COMPUTER NETWORKS
ASSIGNMENT 03

Group Members:

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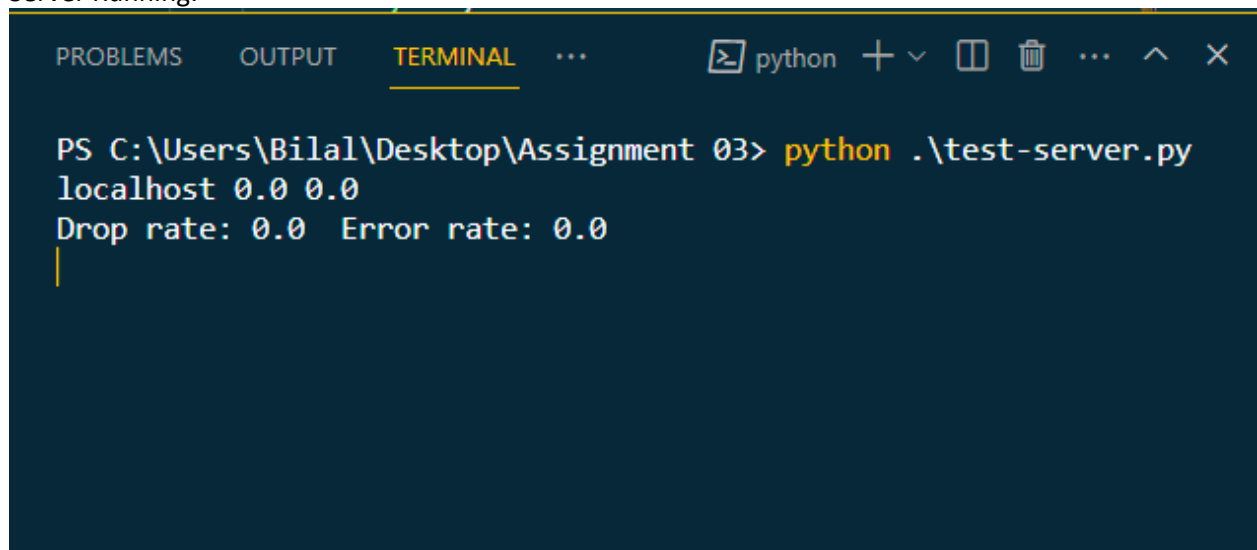ii)   Muaaz Alam (20k0212)

Task:

Develop the reliable data transfer protocol (rdt 3.0). For the sake of simplicity consider only uni-directional data transfer, but the control information will flow on both directions. You may use the finite state machine (FSM) of the rdt 3.0 to understand all the states, events and actions.
Note:
You need to implement stop and wait protocol where only a single packet is in-flight. Further the size and count of packets to be transferred should be configurable. You can also assume a fix timeout period.

Solution:

i)   Server Running:

ii)   Client Sending File:

```
Bilal@DESKTOP-86USMRL MINGW64 ~/Desktop/Assignment 03
$ python test-client.py localhost test.txt 0.1 0.1
Open file successfully
File bytes are  12578
Drop rate: 0.1  Error rate: 0.1
rdt_send(): Sent one message [0] of size 11 --> (12, False, 37205, 5)
rdt_send(): Received expected ACK [0]!
rdt_send(): Sent one message [1] of size 14 --> (12, True, 13413, 8)
rdt_send(): Received expected ACK [1]!
rdt_recv(): Received expected DATA [0] of size 10
rdt_recv(): Sent expected ACK [0]
Received server positive response
Start the file transfer . . .
---- Client progress: 0 / 12578
rdt_send(): Sent one message [0] of size 1006 --> (12, False, 21889, 1000)
rdt_send(): Received expected ACK [0]!
---- Client progress: 1000 / 12578
WARNING: udt_send: Packet corrupted in unreliable layer!!
rdt_send(): Sent one message [1] of size 1006 --> (12, True, 34227, 1000)
rdt_send(): recv [corrupt] OR unexpected [ACK 0] | Keep waiting for ACK [1]
! PACKET TIMEOUT !
rdt_send(): Re-sent one message [1] of size 1006 -> (12, True, 34227, 1000)
rdt_send(): Received expected ACK [1]!
---- Client progress: 2000 / 12578
rdt_send(): Sent one message [0] of size 1006 --> (12, False, 16901, 1000)
rdt_send(): Received expected ACK [0]!
---- Client progress: 3000 / 12578
rdt_send(): Sent one message [1] of size 1006 --> (12, True, 34372, 1000)
rdt_send(): Received expected ACK [1]!
---- Client progress: 4000 / 12578
WARNING: udt_send: Packet lost in unreliable layer!!
rdt_send(): Sent one message [0] of size 1006 --> (12, False, 22688, 1000)
! PACKET TIMEOUT !
rdt_send(): Re-sent one message [0] of size 1006 -> (12, False, 22688, 1000)
rdt_send(): Received expected ACK [0]!
---- Client progress: 5000 / 12578
WARNING: udt_send: Packet corrupted in unreliable layer!!
rdt_send(): Sent one message [1] of size 1006 --> (12, True, 62288, 1000)
rdt_send(): recv [corrupt] OR unexpected [ACK 0] | Keep waiting for ACK [1]
! PACKET TIMEOUT !
rdt_send(): Re-sent one message [1] of size 1006 -> (12, True, 62288, 1000)
rdt_send(): Received expected ACK [1]!
---- Client progress: 6000 / 12578
rdt_send(): Sent one message [0] of size 1006 --> (12, False, 49656, 1000)
rdt_send(): Received expected ACK [0]!
---- Client progress: 7000 / 12578
rdt_send(): Sent one message [1] of size 1006 --> (12, True, 39222, 1000)
rdt_send(): Received expected ACK [1]!
```

iii)   File completely sent from client side

```
rdt_send(): Sent one message [1] of size 1006 --> (12, True, 39222, 1000)
rdt_send(): Received expected ACK [1]!
---- Client progress: 8000 / 12578
rdt_send(): Sent one message [0] of size 1006 --> (12, False, 23111, 1000)
rdt_send(): Received expected ACK [0]!
---- Client progress: 9000 / 12578
rdt_send(): Sent one message [1] of size 1006 --> (12, True, 50685, 1000)
rdt_send(): Received expected ACK [1]!
---- Client progress: 10000 / 12578
rdt_send(): Sent one message [0] of size 1006 --> (12, False, 53962, 1000)
rdt_send(): Received expected ACK [0]!
---- Client progress: 11000 / 12578
rdt_send(): Sent one message [1] of size 1006 --> (12, True, 30419, 1000)
rdt_send(): Received expected ACK [1]!
---- Client progress: 12000 / 12578
WARNING: udt_send: Packet lost in unreliable layer!!
rdt_send(): Sent one message [0] of size 584 --> (12, False, 2914, 578)
! PACKET TIMEOUT !
rdt_send(): Re-sent one message [0] of size 584 -> (12, False, 2914, 578)
rdt_send(): Received expected ACK [0]!
Completed the file transfer.
Total elapse time: 0.282 s       Throughtput: 44.60 KB/s
rdt_close(): time to CLOSE!!!
Client program terminated
```

iv)   File completely received by server

```
rdt_recv(): Received expected DATA [1] of size 1006
rdt_recv(): Sent expected ACK [1]
---- Server progress: 10000 / 12578
rdt_recv(): Received expected DATA [0] of size 1006
rdt_recv(): Sent expected ACK [0]
---- Server progress: 11000 / 12578
rdt_recv(): Received expected DATA [1] of size 1006
rdt_recv(): Sent expected ACK [1]
---- Server progress: 12000 / 12578
rdt_recv(): Received expected DATA [0] of size 584
rdt_recv(): Sent expected ACK [0]
rdt_close(): time to CLOSE!!!
File Transfer Complete!
PS C:\Users\Bilal\Desktop\Assignment 03>
```

v)   File showcased in folder:

This PC > Desktop > Assignment 03 > Store

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test	3/29/2023 12:03 PM	Text Document	13 KB