Computer network HW2
Retransmission + Congest control

How to execute
Environment: CSIE workstation
Compile: run makefile
Execute:
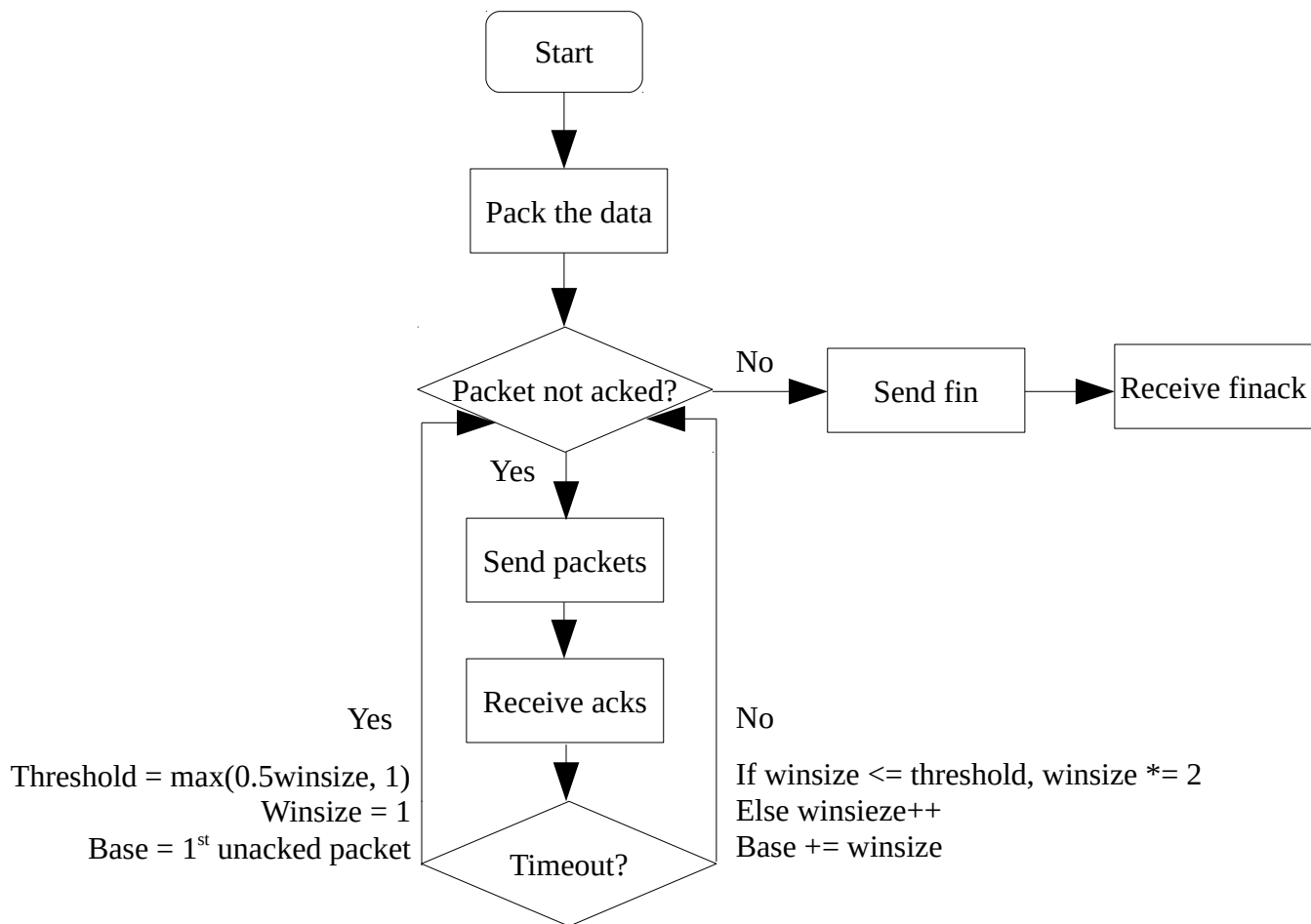./sender <agent IP> <recv IP> <sender port> <agent port> <recv port> <file_path> <threshold>
./agent <sender IP> <recv IP> <sender port> <agent port> <recv port> <loss_rate>
./receiver <sender IP> <agent IP> <sender port> <agent port> <recv port> <file_path> <buffer_size>

Program structures
Sender: Packs and sends the data.

Start

Pack the data

Packet not acked? — No → Send fin → Receive finack

Yes

Send packets

Receive acks

Timeout?

Yes
Threshold = max(0.5winsize, 1)
Winsize = 1
Base = 1st unacked packet

No
If winsize <= threshold, winsize *= 2
Else winsieze++
Base += winsize

Agent: Manage the transfer.

```
        ┌─────────┐
        │  Start  │
        └─────────┘
             │
             ▼
    ┌──────────────────┐
    │ Receive packets  │◄───┐
    └──────────────────┘    │
             │              │
             ▼              │
    ┌──────────────────┐    │
    │  Send packets    │────┘
    │  (Random drop)   │
    └──────────────────┘
```
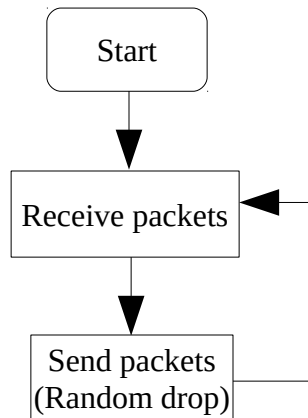
Receiver: Receives the data and acks.

```
        ┌─────────┐
        │  Start  │
        └─────────┘
             │
             ▼
    ┌──────────────────┐
    │ Receive packets  │
    └──────────────────┘
             │
             ▼
        ◇ Is it fin? ◇──Yes──► [Send finack] ──► [Flush the left data]
             │
             No
             │
             ▼
     ◇ Still in range? ◇──No──► ◇ Data in range received? ◇──Yes──► [Flush]
             │                              │
             Yes                            No
             │                              │
             ▼                              ▼
        [Send ack]                       [Drop]
```
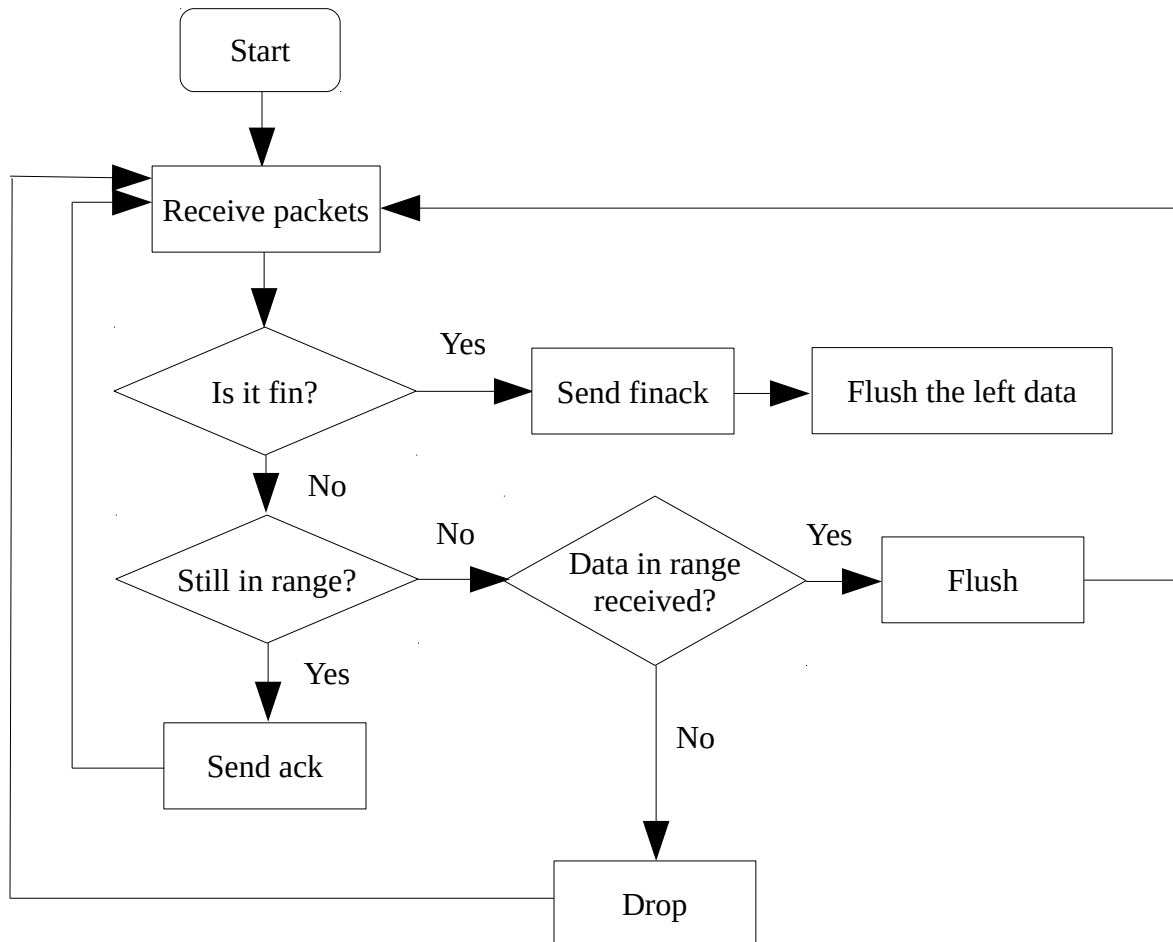
Difficulties and Solutions

As always, running programs on Linux is a tiring work.
File I/O and socket programming on C is what I'm not quite familiar with, so I spent most of the time looking for manuals.