

Lab3 readme

(a) Is it able to be built by the “Make” tool?

Yes!

(b) Does it meet all requirements?

Stop-and-wait 的所有 requirements 都有達成；沒有實作 extra bonus 的 selective repeat。

(c) How do you handle the stop-and-wait mechanism?

Client 端向 server 端提出 download file 的 command 後，server 以 1024 bits 為單位把一個 packet 送到 client 端，與此同時 set 一個 timer：如果 client 有收到 packet，則會回傳 ACK 給 server，等 server 收到 ACK 之後才會繼續傳下一個封包；然而，如果 client 端沒收到封包(packet loss)，等到 time expire 之後，server 會重傳一次封包並重新 set timer。

(d) What have you learned from this lab?

了解 UDP socket 的運作原理，以及如何實作出 stop-and-wait 的 technique，另外也更熟悉操作檔案層級的指令如 fopen, fclose, fwrite, sendto, recvfrom，也對 file descriptor 有更深的了解。

Some screenshots of server and client：

Left side are server's screenshots, right side are client's screenshots.

```
canlab@ubuntu:~/Desktop$ ./server 7777
===== Server =====
Server IP is 127.0.0.1
Listening on port 7777
=====
Server is waiting...
Processing command...
Filename is video.mp4
===== Sending =====
Send SEQ = 0
Received ACK = 0
Send SEQ = 1
Received ACK = 1
Send SEQ = 2
Received ACK = 2
Send SEQ = 3
Received ACK = 3
Send SEQ = 4
Received ACK = 4
Send SEQ = 5
Received ACK = 5
Send SEQ = 6
Received ACK = 6
Send SEQ = 7
Timeout! Resend!
Send SEQ = 7
Received ACK = 7
Send SEQ = 8
Received ACK = 8

canlab@ubuntu:~/Desktop$ ./client
===== Enter Server Info =====
Server IP: 127.0.0.1
Server port: 7777
=====
Please enter a command:
download video.mp4
File size is 275508 bytes
===== Receiving =====
Received SEQ = 0
Received SEQ = 1
Received SEQ = 2
Received SEQ = 3
Received SEQ = 4
Received SEQ = 5
Received SEQ = 6
Oops! Packet loss!
Received SEQ = 7
Received SEQ = 8
Received SEQ = 9
Oops! Packet loss!
Received SEQ = 10
Received SEQ = 11
Received SEQ = 12
Received SEQ = 13
Oops! Packet loss!
Received SEQ = 14
```

Send SEQ = 263	Received SEQ = 262
Timeout! Resend!	Oops! Packet loss!
Send SEQ = 263	Received SEQ = 263
Received ACK = 263	Received SEQ = 264
Send SEQ = 264	Received SEQ = 265
Received ACK = 264	Received SEQ = 266
Send SEQ = 265	Received SEQ = 267
Received ACK = 265	Oops! Packet loss!
Send SEQ = 266	Received SEQ = 268
Received ACK = 266	Received SEQ = 269
Send SEQ = 267	Elapsed: 13 sec
Received ACK = 267	
Send SEQ = 268	
Timeout! Resend!	
Send SEQ = 268	
Received ACK = 268	=====
Send SEQ = 269	Saving download_video.mp4
Received ACK = 269	File has been written
	=====
Server is waiting...	Please enter a command: