COMP 7005
Project
Testing

Daryush Balsara
A01265967

Tony Cheng
A01032886
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Test	Expected	Actual	Screenshot
No arguments	fail	fail	Test 1
Client -h, server -h, proxy -h	pass	pass	Test 2
server --listen-ip <invalid_ip> --listen-port <wrong_port>	fail	fail	Test 3
server --listen-ip <right_ip> --listen-port <wrong_port>	fail	fail	Test 4
server --listen-ip <all_ip> --listen-port <correct_port>	pass	pass	Test 5
client --target-ip <invalid_ip> --target-port <invalid_port> –timeout <invalid_int>	fail	fail	Test 6
client --target-ip <valid_ip> --target-port <invalid_port> –timeout <invalid_int>	fail	fail	Test 7
client --target-ip <valid_ip> --target-port <valid_port> –timeout <invalid_int>	fail	fail	Test 8
client --target-ip <valid_ip> --target-port <valid_port> –timeout <valid_int>, but not server_ip and port	fail	fail	Test 9
client --target-ip <server_ip> --target-port <server_port> –timeout <valid_int>	pass	pass	Test 10
proxy --listen-ip <invalid_ip> --listen-port <invalid_port> --target-ip <invalid_port> --target-port <invalid_port>	fail	fail	Test 11
proxy --listen-ip <valid_ip> --listen-port <invalid_port> --target-ip <invalid_ip> --target-port <invalid_port>	fail	fail	Test 12
proxy --listen-ip <valid_ip> --listen-port <invalid_port> --target-ip <valid_ip> --target-port <invalid_port>	fail	fail	Test 13
proxy --listen-ip <valid_ip> --listen-port <valid_port> --target-ip <valid_ip> --target-port <invalid_port>	fail	fail	Test 14
proxy --listen-ip <valid_ip> --listen-port <valid_port> --target-ip <valid_ip> --target-port <valid_port>, run client and server to see if it works.	fail	fail	Test 15
proxy --listen-ip <all_ip> --listen-port <correct_port> --target-ip <server_ip> --target-port <server_port>, run client and server to see if it works.	pass	pass	Test 16
proxy --listen-ip <all_ip> --listen-port <correct_port> --target-ip <server_ip> --target-port <server_port> --client-drop 50	pass	pass	Test 17

proxy --listen-ip <all_ip> --listen-port <correct_port> --target-ip <server_ip> --target-port <server_port> --client-drop 100	fail	fail	Test 18
proxy --listen-ip <all_ip> --listen-port <correct_port> --target-ip <server_ip> --target-port <server_port> --server-drop 50	pass	pass	Test 19
proxy --listen-ip <all_ip> --listen-port <correct_port> --target-ip <server_ip> --target-port <server_port> --server-drop 100	fail	fail	Test 20
proxy --listen-ip <all_ip> --listen-port <correct_port> --target-ip <server_ip> --target-port <server_port> --client-delay 50 --client-delay-time 4000	pass	pass	Test 21
proxy --listen-ip <all_ip> --listen-port <correct_port> --target-ip <server_ip> --target-port <server_port> --client-delay 100 --client-delay-time 4000	pass	pass	Test 22
proxy --listen-ip <all_ip> --listen-port <correct_port> --target-ip <server_ip> --target-port <server_port> --server-delay 50 --server-delay-time 4000	pass	pass	Test 23
proxy --listen-ip <all_ip> --listen-port <correct_port> --target-ip <server_ip> --target-port <server_port> --server-delay 100 --server-delay-time 4000	pass	pass	Test 24
Change proxy setting dynamic (client drop 100% to 0%)	pass	pass	Test 25

Tests

Test 1

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py
usage: client.py [-h] -i TARGET_IP -p TARGET_PORT -t TIMEOUT
client.py: error: the following arguments are required: -i/--target-ip, -p/--tar
get-port, -t/--timeout
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 server.py
usage: server.py [-h] --listen-ip LISTEN_IP --listen-port LISTEN_PORT
server.py: error: the following arguments are required: --listen-ip, --listen-po
rt
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 proxy.py
usage: proxy.py [-h] --listen-ip LISTEN_IP --listen-port LISTEN_PORT
                --target-ip TARGET_IP --target-port TARGET_PORT
                [--client-drop CLIENT_DROP] [--server-drop SERVER_DROP]
                [--client-delay CLIENT_DELAY] [--server-delay SERVER_DELAY]
                [--client-delay-time CLIENT_DELAY_TIME]
                [--server-delay-time SERVER_DELAY_TIME]
proxy.py: error: the following arguments are required: --listen-ip, --listen-por
t, --target-ip, --target-port
```

Test 2

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py -h
usage: client.py [-h] -i TARGET_IP -p TARGET_PORT -t TIMEOUT

Client-server application using UDP sockets over the network

options:
  -h, --help            show this help message and exit
  -i TARGET_IP, --target-ip TARGET_IP
                        Accepts the IP to connect to
  -p TARGET_PORT, --target-port TARGET_PORT
                        Accepts the port to connect to
  -t TIMEOUT, --timeout TIMEOUT
                        Timeout in seconds
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 server.py -h
usage: server.py [-h] --listen-ip LISTEN_IP --listen-port LISTEN_PORT

UDP Reliable Server

options:
  -h, --help            show this help message and exit
  --listen-ip LISTEN_IP
                        IP address to bind the server.
  --listen-port LISTEN_PORT
                        Port number to listen on.
```

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 proxy.py -h
usage: proxy.py [-h] --listen-ip LISTEN_IP --listen-port LISTEN_PORT
                --target-ip TARGET_IP --target-port TARGET_PORT
                [--client-drop CLIENT_DROP] [--server-drop SERVER_DROP]
                [--client-delay CLIENT_DELAY] [--server-delay SERVER_DELAY]
                [--client-delay-time CLIENT_DELAY_TIME]
                [--server-delay-time SERVER_DELAY_TIME]

UDP Proxy Server

options:
  -h, --help            show this help message and exit
  --listen-ip LISTEN_IP
                        IP address to bind the proxy server.
  --listen-port LISTEN_PORT
                        Port number to listen for client packets.
  --target-ip TARGET_IP
                        IP address of the server to forward packets to.
  --target-port TARGET_PORT
                        Port number of the server.
  --client-drop CLIENT_DROP
                        Drop chance (0 - 100 percent) for packets from the
                        client.
  --server-drop SERVER_DROP
                        Drop chance (0 - 100 percent) for packets from the
                        server.
  --client-delay CLIENT_DELAY
                        Delay chance (0 - 100 percent) for packets from the
                        client.
  --server-delay SERVER_DELAY
                        Delay chance (0 - 100 percent) for packets from the
                        server.
  --client-delay-time CLIENT_DELAY_TIME
                        Delay time in milliseconds (fixed or range) for client
                        packets.
  --server-delay-time SERVER_DELAY_TIME
                        Delay time in milliseconds (fixed or range) for server
                        packets.
```

Test 3

```
tonyc@tonyc-Aspire-E5-575:~/Desktop/comp7005/Project/udp-project/source$ python3
 server.py --listen-ip 300.3.300.666  --listen-port -1
usage: server.py [-h] --listen-ip LISTEN_IP --listen-port LISTEN_PORT
server.py: error: argument --listen-ip: invalid ip_address value: '300.3.300.666
'
```

Test 4

```
tonyc@tonyc-Aspire-E5-575:~/Desktop/comp7005/Project/udp-project/source$ python3
 server.py --listen-ip 0.0.0.0  --listen-port -1
usage: server.py [-h] --listen-ip LISTEN_IP --listen-port LISTEN_PORT
server.py: error: Port numbers must be between 1 and 65535.
```

Test 5

```
tonyc@tonyc-Aspire-E5-575:~/Desktop/comp7005/Project/udp-project/source$ python3
 server.py --listen-ip 0.0.0.0  --listen-port 12345
Server listening on 0.0.0.0:12345
```

Test 6

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 300.0.2.1234 --target-port -1 --timeout 0
usage: client.py [-h] -i TARGET_IP -p TARGET_PORT -t TIMEOUT
client.py: error: argument -i/--target-ip: invalid ip_address value: '300.0.2.12
34'
```

Test 7

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 192.168.1.60 --target-port -1 --timeout 0
usage: client.py [-h] -i TARGET_IP -p TARGET_PORT -t TIMEOUT
client.py: error: Port numbers must be between 1 and 65535.
```

Test 8

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 192.168.1.60 --target-port 12345 --timeout 0
usage: client.py [-h] -i TARGET_IP -p TARGET_PORT -t TIMEOUT
client.py: error: Argument --timeout must be a positive integer bigger than 0.
```

Test 9

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 192.168.1.60 --target-port 12345 --timeout 2
Enter message to send: Hello World!
('192.168.1.60', 12345)
Message sent to ('192.168.1.60', 12345)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.60', 12345)
Message sent to ('192.168.1.60', 12345)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.60', 12345)
Message sent to ('192.168.1.60', 12345)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.60', 12345)
Message sent to ('192.168.1.60', 12345)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.60', 12345)
Message sent to ('192.168.1.60', 12345)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
Failed to receive ACK after maximum 5 retries. Exiting.
```

Test 10

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 192.168.1.77 --target-port 12345 --timeout 2
Enter message to send: Hello World!
('192.168.1.77', 12345)
Message sent to ('192.168.1.77', 12345)
Message sent, waiting for ACK...
Received ACK from server.
```

```
tonyc@tonyc-Aspire-E5-575:~/Desktop/comp7005/Project/udp-project/source$ python3
 server.py --listen-ip 0.0.0.0  --listen-port 12345
Server listening on 0.0.0.0:12345
Received new message from ('192.168.1.67', 38688):
>Hello World!
Sent ACK for message ID 1761b3be-46aa-4d06-8fec-7bb3d9b0d616 to ('192.168.1.67',
 38688)
```

Test 11

```
[tonyc@tony-inspiron5515 source]$ python3 proxy.py --listen-ip 300.0.0 --liste
n-port -2 --target-ip abc --target-port efg
usage: proxy.py [-h] --listen-ip LISTEN_IP --listen-port LISTEN_PORT
                --target-ip TARGET_IP --target-port TARGET_PORT
                [--client-drop CLIENT_DROP] [--server-drop SERVER_DROP]
                [--client-delay CLIENT_DELAY] [--server-delay SERVER_DELAY]
                [--client-delay-time CLIENT_DELAY_TIME]
                [--server-delay-time SERVER_DELAY_TIME]
proxy.py: error: argument --listen-ip: invalid ip_address value: '300.0.0'
```

Test 12

```
[tonyc@tony-inspiron5515 source]$ python3 proxy.py --listen-ip 0.0.0.0 --liste
n-port -2 --target-ip abc --target-port efg
usage: proxy.py [-h] --listen-ip LISTEN_IP --listen-port LISTEN_PORT
                --target-ip TARGET_IP --target-port TARGET_PORT
                [--client-drop CLIENT_DROP] [--server-drop SERVER_DROP]
                [--client-delay CLIENT_DELAY] [--server-delay SERVER_DELAY]
                [--client-delay-time CLIENT_DELAY_TIME]
                [--server-delay-time SERVER_DELAY_TIME]
proxy.py: error: argument --target-ip: invalid ip_address value: 'abc'
```

Test 13

```
[tonyc@tony-inspiron5515 source]$ python3 proxy.py --listen-ip 0.0.0.0 --liste
n-port -2 --target-ip 192.168.0.5 --target-port 565656154
usage: proxy.py [-h] --listen-ip LISTEN_IP --listen-port LISTEN_PORT
                --target-ip TARGET_IP --target-port TARGET_PORT
                [--client-drop CLIENT_DROP] [--server-drop SERVER_DROP]
                [--client-delay CLIENT_DELAY] [--server-delay SERVER_DELAY]
                [--client-delay-time CLIENT_DELAY_TIME]
                [--server-delay-time SERVER_DELAY_TIME]
proxy.py: error: Port numbers must be between 1 and 65535.
```

Test 14

```
[tonyc@tony-inspiron5515 source]$ python3 proxy.py --listen-ip 0.0.0.0 --liste
n-port 5555 --target-ip 192.168.0.5 --target-port 565656154
usage: proxy.py [-h] --listen-ip LISTEN_IP --listen-port LISTEN_PORT
                --target-ip TARGET_IP --target-port TARGET_PORT
                [--client-drop CLIENT_DROP] [--server-drop SERVER_DROP]
                [--client-delay CLIENT_DELAY] [--server-delay SERVER_DELAY]
                [--client-delay-time CLIENT_DELAY_TIME]
                [--server-delay-time SERVER_DELAY_TIME]
proxy.py: error: Port numbers must be between 1 and 65535.
```

Test 15

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 192.168.1.73 --target-port 5555 --timeout 2
Enter message to send: Hello World!
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
Failed to receive ACK after maximum 5 retries. Exiting.
```

Since the target in proxy is not sever, it wont reach, but client targeted proxy and shows it received

```
[tonyc@tony-inspiron5515 source]$ python3 proxy.py --listen-ip 0.0.0.0 --liste
n-port 5555 --target-ip 192.168.0.5 --target-port 12345
Proxy server listening on 0.0.0.0:5555
Proxy server is running.
Enter 'e' to edit settings
Enter 'q' or Ctrl+C to close server
Forwarded message_id 47fe9bba-ed9b-4f9d-95c5-54d2b719fbe0 from client ('192.16
8.1.67', 34531) to server ('192.168.0.5', 12345)
Forwarded message_id 47fe9bba-ed9b-4f9d-95c5-54d2b719fbe0 from client ('192.16
8.1.67', 34531) to server ('192.168.0.5', 12345)
Forwarded message_id 47fe9bba-ed9b-4f9d-95c5-54d2b719fbe0 from client ('192.16
8.1.67', 34531) to server ('192.168.0.5', 12345)
Forwarded message_id 47fe9bba-ed9b-4f9d-95c5-54d2b719fbe0 from client ('192.16
8.1.67', 34531) to server ('192.168.0.5', 12345)
Forwarded message_id 47fe9bba-ed9b-4f9d-95c5-54d2b719fbe0 from client ('192.16
8.1.67', 34531) to server ('192.168.0.5', 12345)
```

```
tonyc@tonyc-Aspire-E5-575:~/Desktop/comp7005/Project/udp-project/source$ python3
 server.py --listen-ip 0.0.0.0  --listen-port 12345
Server listening on 0.0.0.0:12345
```

Test 16

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 192.168.1.73 --target-port 5555 --timeout 2
Enter message to send: Hello World!
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Received ACK from server.
```

```
[tonyc@tony-inspiron5515 source]$ python3 proxy.py --listen-ip 0.0.0.0 --liste
n-port 5555 --target-ip 192.168.1.77 --target-port 12345
Proxy server listening on 0.0.0.0:5555
Proxy server is running.
Enter 'e' to edit settings
Enter 'q' or Ctrl+C to close server
Forwarded message_id 426d22c9-86b1-4146-bbf9-2584753e231d from client ('192.16
8.1.67', 50860) to server ('192.168.1.77', 12345)
Forwarded message_id 426d22c9-86b1-4146-bbf9-2584753e231d from server to clien
t ('192.168.1.67', 50860)
```

```
tonyc@tonyc-Aspire-E5-575:~/Desktop/comp7005/Project/udp-project/source$ python3
 server.py --listen-ip 0.0.0.0  --listen-port 12345
Server listening on 0.0.0.0:12345
Received new message from ('192.168.1.73', 5555):
>Hello World!
Sent ACK for message ID 426d22c9-86b1-4146-bbf9-2584753e231d to ('192.168.1.73',
 5555)
```

Test 17

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 192.168.1.73 --target-port 5555 --timeout 2
Enter message to send: Hello World!
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Received ACK from server.
```

The packet drop once, hits the 50% chance, after retransmit it pass the drop 50% and is delivered.

```
[tonyc@tony-inspiron5515 source]$ python3 proxy.py --listen-ip 0.0.0.0 --liste
n-port 5555 --target-ip 192.168.1.77 --target-port 12345 --client-drop 50
Proxy server listening on 0.0.0.0:5555
Proxy server is running.
Enter 'e' to edit settings
Enter 'q' or Ctrl+C to close server
Dropped packet from client ('192.168.1.67', 44956)
Forwarded message_id 4b684df6-b0e0-4c32-8417-5ead6a5d9bd7 from client ('192.16
8.1.67', 44956) to server ('192.168.1.77', 12345)
Forwarded message_id 4b684df6-b0e0-4c32-8417-5ead6a5d9bd7 from server to clien
t ('192.168.1.67', 44956)
```

```
tonyc@tonyc-Aspire-E5-575:~/Desktop/comp7005/Project/udp-project/source$ python3
 server.py --listen-ip 0.0.0.0  --listen-port 12345
Server listening on 0.0.0.0:12345
Received new message from ('192.168.1.73', 5555):
>Hello World!
Sent ACK for message ID 4b684df6-b0e0-4c32-8417-5ead6a5d9bd7 to ('192.168.1.73',
 5555)
```

Test 18

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 192.168.1.73 --target-port 5555 --timeout 2
Enter message to send: Hello World!
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
Failed to receive ACK after maximum 5 retries. Exiting.
```

```
[tonyc@tony-inspiron5515 source]$ python3 proxy.py --listen-ip 0.0.0.0 --liste
n-port 5555 --target-ip 192.168.1.77 --target-port 12345 --client-drop 100
Proxy server listening on 0.0.0.0:5555
Proxy server is running.
Enter 'e' to edit settings
Enter 'q' or Ctrl+C to close server
Dropped packet from client ('192.168.1.67', 51125)
Dropped packet from client ('192.168.1.67', 51125)
Dropped packet from client ('192.168.1.67', 51125)
Dropped packet from client ('192.168.1.67', 51125)
Dropped packet from client ('192.168.1.67', 51125)
```

```
tonyc@tonyc-Aspire-E5-575:~/Desktop/comp7005/Project/udp-project/source$ python3
 server.py --listen-ip 0.0.0.0  --listen-port 12345
Server listening on 0.0.0.0:12345
```

Test 19

The first message send from client to proxy, and proxy to server, you can see server display message and send ack back to proxy, but since proxy drop it. The client restransmit the same packet, server detect it is duplicated so it dont show the message, but send ack back. This time proxy didnt drop it.

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 192.168.1.73 --target-port 5555 --timeout 2
Enter message to send: Hello World!
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Received ACK from server.
```

```
[tonyc@tony-inspiron5515 source]$ python3 proxy.py --listen-ip 0.0.0.0 --liste
n-port 5555 --target-ip 192.168.1.77 --target-port 12345 --server-drop 50
Proxy server listening on 0.0.0.0:5555
Proxy server is running.
Enter 'e' to edit settings
Enter 'q' or Ctrl+C to close server
Forwarded message_id a256dbbd-8fbc-484f-ae26-22ef535d0707 from client ('192.16
8.1.67', 45983) to server ('192.168.1.77', 12345)
Dropped packet from server ('192.168.1.77', 12345)
Forwarded message_id a256dbbd-8fbc-484f-ae26-22ef535d0707 from client ('192.16
8.1.67', 45983) to server ('192.168.1.77', 12345)
Forwarded message_id a256dbbd-8fbc-484f-ae26-22ef535d0707 from server to clien
t ('192.168.1.67', 45983)
```

```
tonyc@tonyc-Aspire-E5-575:~/Desktop/comp7005/Project/udp-project/source$ python3
 server.py --listen-ip 0.0.0.0  --listen-port 12345
Server listening on 0.0.0.0:12345
Received new message from ('192.168.1.73', 5555):
>Hello World!
Sent ACK for message ID a256dbbd-8fbc-484f-ae26-22ef535d0707 to ('192.168.1.73',
 5555)
Duplicate message from ('192.168.1.73', 5555) (ID a256dbbd-8fbc-484f-ae26-22ef53
5d0707), ignoring.
Sent ACK for message ID a256dbbd-8fbc-484f-ae26-22ef535d0707 to ('192.168.1.73',
 5555)
```

Test 20

Since all ack packet from server drop in proxy, client retransmit 5 times, server show sending ack 5 times.

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 192.168.1.73 --target-port 5555 --timeout 2
Enter message to send: Hello World!
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
Failed to receive ACK after maximum 5 retries. Exiting.
```

```
[tonyc@tony-inspiron5515 source]$ python3 proxy.py --listen-ip 0.0.0.0 --liste
n-port 5555 --target-ip 192.168.1.77 --target-port 12345 --server-drop 100
Proxy server listening on 0.0.0.0:5555
Proxy server is running.
Enter 'e' to edit settings
Enter 'q' or Ctrl+C to close server
Forwarded message_id 72f9df1e-65ba-4208-9360-50f3d4f166b7 from client ('192.16
8.1.67', 47973) to server ('192.168.1.77', 12345)
Dropped packet from server ('192.168.1.77', 12345)
Forwarded message_id 72f9df1e-65ba-4208-9360-50f3d4f166b7 from client ('192.16
8.1.67', 47973) to server ('192.168.1.77', 12345)
Dropped packet from server ('192.168.1.77', 12345)
Forwarded message_id 72f9df1e-65ba-4208-9360-50f3d4f166b7 from client ('192.16
8.1.67', 47973) to server ('192.168.1.77', 12345)
Dropped packet from server ('192.168.1.77', 12345)
Forwarded message_id 72f9df1e-65ba-4208-9360-50f3d4f166b7 from client ('192.16
8.1.67', 47973) to server ('192.168.1.77', 12345)
Dropped packet from server ('192.168.1.77', 12345)
Forwarded message_id 72f9df1e-65ba-4208-9360-50f3d4f166b7 from client ('192.16
8.1.67', 47973) to server ('192.168.1.77', 12345)
Dropped packet from server ('192.168.1.77', 12345)
```

```
tonyc@tonyc-Aspire-E5-575:~/Desktop/comp7005/Project/udp-project/source$ python3
 server.py --listen-ip 0.0.0.0  --listen-port 12345
Server listening on 0.0.0.0:12345
Received new message from ('192.168.1.73', 5555):
>Hello World!
Sent ACK for message ID 72f9df1e-65ba-4208-9360-50f3d4f166b7 to ('192.168.1.73',
 5555)
Duplicate message from ('192.168.1.73', 5555) (ID 72f9df1e-65ba-4208-9360-50f3d4
f166b7), ignoring.
Sent ACK for message ID 72f9df1e-65ba-4208-9360-50f3d4f166b7 to ('192.168.1.73',
 5555)
Duplicate message from ('192.168.1.73', 5555) (ID 72f9df1e-65ba-4208-9360-50f3d4
f166b7), ignoring.
Sent ACK for message ID 72f9df1e-65ba-4208-9360-50f3d4f166b7 to ('192.168.1.73',
 5555)
Duplicate message from ('192.168.1.73', 5555) (ID 72f9df1e-65ba-4208-9360-50f3d4
f166b7), ignoring.
Sent ACK for message ID 72f9df1e-65ba-4208-9360-50f3d4f166b7 to ('192.168.1.73',
 5555)
Duplicate message from ('192.168.1.73', 5555) (ID 72f9df1e-65ba-4208-9360-50f3d4
f166b7), ignoring.
Sent ACK for message ID 72f9df1e-65ba-4208-9360-50f3d4f166b7 to ('192.168.1.73',
 5555)
```

Test 21

Since timeout is 2 sec and delay is 4 sec (4000ms), when client send packet it has delayed, after 2 second timeout it doesnt receive ACK so it will send packet again, at t=4s the proxy forward the packet to server, server display message and send ack back, also the proxy send the retransmission to server, but the server have the message already so it wont display, it will drop but also send ack back. The client got ack in time so it wont send the second retransmission.

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 192.168.1.73 --target-port 5555 --timeout 2
Enter message to send: Hello World!
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Received ACK from server.
```

```
[tonyc@tony-inspiron5515 source]$ python3 proxy.py --listen-ip 0.0.0.0 --liste
n-port 5555 --target-ip 192.168.1.77 --target-port 12345 --client-delay 50 --c
lient-delay-time 4000
Proxy server listening on 0.0.0.0:5555
Proxy server is running.
Enter 'e' to edit settings
Enter 'q' or Ctrl+C to close server
Delaying packet from ('192.168.1.67', 35135) by 4000.00 ms
Forwarded message_id f43cf061-405b-4416-9f0d-98e648496626 from client ('192.16
8.1.67', 35135) to server ('192.168.1.77', 12345)
Forwarded message_id f43cf061-405b-4416-9f0d-98e648496626 from server to clien
t ('192.168.1.67', 35135)
Forwarded message_id f43cf061-405b-4416-9f0d-98e648496626 from client ('192.16
8.1.67', 35135) to server ('192.168.1.77', 12345)
Forwarded message_id f43cf061-405b-4416-9f0d-98e648496626 from server to clien
t ('192.168.1.67', 35135)
```

```
tonyc@tonyc-Aspire-E5-575:~/Desktop/comp7005/Project/udp-project/source$ python3
 server.py --listen-ip 0.0.0.0  --listen-port 12345
Server listening on 0.0.0.0:12345
Received new message from ('192.168.1.73', 5555):
>Hello World!
Sent ACK for message ID f43cf061-405b-4416-9f0d-98e648496626 to ('192.168.1.73',
 5555)
Duplicate message from ('192.168.1.73', 5555) (ID f43cf061-405b-4416-9f0d-98e648
496626), ignoring.
Sent ACK for message ID f43cf061-405b-4416-9f0d-98e648496626 to ('192.168.1.73',
 5555)
```

Test 22

Same as Test 21, but since 100 drop chance all retransmission also delayed, thats why client dont get ack back and send a second retransmission.

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 192.168.1.73 --target-port 5555 --timeout 2
Enter message to send: Hello World!
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Received ACK from server.
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$
```

```
[tonyc@tony-inspiron5515 source]$ python3 proxy.py --listen-ip 0.0.0.0 --liste
n-port 5555 --target-ip 192.168.1.77 --target-port 12345 --client-delay 100 --
client-delay-time 4000
Proxy server listening on 0.0.0.0:5555
Proxy server is running.
Enter 'e' to edit settings
Enter 'q' or Ctrl+C to close server
Delaying packet from ('192.168.1.67', 33894) by 4000.00 ms
Delaying packet from ('192.168.1.67', 33894) by 4000.00 ms
Delaying packet from ('192.168.1.67', 33894) by 4000.00 ms
Forwarded message_id d532df84-e1c2-462c-ba7d-ff1289e07c8c from client ('192.16
8.1.67', 33894) to server ('192.168.1.77', 12345)
Forwarded message_id d532df84-e1c2-462c-ba7d-ff1289e07c8c from server to clien
t ('192.168.1.67', 33894)
Forwarded message_id d532df84-e1c2-462c-ba7d-ff1289e07c8c from client ('192.16
8.1.67', 33894) to server ('192.168.1.77', 12345)
Forwarded message_id d532df84-e1c2-462c-ba7d-ff1289e07c8c from server to clien
t ('192.168.1.67', 33894)
Forwarded message_id d532df84-e1c2-462c-ba7d-ff1289e07c8c from client ('192.16
8.1.67', 33894) to server ('192.168.1.77', 12345)
Forwarded message_id d532df84-e1c2-462c-ba7d-ff1289e07c8c from server to clien
t ('192.168.1.67', 33894)
```

```
tonyc@tonyc-Aspire-E5-575:~/Desktop/comp7005/Project/udp-project/source$ python3
 server.py --listen-ip 0.0.0.0  --listen-port 12345
Server listening on 0.0.0.0:12345
Received new message from ('192.168.1.73', 5555):
>Hello World!
Sent ACK for message ID d532df84-e1c2-462c-ba7d-ff1289e07c8c to ('192.168.1.73',
 5555)
Duplicate message from ('192.168.1.73', 5555) (ID d532df84-e1c2-462c-ba7d-ff1289
e07c8c), ignoring.
Sent ACK for message ID d532df84-e1c2-462c-ba7d-ff1289e07c8c to ('192.168.1.73',
 5555)
Duplicate message from ('192.168.1.73', 5555) (ID d532df84-e1c2-462c-ba7d-ff1289
e07c8c), ignoring.
Sent ACK for message ID d532df84-e1c2-462c-ba7d-ff1289e07c8c to ('192.168.1.73',
 5555)
```

Test 23

Client send message to proxy, proxy forward to server, server send ACK back but hit the delay, since client dont get ACK in time it send the same packet, server drop packet but send ACK. Now the ack got back to Client so it doesnt send second retransmission.

```
tonyc@tonyc-MS-7C92: ~/Desktop/COMP7005/Project/udp-project/source
File  Edit  View  Search  Terminal  Help
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 192.168.1.73 --target-port 5555 --timeout 2
Enter message to send: Hello World!
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Received ACK from server.
```

```
[tonyc@tony-inspiron5515 source]$ python3 proxy.py --listen-ip 0.0.0.0 --liste
n-port 5555 --target-ip 192.168.1.77 --target-port 12345 --server-delay 50 --s
erver-delay-time 4000
Proxy server listening on 0.0.0.0:5555
Proxy server is running.
Enter 'e' to edit settings
Enter 'q' or Ctrl+C to close server
Forwarded message_id 82b049b4-7863-4ee5-af08-4803432635c9 from client ('192.16
8.1.67', 47738) to server ('192.168.1.77', 12345)
Delaying packet from ('192.168.1.77', 12345) by 4000.00 ms
Forwarded message_id 82b049b4-7863-4ee5-af08-4803432635c9 from client ('192.16
8.1.67', 47738) to server ('192.168.1.77', 12345)
Forwarded message_id 82b049b4-7863-4ee5-af08-4803432635c9 from server to clien
t ('192.168.1.67', 47738)
Forwarded message_id 82b049b4-7863-4ee5-af08-4803432635c9 from server to clien
t ('192.168.1.67', 47738)
```

```
tonyc@tonyc-Aspire-E5-575:~/Desktop/comp7005/Project/udp-project/source$ python3
 server.py --listen-ip 0.0.0.0  --listen-port 12345
Server listening on 0.0.0.0:12345
Received new message from ('192.168.1.73', 5555):
>Hello World!
Sent ACK for message ID 82b049b4-7863-4ee5-af08-4803432635c9 to ('192.168.1.73',
 5555)
Duplicate message from ('192.168.1.73', 5555) (ID 82b049b4-7863-4ee5-af08-480343
2635c9), ignoring.
Sent ACK for message ID 82b049b4-7863-4ee5-af08-4803432635c9 to ('192.168.1.73',
 5555)
```

Test 24

Same as test 23, but this time 100 percent delay,

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 192.168.1.73 --target-port 5555 --timeout 2
Enter message to send: Hello World!
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Received ACK from server.
```

```
[tonyc@tony-inspiron5515 source]$ python3 proxy.py --listen-ip 0.0.0.0 --liste
n-port 5555 --target-ip 192.168.1.77 --target-port 12345 --server-delay 100 --
server-delay-time 4000
Proxy server listening on 0.0.0.0:5555
Proxy server is running.
Enter 'e' to edit settings
Enter 'q' or Ctrl+C to close server
Forwarded message_id ffb1f9f4-85bd-408e-9eba-c48b2442afe4 from client ('192.16
8.1.67', 57566) to server ('192.168.1.77', 12345)
Delaying packet from ('192.168.1.77', 12345) by 4000.00 ms
Forwarded message_id ffb1f9f4-85bd-408e-9eba-c48b2442afe4 from client ('192.16
8.1.67', 57566) to server ('192.168.1.77', 12345)
Delaying packet from ('192.168.1.77', 12345) by 4000.00 ms
Forwarded message_id ffb1f9f4-85bd-408e-9eba-c48b2442afe4 from client ('192.16
8.1.67', 57566) to server ('192.168.1.77', 12345)
Delaying packet from ('192.168.1.77', 12345) by 4000.00 ms
Forwarded message_id ffb1f9f4-85bd-408e-9eba-c48b2442afe4 from server to clien
t ('192.168.1.67', 57566)
Forwarded message_id ffb1f9f4-85bd-408e-9eba-c48b2442afe4 from server to clien
t ('192.168.1.67', 57566)
Forwarded message_id ffb1f9f4-85bd-408e-9eba-c48b2442afe4 from server to clien
t ('192.168.1.67', 57566)
```

```
tonyc@tonyc-Aspire-E5-575:~/Desktop/comp7005/Project/udp-project/source$ python3
 server.py --listen-ip 0.0.0.0  --listen-port 12345
Server listening on 0.0.0.0:12345
Received new message from ('192.168.1.73', 5555):
>Hello World!
Sent ACK for message ID ffb1f9f4-85bd-408e-9eba-c48b2442afe4 to ('192.168.1.73',
 5555)
Duplicate message from ('192.168.1.73', 5555) (ID ffb1f9f4-85bd-408e-9eba-c48b24
42afe4), ignoring.
Sent ACK for message ID ffb1f9f4-85bd-408e-9eba-c48b2442afe4 to ('192.168.1.73',
 5555)
Duplicate message from ('192.168.1.73', 5555) (ID ffb1f9f4-85bd-408e-9eba-c48b24
42afe4), ignoring.
Sent ACK for message ID ffb1f9f4-85bd-408e-9eba-c48b2442afe4 to ('192.168.1.73',
 5555)
```

Test 25

```
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 192.168.1.73 --target-port 5555 --timeout 2
Enter message to send: This Packet should always drop
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Timeout waiting for ACK.
Retransmitting message...
Failed to receive ACK after maximum 5 retries. Exiting.
(venv) tonyc@tonyc-MS-7C92:~/Desktop/COMP7005/Project/udp-project/source$ python
3 client.py --target-ip 192.168.1.73 --target-port 5555 --timeout 2
Enter message to send: This message have no dropping
('192.168.1.73', 5555)
Message sent to ('192.168.1.73', 5555)
Message sent, waiting for ACK...
Received ACK from server.
```

```
[tonyc@tony-inspiron5515 source]$ python3 proxy.py --listen-ip 0.0.0.0 --liste
n-port 5555 --target-ip 192.168.1.77 --target-port 12345 --client-drop 100
Proxy server listening on 0.0.0.0:5555
Proxy server is running.
Enter 'e' to edit settings
Enter 'q' or Ctrl+C to close server
Dropped packet from client ('192.168.1.67', 59103)
Dropped packet from client ('192.168.1.67', 59103)
Dropped packet from client ('192.168.1.67', 59103)
Dropped packet from client ('192.168.1.67', 59103)
Dropped packet from client ('192.168.1.67', 59103)
e

--- Proxy Settings ---
1. Client Drop Chance (current: 100.0 percent)
2. Server Drop Chance (current: 0.0 percent)
3. Client Delay Chance (current: 0.0 percent)
4. Server Delay Chance (current: 0.0 percent)
5. Client Delay Time (current: 0.00-0.00 ms)
6. Server Delay Time (current: 0.00-0.00 ms)
Enter 'q' to return to the main menu.
Choose an option (1-6): 1
Enter a new value (0-100): 0

--- Proxy Settings ---
1. Client Drop Chance (current: 0.0 percent)
2. Server Drop Chance (current: 0.0 percent)
3. Client Delay Chance (current: 0.0 percent)
4. Server Delay Chance (current: 0.0 percent)
5. Client Delay Time (current: 0.00-0.00 ms)
6. Server Delay Time (current: 0.00-0.00 ms)
Enter 'q' to return to the main menu.
Choose an option (1-6): q
Proxy server is running.
Enter 'e' to edit settings
Enter 'q' or Ctrl+C to close server
Forwarded message_id aa14044e-23fe-4815-b7f1-d0120d1486a2 from client ('192.16
8.1.67', 59610) to server ('192.168.1.77', 12345)
Forwarded message_id aa14044e-23fe-4815-b7f1-d0120d1486a2 from server to clien
t ('192.168.1.67', 59610)
```

```
tonyc@tonyc-Aspire-E5-575:~/Desktop/comp7005/Project/udp-project/source$ python3
 server.py --listen-ip 0.0.0.0  --listen-port 12345
Server listening on 0.0.0.0:12345
Received new message from ('192.168.1.73', 5555):
>This message have no dropping
Sent ACK for message ID aa14044e-23fe-4815-b7f1-d0120d1486a2 to ('192.168.1.73',
 5555)
```