226 Transfer complete.

ftp> dir
227 Entering Passive Mode (192,168,195,128,72,67).
150 Here comes the directory listing.
-rw-----  1 1001    1001    633856 May 25 16:53 FTP_Client.pdb
-rw-rw-rw-  1 1001    1001    8980 Apr 20 2016 examples.desktop
-rw-r--r--  1 1000    1000   12012 May 23 22:58 images.jpeg
drwxr-xr-x  2 1001    1001    4096 May 23 22:53 new
drwx-----  2 1001    1001    4096 May 25 16:42 neww
drwxrwxrwx  2 0       0      4096 May 23 23:54 upload
226 Directory send OK.

```

Thay đổi thư mục làm việc trên server:

```

ftp> cd upload
250 Directory successfully changed.

ftp> pwd
257 "/home/jack/upload" is the current directory

ftp> lcd
Current working directory: C:\Users\Admin\Desktop\is.fit.hcmus.vn\FTP_Client\Debug

ftp> cd ..
250 Directory successfully changed.

ftp> pwd
257 "/home/jack" is the current directory

```

Thay đổi thư mục làm việc trên client:

```
ftp> lcd
Current working directory: C:\Users\Admin\Desktop\is.fit.hcmus.vn\FTP_Client\Debug

ftp> lcd ..
Current working directory changed: C:\Users\Admin\Desktop\is.fit.hcmus.vn\FTP_Client

ftp> lcd ...
Current working directory changed: C:\Users\Admin\Desktop\is.fit.hcmus.vn

ftp> lcd C:\Users\Admin\Desktop
Current working directory changed: C:\Users\Admin\Desktop

ftp> get images.jpeg
200 PORT command successful. Consider using PASV.
150 Opening BINARY mode data connection for images.jpeg (12012 bytes).
226 Transfer complete.
```

Xóa thư mục, tập tin trên server:

```
ftp> mkdir new
257 "/home/jack/new" created

ftp> rmdir new
250 Remove directory operation successful.

ftp> rmdir new
550 Remove directory operation failed.

ftp> mdelelte FTP_Client.pdb FTP_Client.pdb
Ur command haven't been supported just yet :3, type ? for help dude

ftp> mdelelete FTP_Client.pdb FTP_Client.pdb
Ur command haven't been supported just yet :3, type ? for help dude

ftp> mdelete FTP Client.pdb FTP_Client.pdb
File FTP_Client.pdb:
250 Delete operation successful.

File FTP_Client.pdb:
550 Delete operation failed.
```

- Phân tích gói tin Wireshark: (Active mode)

- Đầu tiên client gửi lệnh PORT cho server, rồi chờ phản hồi:

57	27.647417	192.168.195.1	192.168.195.128	FTP	81 Request: PORT 192,168,195,1,11,125
58	27.647644	192.168.195.128	192.168.195.1	TCP	60 21 → 2940 [ACK] Seq=75 Ack=50 Win=29312 Len=0
59	27.647954	192.168.195.128	192.168.195.1	FTP	105 Response: 200 PORT command successful. Consider using PASV.

- Tiếp theo client gửi lệnh RETR để tải file:

72	Request: RETR images.jpeg				
----	---------------------------	--	--	--	--

- Server phản hồi:

126	Response: 150 Opening BINARY mode data connection for images.jpeg (12012 bytes).				
-----	--	--	--	--	--

- Sau đó server gửi các gói tin FTP-DATA để truyền dữ liệu:

FTP-DATA	1514	FTP Data: 1460 bytes
TCP	54	2941 → 20 [ACK] Seq=1 Ack=2921 Win=525568 Len=0
FTP-DATA	1514	FTP Data: 1460 bytes
FTP-DATA	1514	FTP Data: 1460 bytes
TCP	54	2941 → 20 [ACK] Seq=1 Ack=5841 Win=525568 Len=0
FTP-DATA	1514	FTP Data: 1460 bytes
FTP-DATA	1514	FTP Data: 1460 bytes
TCP	54	2941 → 20 [ACK] Seq=1 Ack=8761 Win=525568 Len=0
FTP-DATA	1514	FTP Data: 1460 bytes
FTP-DATA	1514	FTP Data: 1460 bytes

- Truyền xong dữ liệu thì server gửi phản hồi 226, đóng kết nối:

FTP	78	Response: 226 Transfer complete.
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- Các nguồn tài liệu tham khảo:

1. Slide bài giảng
2. RFC959
3. <https://www.binarytides.com/winsock-socket-programming-tutorial/>
4. Các nguồn khác từ internet (google, stackoverflow)