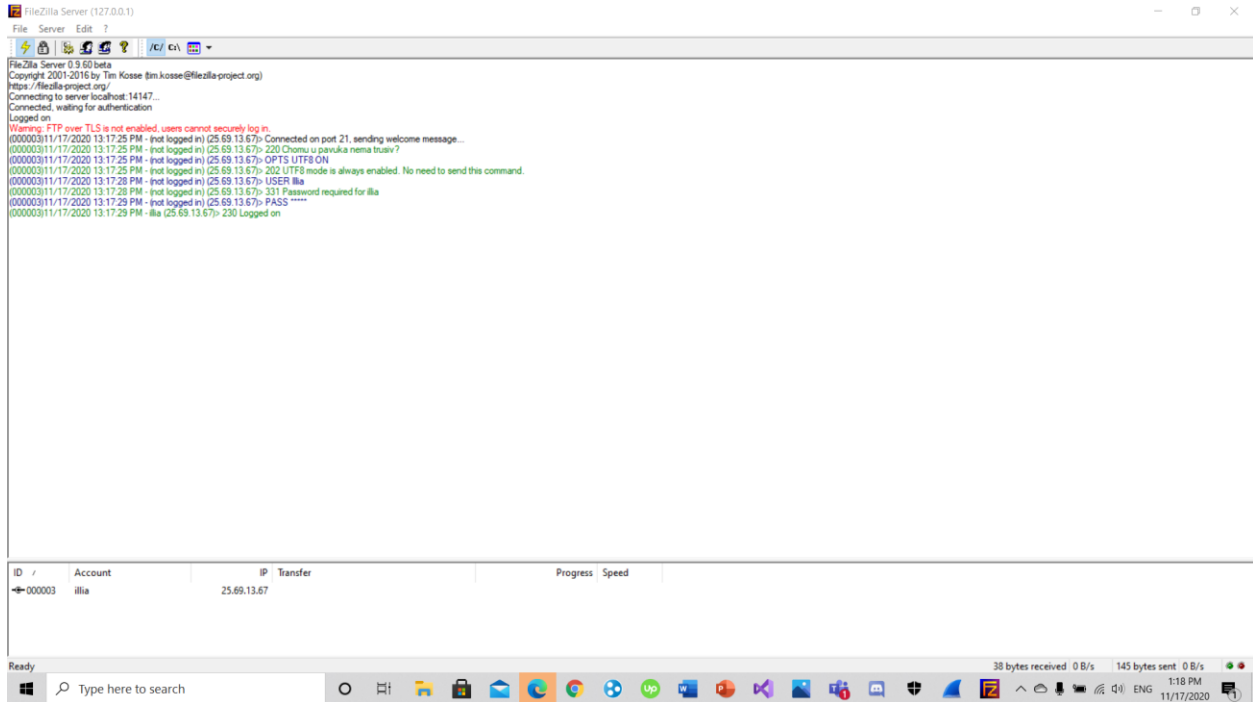**Lab 6**

Vasylyshyn Danylo 256711

Illia Nykonchuk 245693

Task 1:

Illia connected to server:

Connecting to server localhost:14147...
Connected, waiting for authentication
Logged on
Warning: FTP over TLS is not enabled, users cannot securely log in.
Retrieving account settings, please wait...
Done retrieving account settings
Sending account settings, please wait...
Done sending account settings.
(000006)11/17/2020 13:24:50 PM - (not logged in) (25.69.13.67)> Connected on port 21, sending welcome message...
(000006)11/17/2020 13:24:50 PM - (not logged in) (25.69.13.67)> 220 Chomu u pavuka nema trusiv?
(000006)11/17/2020 13:24:50 PM - (not logged in) (25.69.13.67)> OPTS UTF8 ON
(000006)11/17/2020 13:24:50 PM - (not logged in) (25.69.13.67)> 202 UTF8 mode is always enabled. No need to send this command.
(000006)11/17/2020 13:24:55 PM - (not logged in) (25.69.13.67)> USER anonymous
(000006)11/17/2020 13:24:55 PM - (not logged in) (25.69.13.67)> 331 Password required for anonymous
(000006)11/17/2020 13:24:56 PM - (not logged in) (25.69.13.67)> PASS ***
(000006)11/17/2020 13:24:56 PM - anonymous (25.69.13.67)> 230 Logged on

```
C:\ftp>ping 25.30.154.246

Обмен пакетами с 25.30.154.246 по с 32 байтами данных:
Ответ от 25.30.154.246: число байт=32 время=60мс TTL=128
Ответ от 25.30.154.246: число байт=32 время=57мс TTL=128
Ответ от 25.30.154.246: число байт=32 время=62мс TTL=128
Ответ от 25.30.154.246: число байт=32 время=58мс TTL=128

Статистика Ping для 25.30.154.246:
    Пакетов: отправлено = 4, получено = 4, потеряно = 0
    (0% потерь)
Приблизительное время приема-передачи в мс:
    Минимальное = 57мсек, Максимальное = 62 мсек, Среднее = 59 мсек
```

Illia's cmd output:

```
C:\ftp>ftp 25.30.154.246
Связь с 25.30.154.246.
220 Chomu u pavuka nema trusiv?
202 UTF8 mode is always enabled. No need to send this command.
Пользователь (25.30.154.246:(none)): anonymous
331 Password required for anonymous
Пароль:
230 Logged on
ftp>
```

Wireshark output:

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	25.69.13.67	25.30.154.246	TCP	66	59023 → 21 [SYN] Seq=0 Win=8192 Len=0 MSS=1364 WS=1 SACK_PERM=1
2	0.054629	25.30.154.246	25.69.13.67	TCP	62	21 → 59023 [SYN, ACK] Seq=0 Ack=1 Win=65472 Len=0 MSS=1364 SACK_PERM=1
3	0.054687	25.69.13.67	25.30.154.246	TCP	54	59023 → 21 [ACK] Seq=1 Ack=1 Win=8192 Len=0
4	0.113885	25.30.154.246	25.69.13.67	FTP	87	Response: 220 Chomu u pavuka nema trusiv?
5	0.119441	25.69.13.67	25.30.154.246	FTP	68	Request: OPTS UTF8 ON
6	0.179662	25.30.154.246	25.69.13.67	FTP	118	Response: 202 UTF8 mode is always enabled. No need to send this command.
7	0.219745	25.69.13.67	25.30.154.246	TCP	54	59023 → 21 [ACK] Seq=15 Ack=98 Win=8095 Len=0
8	4.264534	25.69.13.67	25.30.154.246	FTP	70	Request: USER anonymous
9	4.322761	25.30.154.246	25.69.13.67	FTP	91	Response: 331 Password required for anonymous
10	4.363814	25.69.13.67	25.30.154.246	TCP	54	59023 → 21 [ACK] Seq=31 Ack=135 Win=8058 Len=0
11	6.187617	25.69.13.67	25.30.154.246	FTP	62	Request: PASS c
12	6.241892	25.30.154.246	25.69.13.67	FTP	69	Response: 230 Logged on
13	6.282502	25.69.13.67	25.30.154.246	TCP	54	59023 → 21 [ACK] Seq=39 Ack=150 Win=8043 Len=0

Illia requesting directory:

```
ftp> dir
200 Port command successful
150 Opening data channel for directory listing of "/"
-rw-r--r-- 1 ftp ftp              17 Nov 17 13:22 server_ftp.txt
226 Successfully transferred "/"
ftp: 68 байт получено за 0.01 (сек) со скоростью 13.60 (КБ/сек).
```

55	79.991866	25.69.13.67	25.30.154.246	FTP	80	Request: PORT 25,69,13,67,230,187
56	80.047449	25.30.154.246	25.69.13.67	FTP	83	Response: 200 Port command successful
57	80.053143	25.69.13.67	25.30.154.246	FTP	60	Request: LIST
58	80.107915	25.30.154.246	25.69.13.67	TCP	62	20 → 59067 [SYN] Seq=0 Win=65472 Len=0 MSS=1364 SACK_PERM=1
59	80.108106	25.69.13.67	25.30.154.246	TCP	62	59067 → 20 [SYN, ACK] Seq=0 Ack=1 Win=65472 Len=0 MSS=1364 SACK_PERM=1
60	80.161555	25.30.154.246	25.69.13.67	FTP	109	Response: 150 Opening data channel for directory listing of "/"
61	80.202645	25.69.13.67	25.30.154.246	TCP	54	59023 → 21 [ACK] Seq=71 Ack=234 Win=7959 Len=0
62	80.255308	25.30.154.246	25.69.13.67	TCP	60	20 → 59067 [ACK] Seq=1 Ack=1 Win=65472 Len=0
63	80.255318	25.30.154.246	25.69.13.67	FTP-D..	119	FTP Data: 65 bytes (PORT) (PORT 25,69,13,67,230,187)
64	80.255321	25.30.154.246	25.69.13.67	TCP	60	20 → 59067 [FIN, ACK] Seq=66 Ack=1 Win=65472 Len=0
65	80.255403	25.69.13.67	25.30.154.246	TCP	54	59067 → 20 [ACK] Seq=1 Ack=67 Win=65407 Len=0
66	80.255432	25.30.154.246	25.69.13.67	FTP	88	Response: 226 Successfully transferred "/"
67	80.260023	25.69.13.67	25.30.154.246	TCP	54	59067 → 20 [FIN, ACK] Seq=1 Ack=67 Win=65407 Len=0
68	80.296864	25.69.13.67	25.30.154.246	TCP	54	59023 → 21 [ACK] Seq=71 Ack=268 Win=7925 Len=0
69	80.405293	25.30.154.246	25.69.13.67	TCP	60	20 → 59067 [ACK] Seq=67 Ack=2 Win=65472 Len=0

"?" and ascii and hash and get commands:

```
ftp> ?
Допускается сокращение команд при вводе.  Набор команд:

!               delete         literal        prompt         send
?               debug          ls             put            status
append          dir            mdelete        pwd            trace
ascii           disconnect     mdir           quit           type
bell            get            mget           quote          user
binary          glob           mkdir          recv           verbose
bye             hash           mls            remotehelp
cd              help           mput           rename
close           lcd            open           rmdir
ftp> ascii
200 Type set to A
ftp> hash
Вывод метки хеширования Вклftp: (2048 байт/хеш-метка).
ftp> get server_ftp.txt
200 Port command successful
150 Opening data channel for file download from server of "/server_ftp.txt"
226 Successfully transferred "/server_ftp.txt"
ftp: 17 байт получено за 0.00 (сек) со скоростью 17000.00 (КБ/сек).
```

```
119 148.082112   25.69.13.67    25.30.154.246   FTP      62 Request: TYPE A
120 148.142821   25.30.154.246  25.69.13.67     FTP      73 Response: 200 Type set to A
121 148.183985   25.69.13.67    25.30.154.246   TCP      54 59023 → 21 [ACK] Seq=79 Ack=287 Win=7906 Len=0
126 156.986138   25.69.13.67    25.30.154.246   FTP      80 Request: PORT 25,69,13,67,230,190
127 157.045070   25.30.154.246  25.69.13.67     FTP      83 Response: 200 Port command successful
128 157.051898   25.69.13.67    25.30.154.246   FTP      75 Request: RETR server_ftp.txt
129 157.107440   25.30.154.246  25.69.13.67     TCP      62 20 → 59070 [SYN] Seq=0 Win=65472 Len=0 MSS=1364 SACK_PERM=1
130 157.107525   25.69.13.67    25.30.154.246   TCP      62 59070 → 20 [SYN, ACK] Seq=0 Ack=1 Win=65472 Len=0 MSS=1364 SACK_PERM=1
131 157.162973   25.30.154.246  25.69.13.67     FTP     131 Response: 150 Opening data channel for file download from server of "/server_ftp.txt"
132 157.203632   25.69.13.67    25.30.154.246   TCP      54 59023 → 21 [ACK] Seq=126 Ack=393 Win=7800 Len=0
133 157.255775   25.69.13.67    25.30.154.246   TCP      60 20 → 59070 [ACK] Seq=1 Ack=1 Win=65472 Len=0
134 157.255783   25.30.154.246  25.69.13.67     FTP-D.   71 FTP Data: 17 bytes (PORT) (RETR server_ftp.txt)
135 157.255783   25.30.154.246  25.69.13.67     TCP      60 20 → 59070 [FIN, ACK] Seq=18 Ack=1 Win=65472 Len=0
136 157.255852   25.69.13.67    25.30.154.246   TCP      54 59070 → 20 [ACK] Seq=1 Ack=19 Win=65455 Len=0
137 157.255870   25.30.154.246  25.69.13.67     FTP     102 Response: 226 Successfully transferred "/server_ftp.txt"
138 157.262379   25.69.13.67    25.30.154.246   TCP      54 59070 → 20 [FIN, ACK] Seq=1 Ack=19 Win=65455 Len=0
139 157.295714   25.69.13.67    25.30.154.246   TCP      54 59023 → 21 [ACK] Seq=126 Ack=441 Win=7752 Len=0
140 157.359225   25.30.154.246  25.69.13.67     TCP      60 20 → 59070 [ACK] Seq=19 Ack=2 Win=65472 Len=0
```

Server output:

```
(000008)11/17/2020 13:29:37 PM - anonymous (25.69.13.67)> 230 Logged on
(000008)11/17/2020 13:30:51 PM - anonymous (25.69.13.67)> PORT 25,69,13,67,230,187
(000008)11/17/2020 13:30:51 PM - anonymous (25.69.13.67)> 200 Port command successful
(000008)11/17/2020 13:30:51 PM - anonymous (25.69.13.67)> LIST
(000008)11/17/2020 13:30:51 PM - anonymous (25.69.13.67)> 150 Opening data channel for directory listing of "/"
(000008)11/17/2020 13:30:51 PM - anonymous (25.69.13.67)> 226 Successfully transferred "/"
(000008)11/17/2020 13:31:59 PM - anonymous (25.69.13.67)> TYPE A
(000008)11/17/2020 13:31:59 PM - anonymous (25.69.13.67)> 200 Type set to A
(000008)11/17/2020 13:32:08 PM - anonymous (25.69.13.67)> PORT 25,69,13,67,230,190
(000008)11/17/2020 13:32:08 PM - anonymous (25.69.13.67)> 200 Port command successful
(000008)11/17/2020 13:32:08 PM - anonymous (25.69.13.67)> RETR server_ftp.txt
(000008)11/17/2020 13:32:08 PM - anonymous (25.69.13.67)> 150 Opening data channel for file download from server of "/server_ftp.txt"
(000008)11/17/2020 13:32:08 PM - anonymous (25.69.13.67)> 226 Successfully transferred "/server_ftp.txt"
(000008)11/17/2020 13:34:08 PM - anonymous (25.69.13.67)> 421 Connection timed out
```

Локальний диск (C:) > ftp

Ім'я	Дата змінення
client_ftp.txt	17.11.2020 12:14
server_ftp.txt	17.11.2020 12:32

server_ftp.txt - Блокнот

Файл Редагування Формат Вигляд Довідка
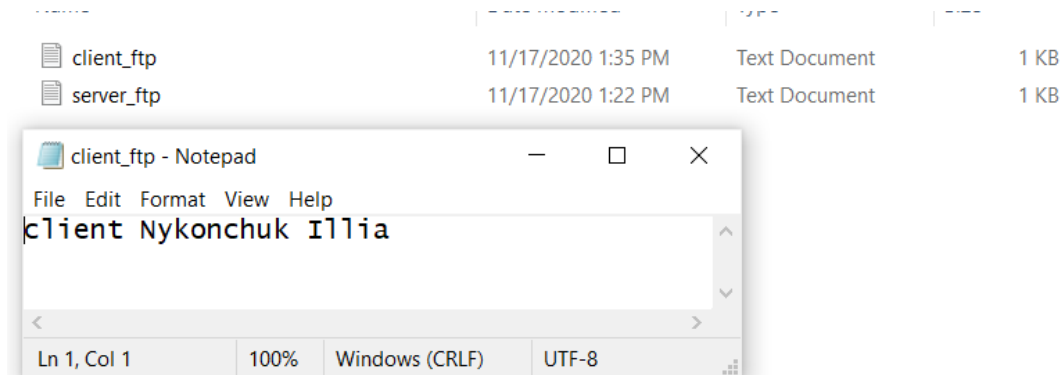
Vasylyshyn Danylo

Put command:

```
ftp> put client_ftp.txt
200 Port command successful
150 Opening data channel for file upload to server of "/client_ftp.txt"
226 Successfully transferred "/client_ftp.txt"
ftp: 22 байт отправлено за 0.10 (сек) со скоростью 0.23 (КБ/сек).
ftp> bye
221 Goodbye
```

203 386.060823	25.69.13.67	25.30.154.246	FTP	80	Request: PORT 25,69,13,67,230,202
204 386.121659	25.30.154.246	25.69.13.67	FTP	83	Response: 200 Port command successful
205 386.126759	25.69.13.67	25.30.154.246	FTP	75	Request: STOR client_ftp.txt
206 386.186455	25.30.154.246	25.69.13.67	TCP	62	20 → 59082 [SYN] Seq=0 Win=65472 Len=0 MSS=1364 SACK_PERM=1
207 386.186551	25.69.13.67	25.30.154.246	TCP	62	59082 → 20 [SYN, ACK] Seq=0 Ack=1 Win=65472 Len=0 MSS=1364 SACK_PERM=1
208 386.246382	25.30.154.246	25.69.13.67	FTP	127	Response: 150 Opening data channel for file upload to server of "/client_ftp.txt"
209 386.287054	25.69.13.67	25.30.154.246	TCP	54	59081 → 21 [ACK] Seq=88 Ack=252 Win=7941 Len=0
210 386.346849	25.69.13.67	25.30.154.246	TCP	60	20 → 59082 [ACK] Seq=1 Ack=1 Win=65472 Len=0
211 386.347117	25.69.13.67	25.30.154.246	FTP-D...	76	FTP Data: 22 bytes (PORT) (STOR client_ftp.txt)
212 386.442837	25.30.154.246	25.69.13.67	TCP	60	20 → 59082 [ACK] Seq=1 Ack=23 Win=65450 Len=0
213 386.442967	25.69.13.67	25.30.154.246	TCP	54	59082 → 20 [FIN, ACK] Seq=23 Ack=1 Win=65472 Len=0
214 386.496525	25.30.154.246	25.69.13.67	TCP	60	20 → 59082 [ACK] Seq=1 Ack=24 Win=65450 Len=0
215 386.593085	25.30.154.246	25.69.13.67	TCP	60	20 → 59082 [FIN, ACK] Seq=1 Ack=24 Win=65450 Len=0
216 386.593126	25.69.13.67	25.30.154.246	TCP	54	59082 → 20 [ACK] Seq=24 Ack=2 Win=65472 Len=0
217 386.593166	25.30.154.246	25.69.13.67	FTP	102	Response: 226 Successfully transferred "/client_ftp.txt"
218 386.632488	25.69.13.67	25.30.154.246	TCP	54	59081 → 21 [ACK] Seq=88 Ack=300 Win=7893 Len=0

Server output:

```
(000009)11/17/2020 13:35:45 PM - (not logged in) (25.69.13.67)> USER anonymous
(000009)11/17/2020 13:35:45 PM - (not logged in) (25.69.13.67)> 331 Password required for anonymous
(000009)11/17/2020 13:35:46 PM - (not logged in) (25.69.13.67)> PASS ***
(000009)11/17/2020 13:35:46 PM - anonymous (25.69.13.67)> 230 Logged on
(000009)11/17/2020 13:35:57 PM - anonymous (25.69.13.67)> PORT 25,69,13,67,230,202
(000009)11/17/2020 13:35:57 PM - anonymous (25.69.13.67)> 200 Port command successful
(000009)11/17/2020 13:35:57 PM - anonymous (25.69.13.67)> STOR client_ftp.txt
(000009)11/17/2020 13:35:57 PM - anonymous (25.69.13.67)> 150 Opening data channel for file upload to server of "/client_ftp.txt"
(000009)11/17/2020 13:35:57 PM - anonymous (25.69.13.67)> 226 Successfully transferred "/client_ftp.txt"
```

client_ftp	11/17/2020 1:35 PM	Text Document	1 KB
server_ftp	11/17/2020 1:22 PM	Text Document	1 KB

client_ftp - Notepad

File Edit Format View Help

```
client Nykonchuk Illia
```

Ln 1, Col 1   100%   Windows (CRLF)   UTF-8

Ending session:

```
ftp> bye
221 Goodbye
```

Wireshark output:

1) Connection (three way handshake):

1 0.000000	25.69.13.67	25.30.154.246	TCP	66 59023 → 21 [SYN] Seq=0 Win=8192 Len=0 MSS=1364 WS=1 SACK_PERM=1
2 0.054629	25.30.154.246	25.69.13.67	TCP	62 21 → 59023 [SYN, ACK] Seq=0 Ack=1 Win=65472 Len=0 MSS=1364 SACK_PERM=1
3 0.054687	25.69.13.67	25.30.154.246	TCP	54 59023 → 21 [ACK] Seq=1 Ack=1 Win=8192 Len=0

2) ftp (name and password):

8 4.264534	25.69.13.67	25.30.154.246	FTP	70 Request: USER anonymous
9 4.322761	25.30.154.246	25.69.13.67	FTP	91 Response: 331 Password required for anonymous
10 4.363814	25.69.13.67	25.30.154.246	TCP	54 59023 → 21 [ACK] Seq=31 Ack=135 Win=8058 Len=0
11 6.187617	25.69.13.67	25.30.154.246	FTP	62 Request: PASS c
12 6.241892	25.30.154.246	25.69.13.67	FTP	69 Response: 230 Logged on

3) Directory listing:

55 79.991866	25.69.13.67	25.30.154.246	FTP	80 Request: PORT 25,69,13,67,230,187
56 80.047449	25.30.154.246	25.69.13.67	FTP	83 Response: 200 Port command successful
57 80.053143	25.69.13.67	25.30.154.246	FTP	60 Request: LIST
58 80.107915	25.30.154.246	25.69.13.67	TCP	62 20 → 59067 [SYN] Seq=0 Win=65472 Len=0 MSS=1364 SACK_PERM=1
59 80.108106	25.69.13.67	25.30.154.246	TCP	62 59067 → 20 [SYN, ACK] Seq=0 Ack=1 Win=65472 Len=0 MSS=1364 SACK_PERM=1
60 80.161555	25.30.154.246	25.69.13.67	FTP	109 Response: 150 Opening data channel for directory listing of "/"
61 80.202645	25.69.13.67	25.30.154.246	TCP	54 59023 → 21 [ACK] Seq=71 Ack=234 Win=7959 Len=0
62 80.255308	25.30.154.246	25.69.13.67	TCP	60 20 → 59067 [ACK] Seq=1 Ack=1 Win=65472 Len=0
63 80.255318	25.30.154.246	25.69.13.67	FTP-DA..	119 FTP Data: 65 bytes (PORT) (LIST)
64 80.255321	25.30.154.246	25.69.13.67	TCP	60 20 → 59067 [FIN, ACK] Seq=66 Ack=1 Win=65472 Len=0
65 80.255403	25.69.13.67	25.30.154.246	TCP	54 59067 → 20 [ACK] Seq=1 Ack=67 Win=65407 Len=0
66 80.255432	25.30.154.246	25.69.13.67	FTP	88 Response: 226 Successfully transferred "/"

4) Frames containing copied file:

128 157.051898	25.69.13.67	25.30.154.246	FTP	75 Request: RETR server_ftp.txt
129 157.107440	25.30.154.246	25.69.13.67	TCP	62 20 → 59070 [SYN] Seq=0 Win=65472 Len=0 MSS=1364 SACK_PERM=1
130 157.107525	25.69.13.67	25.30.154.246	TCP	62 59070 → 20 [SYN, ACK] Seq=0 Ack=1 Win=65472 Len=0 MSS=1364 SACK_PERM=1
131 157.162973	25.30.154.246	25.69.13.67	FTP	131 Response: 150 Opening data channel for file download from server of "/server_ftp.txt"
132 157.203632	25.69.13.67	25.30.154.246	TCP	54 59023 → 21 [ACK] Seq=126 Ack=393 Win=7800 Len=0
133 157.255775	25.30.154.246	25.69.13.67	TCP	60 20 → 59070 [ACK] Seq=1 Ack=1 Win=65472 Len=0
134 157.255783	25.30.154.246	25.69.13.67	FTP-DA..	71 FTP Data: 17 bytes (PORT) (RETR server_ftp.txt)
135 157.255783	25.30.154.246	25.69.13.67	TCP	60 20 → 59070 [FIN, ACK] Seq=18 Ack=1 Win=65472 Len=0
136 157.255852	25.69.13.67	25.30.154.246	TCP	54 59070 → 20 [ACK] Seq=1 Ack=19 Win=65455 Len=0
137 157.255870	25.30.154.246	25.69.13.67	FTP	102 Response: 226 Successfully transferred "/server_ftp.txt"
138 157.262379	25.69.13.67	25.30.154.246	TCP	54 59070 → 20 [FIN, ACK] Seq=1 Ack=19 Win=65455 Len=0
139 157.295714	25.69.13.67	25.30.154.246	TCP	54 59023 → 21 [ACK] Seq=126 Ack=441 Win=7752 Len=0

> Frame 134: 71 bytes on wire (568 bits), 71 bytes captured (568 bits) on interface \Device\NPF_{C922B8F1-2BD0-46DB-BC63-43378F65F116}, id 0
> Ethernet II, Src: 7a:79:19:1e:9a:f6 (7a:79:19:1e:9a:f6), Dst: 7a:79:19:45:0d:43 (7a:79:19:45:0d:43)
> Internet Protocol Version 4, Src: 25.30.154.246, Dst: 25.69.13.67
> Transmission Control Protocol, Src Port: 20, Dst Port: 59070, Seq: 1, Ack: 1, Len: 17
  FTP Data (17 bytes data)
    [Setup frame: 126]
    [Setup method: PORT]
    [Command: RETR server_ftp.txt]
    Command frame: 128
    [Current working directory:]
  ✓ Line-based text data (1 lines)
      Vasylyshyn Danylo

134: username in tcp data part:

5) Frames corresponding to connection end:

231 468.180133	25.69.13.67	25.30.154.246	FTP	60 Request: QUIT
232 468.235830	25.30.154.246	25.69.13.67	FTP	67 Response: 221 Goodbye
233 468.239427	25.69.13.67	25.30.154.246	TCP	54 59081 → 21 [FIN, ACK] Seq=94 Ack=313 Win=7880 Len=0
234 468.294333	25.30.154.246	25.69.13.67	TCP	60 21 → 59081 [FIN, ACK] Seq=313 Ack=94 Win=65379 Len=0
235 468.294378	25.69.13.67	25.30.154.246	TCP	54 59081 → 21 [ACK] Seq=95 Ack=314 Win=7880 Len=0
236 468.354806	25.30.154.246	25.69.13.67	TCP	60 21 → 59081 [ACK] Seq=314 Ack=95 Win=65379 Len=0

Quit request: command for ending session,

233 -236 ending session of tcp with fin ack

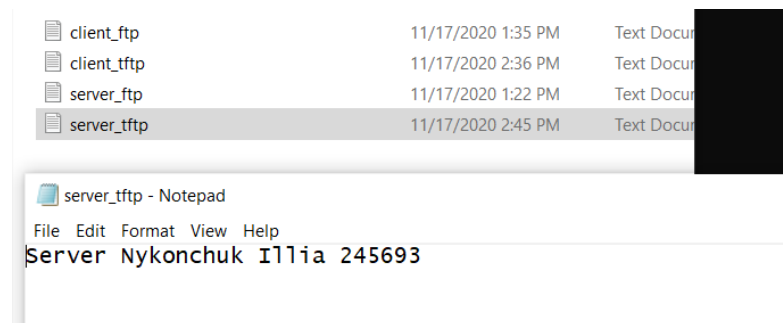**TCP means : transmission control protocol**

Task 2

1)TFTP is operating over udp which is a connectionless protocol, so you don't to first create connection to server to interact with it.

2) Because tftp is a minimal protocol it doeesn't provide function to list the directories.

3) Get files from the server:

```
C:\Users\danyl\Documents\ftp>Tftp 25.69.13.67 get server_tftp.txt
Transfer successful: 29 bytes in 1 second(s), 29 bytes/s
```

client_ftp	11/17/2020 1:35 PM	Text Docur
client_tftp	11/17/2020 2:36 PM	Text Docur
server_ftp	11/17/2020 1:22 PM	Text Docur
server_tftp	11/17/2020 2:45 PM	Text Docur

server_tftp - Notepad

File Edit Format View Help

Server Nykonchuk Illia 245693

```
72 392.081190    25.30.154.246    25.69.13.67      TFTP    69 Read Request, File: server_tftp.txt, Transfer type: netascii
73 392.137340    25.69.13.67      25.30.154.246    TFTP    75 Data Packet, Block: 1 (last)
74 392.137471    25.30.154.246    25.69.13.67      TFTP    46 Acknowledgement, Block: 1
```

```
7a 79 19 1e 9a f6 7a 79   19 45 0d 43 08 00 45 00    zy····zy ·E·C··E·
00 3d aa ab 00 00 80 11   b5 68 19 45 0d 43 19 1e    ·=······ ·h·E·C··
9a f6 f7 68 d4 70 00 29   98 20 00 03 00 01 53 65    ···h·p·) · ····Se
72 76 65 72 20 4e 79 6b   6f 6e 63 68 75 6b 20 49    rver Nyk onchuk I
6c 6c 69 61 20 32 34 35   36 39 33                   llia 245 693
```

Sending files to server:

```
C:\Users\danyl\Documents\ftp>Tftp 25.69.13.67 put client_tftp.txt
Transfer successful: 24 bytes in 1 second(s), 24 bytes/s
```

```
160 839.160462    25.30.154.246    25.69.13.67      TFTP    69 Write Request, File: client_tftp.txt, Transfer type: netascii
161 839.216371    25.69.13.67      25.30.154.246    TFTP    60 Acknowledgement, Block: 0
162 839.216697    25.30.154.246    25.69.13.67      TFTP    70 Data Packet, Block: 1 (last)
163 839.271035    25.69.13.67      25.30.154.246    TFTP    60 Acknowledgement, Block: 1
```

```
7a 79 19 45 0d 43 7a 79   19 1e 9a f6 08 00 45 00    zy·E·Czy ······E·
00 38 19 7f 00 00 80 11   46 9a 19 1e 9a f6 19 45    ·8······ F······E
0d 43 ef 66 dc f0 00 24   d5 62 00 03 00 01 56 61    ·C·f···$ ·b····Va
73 79 6c 79 73 68 79 6e   20 44 61 6e 79 6c 6f 20    sylyshyn  Danylo
74 66 74 70 0d 0a                                    tftp··
```

Локальний диск (C:) > tftp

Ім'я	Дата змінення
client_tftp.txt	17.11.2020 13:52
server_tftp.txt	17.11.2020 13:35

client_tftp.txt - Блокнот

Файл Редагування Формат Вигляд Довідка

Vasylyshyn Danylo tftp
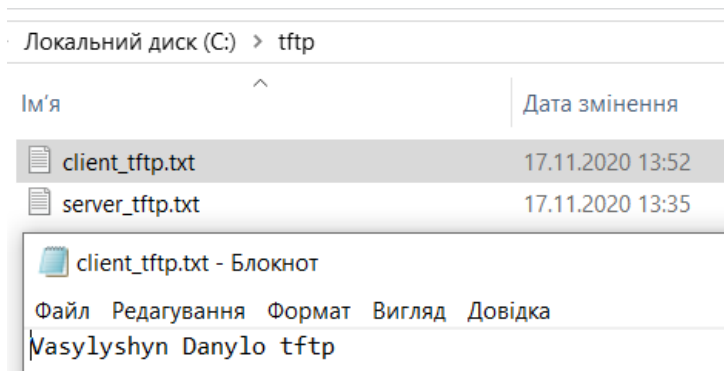
Analyzing wireshark output:
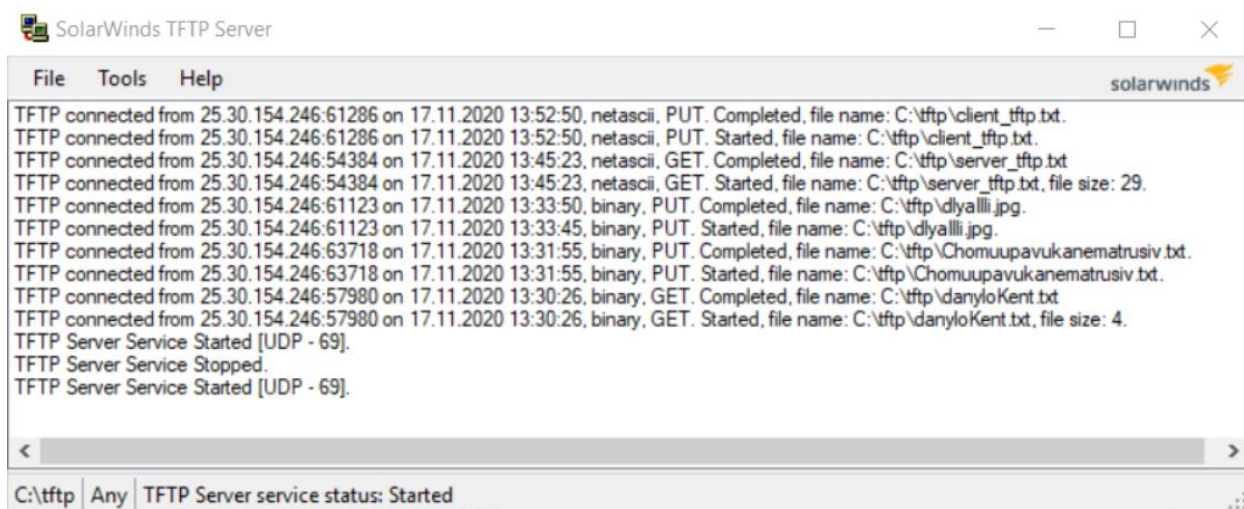

This is all the packets, that are send for getting and putting a fle.

a) No frames for establishing connection, only acknowledgment in response to commands.
b) No login, no password, only ip address needed
c) Doesn't support directory listing
d)

e) No connection end, as it didn't begin

UDP : User Datagram Protocol

Output from the server

Task 3

```
ftp> put binary_file
200 Port command successful
150 Opening data channel for file upload to server of "/binary_file"
226 Successfully transferred "/binary_file"
ftp: 62914560 байт отправлено за 141.74 (сек) со скоростью 443.88 (КБ/сек).
```

a)

Port 20, 21

Port 21 – ftp

Port 20 – ftp data

b)

Hard to find the largest portion because we have 60 mb file which took about 60000 packets to transfer it

c)

```
126 39.704049   25.30.154.246   25.69.13.67     TCP      54 20 → 60270 [ACK] Seq=1 Ack=107853 Win=65472 Len=0
127 39.704814   25.69.13.67     25.30.154.246   FTP-DA.. 1418 FTP Data: 1364 bytes (PORT) (STOR binary_file)
128 39.704814   25.69.13.67     25.30.154.246   FTP-DA.. 1418 FTP Data: 1364 bytes (PORT) (STOR binary_file)
129 39.704822   25.69.13.67     25.30.154.246   FTP-DA.. 1418 FTP Data: 1364 bytes (PORT) (STOR binary_file)
130 39.704849   25.30.154.246   25.69.13.67     TCP      54 20 → 60270 [ACK] Seq=1 Ack=111945 Win=65472 Len=0
131 39.704861   25.69.13.67     25.30.154.246   FTP-DA.. 1418 FTP Data: 1364 bytes (PORT) (STOR binary_file)
132 39.704897   25.69.13.67     25.30.154.246   FTP-DA.. 1418 FTP Data: 1364 bytes (PORT) (STOR binary_file)

∨ Transmission Control Protocol, Src Port: 60270, Dst Port: 20, Seq: 107853, Ack: 1, Len: 1364
    Source Port: 60270
    Destination Port: 20
    [Stream index: 1]
    [TCP Segment Len: 1364]
    Sequence number: 107853    (relative sequence number)
    Sequence number (raw): 354750723
    [Next sequence number: 109217   (relative sequence number)]
    Acknowledgment number: 1    (relative ack number)
    Acknowledgment number (raw): 2066498911
    0101 .... = Header Length: 20 bytes (5)
  > Flags: 0x010 (ACK)
    Window size value: 65472
```

On the top we can see the TCP ack packet which says that the next expected packet have the relative sequence number set to 107854 and we can see that it actually is the sequence number of the next packet sent.

d)

```
 6 14.563905   25.69.13.67     25.30.154.246   TCP    66 60269 → 21 [SYN] Seq=0 Win=8192 Len=0 MSS=1364 WS=1 SACK_PERM=1
 7 14.563977   25.30.154.246   25.69.13.67     TCP    62 21 → 60269 [SYN, ACK] Seq=0 Ack=1 Win=65472 Len=0 MSS=1364 SACK_PERM=1
 8 14.622007   25.69.13.67     25.30.154.246   TCP    60 60269 → 21 [ACK] Seq=1 Ack=1 Win=8192 Len=0
 9 14.622527   25.30.154.246   25.69.13.67     FTP    87 Response: 220 Chomu u pavuka nema trusiv?
10 14.682831   25.69.13.67     25.30.154.246   FTP    68 Request: OPTS UTF8 ON
11 14.683079   25.30.154.246   25.69.13.67     FTP   118 Response: 202 UTF8 mode is always enabled. No need to send this command.
12 14.778134   25.69.13.67     25.30.154.246   TCP    60 60269 → 21 [ACK] Seq=15 Ack=98 Win=8095 Len=0
```

Window size set by client: 8192

Window size set by server: 65472

e)

frame is 1418 bytes each, so

maximum number of frames without confirmation: 65472 / 1418 = 46 frames without confirmation

Part 2 TFTP

a) 69 is the default port for TFTP and all the other ports used are generated dynamically
b) There's an acknowledgement after each frame sent, so 1 frame.

```
63500 1603.890240   25.30.154.246   25.69.13.67     TFTP   558 Data Packet, Block: 383
63501 1603.955207   25.69.13.67     25.30.154.246   TFTP    60 Acknowledgement, Block: 383
```

c) every acknowledgement is sent after the corresponding packet
d) 1 frame without confirmation (There's no window size)
e) Sends acknowledgement packets.