Name: **Mundhe Eeshan**   Date: **24th April, 2023.**

(last name, first name)

NYU ID:
emm10051@nyu.edu

Course Section: 001

Lab #6-2

Total in points (100 points total): _____

Professor's Comments:

Affirmation of my Independent Effort: Eeshan Mundhe
(Sign here)

There are three files namely tcp_fsm.py which contains the main() function, fsm.py and test_tcp_fsm.py which contains the test cases.

```
 1    The main() function is present in the tcp_fsm.py file
 2
 3    To run the files use the following commands,
 4    python3 filename.py (should be in the folder directory)
 5
 6    To use commands inside the files,
 7    Use -
 8    PASSIVE
 9    ACTIVE
10    SYN
11    ACK
12    SDATA
13    RDATA
14    FIN
15    CLOSE
16    TIMEOUT
```

PROBLEMS   OUTPUT   TERMINAL   DEBUG CONSOLE

PS C:\Users\Eeshan\Desktop\EESHAN_DCN_lab_6-2>

1. Running the tcp_fsm.py file to read all the states and show the state transitions.

```
PASSIVE
Event PASSIVE received, current State is LISTEN
SYN
Event SYN received, current State is SYN_RCVD
ACK
Event ACK received, current State is ESTABLISHED
SDATA
DATA sent 1
SDATA
DATA sent 2
RDATA
DATA received 1
RATA
Error: unexpected Event: RATA
RDATA
DATA received 2
FIN
Event FIN received, current State is CLOSE_WAIT
CLOSE
Event CLOSE received, current State is LAST_ACK
SYN
FSMException: Cannot transition from this state "LAST_ACK" on event "SYN"
ACK
Event ACK received, current State is CLOSED
```

```
ACTIVE
Event ACTIVE received, current State is SYN_SENT
SYN
Event SYN received, current State is SYN_RCVD
RDATA
FSMException: Cannot transition from this state "SYN_RCVD" on event "RDATA"
ACK
Event ACK received, current State is ESTABLISHED
RDATA
DATA received 1
RDATA
DATA received 2
RDATA
DATA received 3
SDATA
DATA sent 1
SDATA
DATA sent 2
SDATA
DATA sent 3
ACK
FSMException: Cannot transition from this state "ESTABLISHED" on event "ACK"
CLOSE
Event CLOSE received, current State is FIN_WAIT_1
FIN
Event FIN received, current State is CLOSING
ACK
Event ACK received, current State is TIME_WAIT
TIMEOUT
Event TIMEOUT received, current State is CLOSED
```

2. Here, we can see that SDATA sends an event to the FSM and RDATA shows data received.

```
SDATA
DATA sent 1
SDATA
DATA sent 2
RDATA
DATA received 1
RATA
Error: unexpected Event: RATA
RDATA
DATA received 2
```

3. Any unexpected event when typed in yields an output 'Unexpected Event: Event Name' as shown.

```
RATA
Error: unexpected Event: RATA
```

4. A FsmException is raised whenever an Event is given that is not specified for a current state.

```
SDATA
DATA sent 3
ACK
FSMException: Cannot transition from this state "ESTABLISHED" on event "ACK"
CLOSE
Event CLOSE received, current State is FIN_WAIT_1
FIN
Event FIN received, current State is CLOSING
ACK
Event ACK received, current State is TIME_WAIT
TIMEOUT
Event TIMEOUT received, current State is CLOSED
```

5. After you execute a command, just press Enter to exit.

```
ACTIVE
Event ACTIVE received, current State is SYN_SENT
SYN
Event SYN received, current State is SYN_RCVD
RDATA
FSMException: Cannot transition from this state "SYN_RCVD" on event "RDATA"
ACK
Event ACK received, current State is ESTABLISHED
RDATA
DATA received 1
RDATA
DATA received 2
RDATA
DATA received 3
SDATA
DATA sent 1
SDATA
DATA sent 2
SDATA
DATA sent 3
ACK
FSMException: Cannot transition from this state "ESTABLISHED" on event "ACK"
CLOSE
Event CLOSE received, current State is FIN_WAIT_1
FIN
Event FIN received, current State is CLOSING
ACK
Event ACK received, current State is TIME_WAIT
TIMEOUT
Event TIMEOUT received, current State is CLOSED
```

6. Test cases also run via the test_tcp_fsm.py file.