

COMPUTER NETWORKS LAB

LAB 9

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SERVER

```
import socket
import random
import time

def checksum(data):
    return sum(data) & 0xffffffff

def send_packet(sock, packet, addr):
    sock.sendto(packet, addr)

def receive_packet(sock, buffer_size):
    return sock.recvfrom(buffer_size)

def main():
    server_ip = '127.0.0.1'
    server_port = 12345
    buffer_size = 1024
    timeout = 2 # in seconds
    max_attempts = 5

    sock = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
    sock.bind((server_ip, server_port))

    while True:
        data, client_addr = receive_packet(sock, buffer_size)
        seq_num, payload, checksum_rcvd = data.split(b':')

        if checksum(payload) == int(checksum_rcvd):
            ack_packet = f"ACK:{seq_num.decode()}".encode()
            send_packet(sock, ack_packet, client_addr)
            print(f"Acknowledgment sent for sequence number {seq_num.decode()}")
        else:
            print("Checksum error. Packet discarded.")

        attempts = 0
        while attempts < max_attempts:
            try:
                sock.settimeout(timeout)
                data, client_addr = receive_packet(sock, buffer_size)
                seq_num, payload, checksum_rcvd = data.split(b':')

                if checksum(payload) == int(checksum_rcvd):
                    ack_packet = f"ACK:{seq_num.decode()}".encode()
                    send_packet(sock, ack_packet, client_addr)
```

```

        print(f"Acknowledgment sent for sequence number
{seq_num.decode()}")
    else:
        print("Checksum error. Packet discarded.")

    break # Exit the retry loop if successful
except socket.timeout:
    attempts += 1
    print(f"Timeout: Retransmitting packet {seq_num.decode()}")
    send_packet(sock, data, client_addr)

if __name__ == "__main__":
    main()

```

CLIENT

```

import socket
import random
import time

def checksum(data):
    return sum(data) & 0xffffffff

def send_packet(sock, packet, addr):
    sock.sendto(packet, addr)

def receive_packet(sock, buffer_size):

```

```

    return sock.recvfrom(buffer_size)

def main():
    server_ip = '127.0.0.1'
    server_port = 12345
    buffer_size = 1024
    timeout = 2 # in seconds
    max_attempts = 5

    sock = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)

    seq_num = 0
    while True:
        payload = f"Data Packet {seq_num}".encode()
        checksum_val = checksum(payload)
        packet = f"{seq_num}:{payload.decode()}:{checksum_val}".encode()

        send_packet(sock, packet, (server_ip, server_port))
        print(f"Sent packet with sequence number {seq_num}")

        try:
            sock.settimeout(timeout)
            data, addr = receive_packet(sock, buffer_size)
            if data.decode().startswith("ACK"):
                ack_seq_num = data.decode().split(":")[1]
                print(f"Received acknowledgment for sequence number {ack_seq_num}")
                seq_num += 1
        except socket.timeout:
            print("Timeout: Retransmitting packet")
            seq_num -= 1 # Retransmit the same packet
            if seq_num < 0:
                seq_num = 0

        time.sleep(1) # Add a delay between packet transmissions

if __name__ == "__main__":
    main()

```

• OUTPUT

PROBLEMS OUTPUT DEBUG CONSOLE **TERMINAL** PORTS SEARCH ERROR COMMENTS python3

Acknowledgment sent for sequence number 9
Acknowledgment sent for sequence number 10
Acknowledgment sent for sequence number 11
Acknowledgment sent for sequence number 12
Acknowledgment sent for sequence number 13
Acknowledgment sent for sequence number 14
Acknowledgment sent for sequence number 15
Acknowledgment sent for sequence number 16
Acknowledgment sent for sequence number 17
Acknowledgment sent for sequence number 18
Acknowledgment sent for sequence number 19
Acknowledgment sent for sequence number 20
Acknowledgment sent for sequence number 21
Acknowledgment sent for sequence number 22
Acknowledgment sent for sequence number 23
Acknowledgment sent for sequence number 24
Acknowledgment sent for sequence number 25
Acknowledgment sent for sequence number 26
Acknowledgment sent for sequence number 27

Received acknowledgment for sequence number 18
Sent packet with sequence number 19
Received acknowledgment for sequence number 19
Sent packet with sequence number 20
Received acknowledgment for sequence number 20
Sent packet with sequence number 21
Received acknowledgment for sequence number 21
Sent packet with sequence number 22
Received acknowledgment for sequence number 22
Sent packet with sequence number 23
Received acknowledgment for sequence number 23
Sent packet with sequence number 24
Received acknowledgment for sequence number 24
Sent packet with sequence number 25
Received acknowledgment for sequence number 25
Sent packet with sequence number 26
Received acknowledgment for sequence number 26
Sent packet with sequence number 27
Received acknowledgment for sequence number 27