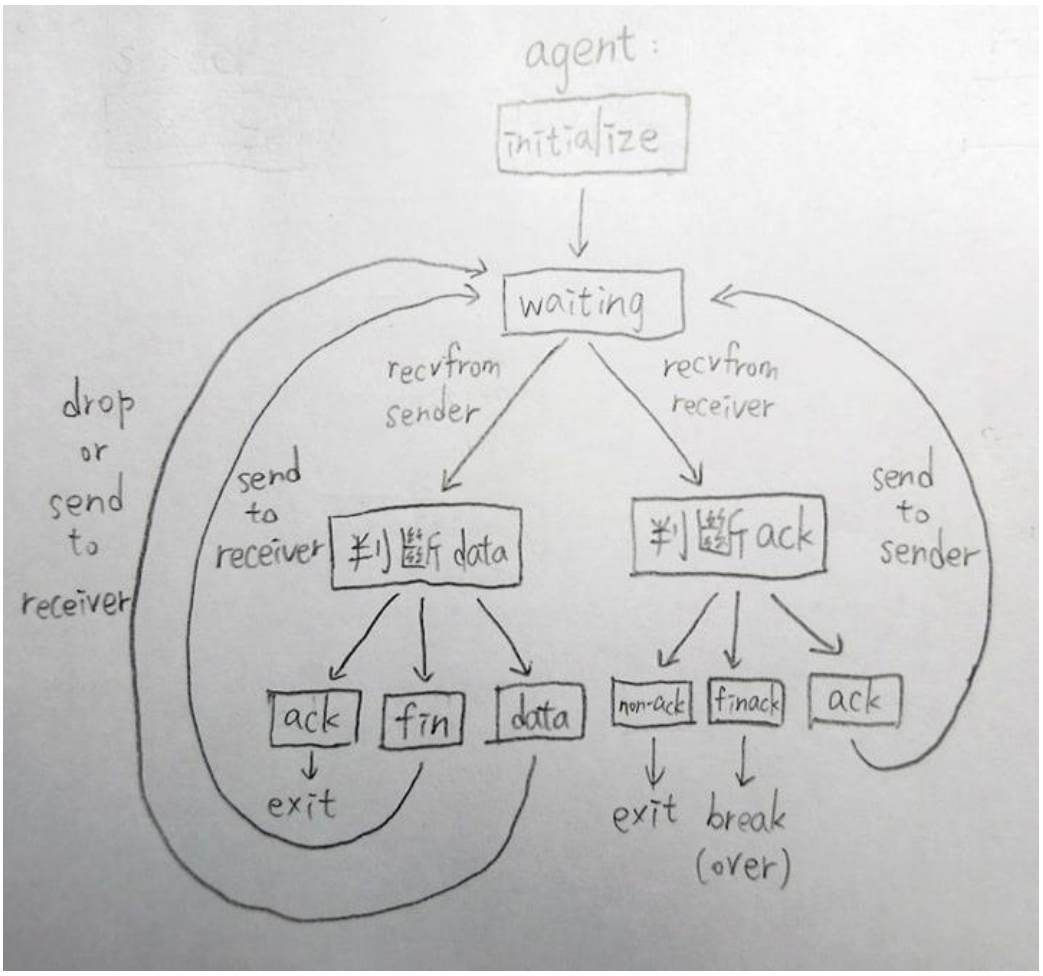
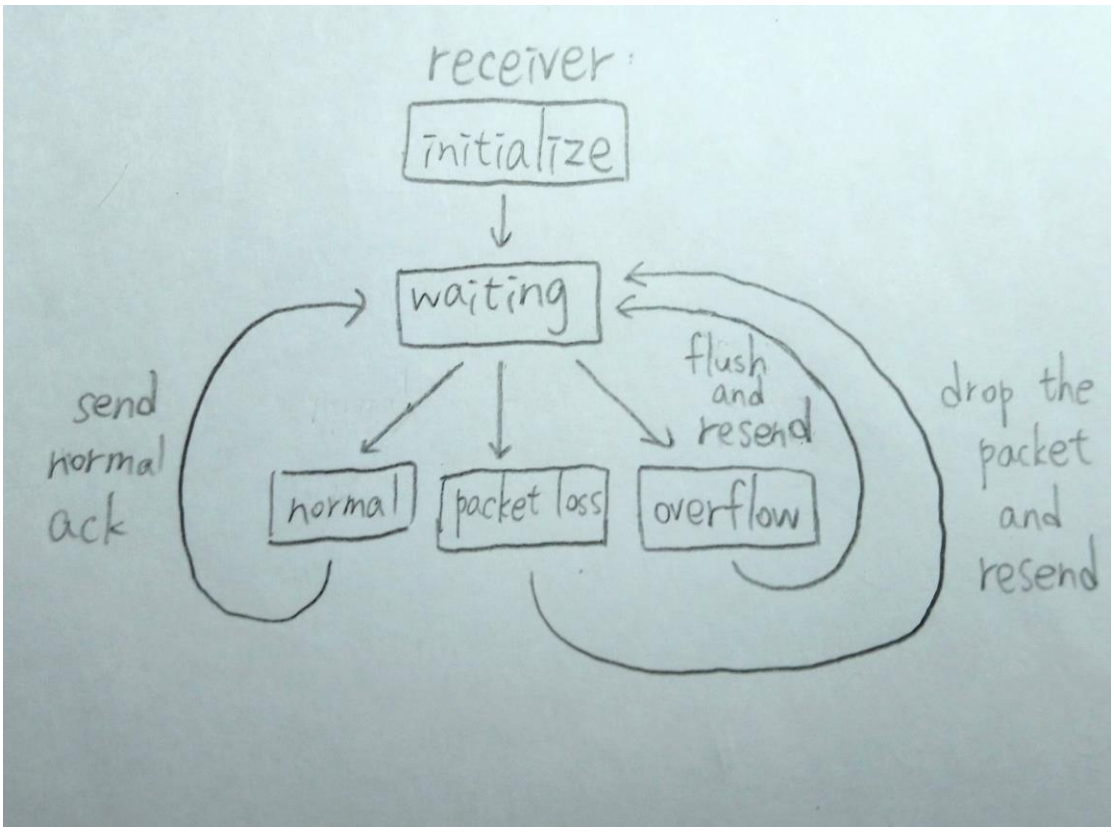
學號:B06902136
系級:資工三
姓名:賴冠毓

1. How to execute your program.
   先編譯 3 個檔案(可不照順序)
   $ make agent
   $ make receiver
   $ make sender
   再來執行 3 個檔案(要照順序)
   $ ./agent <sender IP> <recv IP> <sender port> <agent port> <recv port> <loss_rate>
   $ ./receiver <agent IP> <recv IP> <agent port> <recv port>
   $ ./sender <sender IP> <agent IP> <sender port> <agent port> <videoname>
   (command argument 也可參考 code 裡的例子)
   (如果失敗卡住，<loss_rate>先用 0 跑看看)
2. 3 flow charts for sender, agent, and receiver
   agent:



receiver:

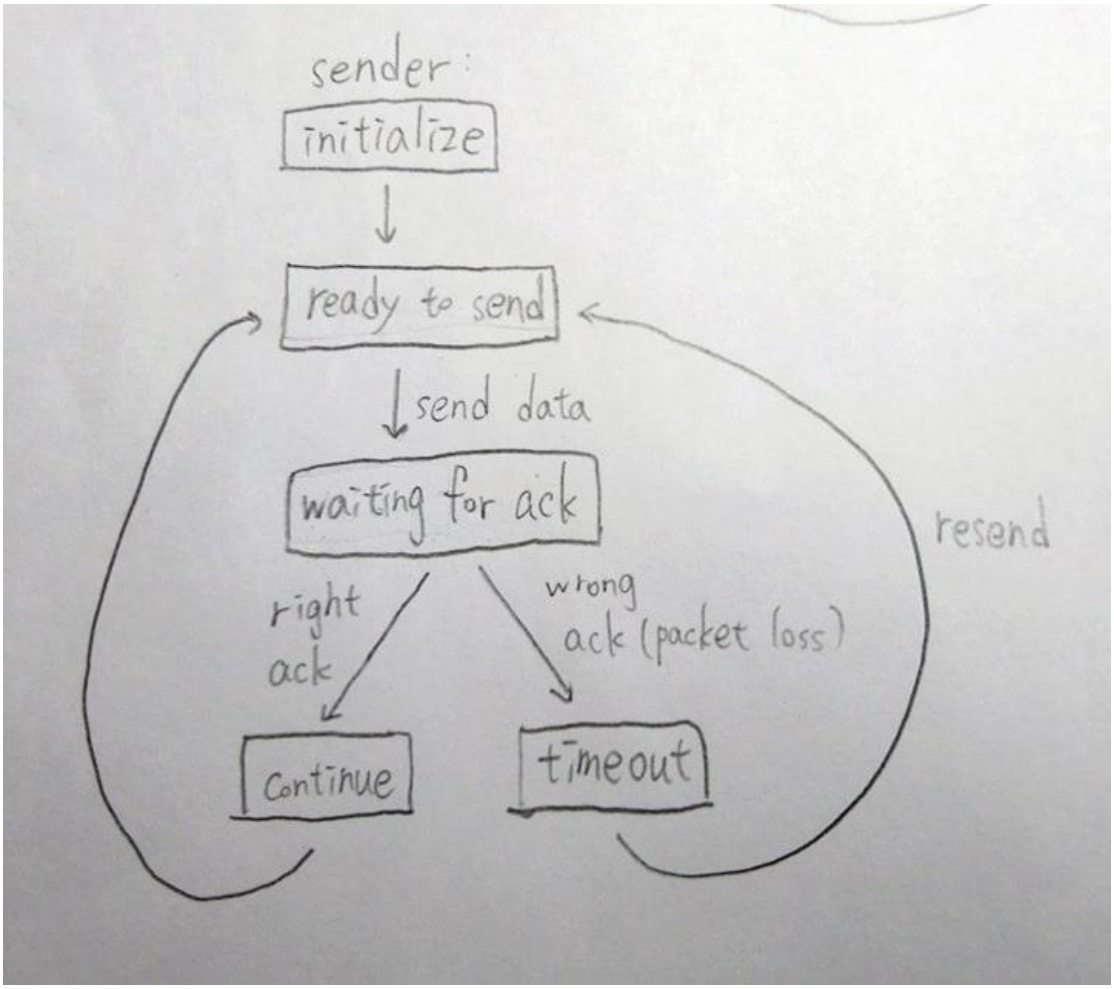
這裡的 drop 是 drop 沒有連續的封包；而 resend 是指等待 sender 重傳遺失+沒有連續的封包，會回傳給 sender 有收到的封包中最後一個封包的數字作為 ack。



sender:

當這次傳完要傳下一個封包時，根據不同情況 window size 要隨之改變，如下圖:

- **Congestion Control** (sender sider)
  - Slow Start
    1. Send single packet in the beginning
    2. When window size is under the threshold, it increases exponentially until packet loses
    3. When window size is over the threshold, it increases linearly until packet loses
  - Packet loss / Time out
    1. Set threshold to $\max\left(\left[\frac{window\ size}{2}\right], 1\right)$
    2. Set window size to 1
    3. Retransmit – from the first “unACKed packet”


sender:
initialize
ready to send
send data
waiting for ack
resend
right
ack
wrong
ack (packet loss)
continue
timeout