Computer Network HW2

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- **Compile:**
  - *make* :
    compile the source code of sender.cpp and receiver.cpp
- **Run:**
  - ./receiver <receiver IP> <receiver port> <new file name and path>
    ex: ./receiver local 8889 result.txt

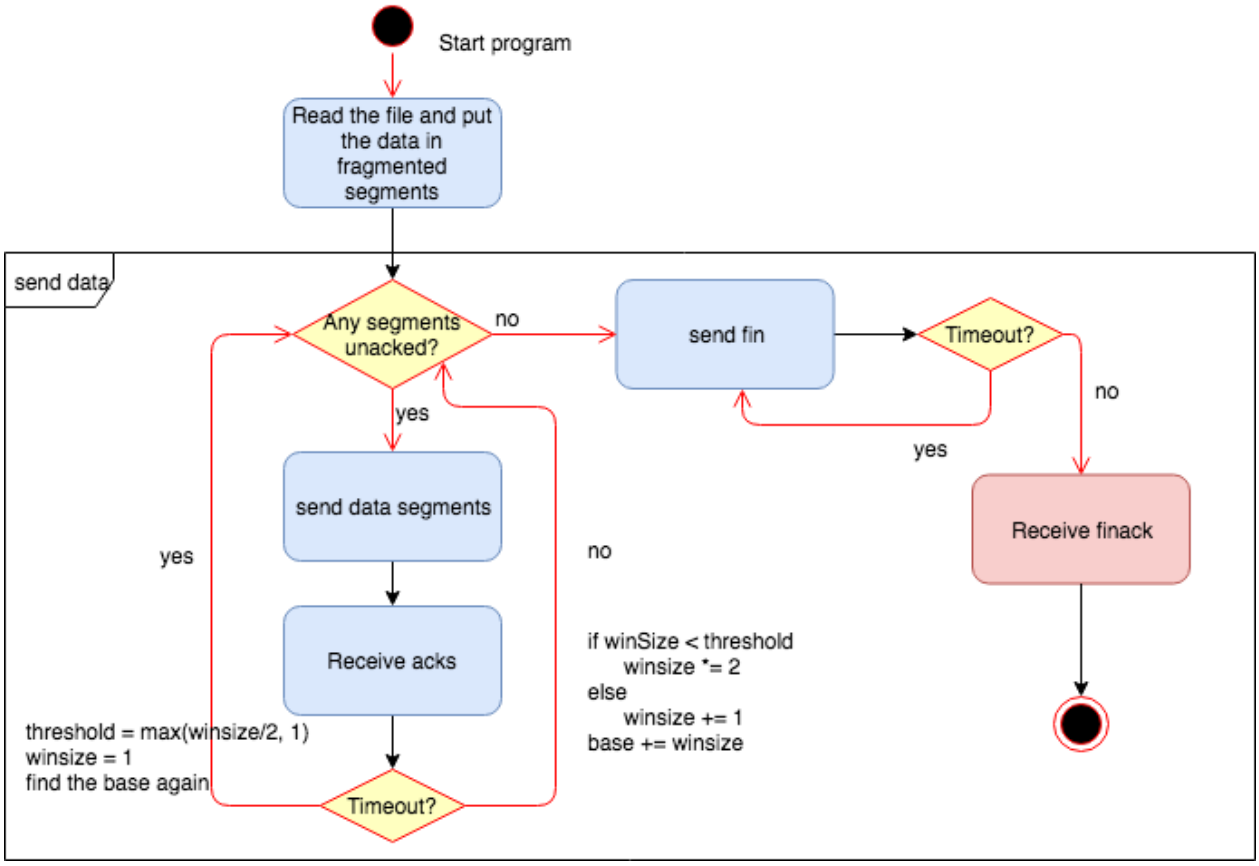
  - ./agent <sender IP> <receiver IP> <sender port> <agent port> <receiver port> <loss rate>
    ex: ./agent local local 8887 8888 8889 0.3

  - ./sender <sender IP> <sender port> <agent port> <file name and path>
    ex: ./sender local 8887 8888 test.txt

  - Remember to run the sender after agent and receiver have run. Or else, sender will keep on timeouting.

- **Difficulties and Solutions**
  - Timeout
    At first, I didn't know how to implement the timeout mechanism. I tried clock() and signal, but I kept facing a problem that the timeout will keep on timeout during the sending process. Moreover, sometimes it isn't easy to implement from it.
    Then, I found a useful function in socket.h, which is setsockopt(). It is really easy to implement and easy to understand, which really save me a lot of time.
  - File Problem
    At first, I used ifstream to read the text file in and fstream to write it. However, I found out that we also have to transfer media files and picture files, which means that I have to read it in binary form and do some process to it.
    Thus, I changed to write it using only open, read, and write. In this way, I don't have to handle the coding problem.

- **Flow Charts**
  - Sender:



  - Receiver: