Assignment_1: -

1.Explore the following tools
a) ftp, telnet, ssh, scp, mail, finger
b) hostname, ifconfig, ping, netstat, tcpdump
2.Implement simple client and server using TCP protocol, server may be designed for echo service (simply send back same string sent by client)
3.Implement simple file transfer over TCP protocol
4.Implement simple sender, receiver using UDP protocol
5.Implement Multi-threading Server that can accept multiple client requests using TCP protocol

Useful tools, techniques for debugging: -

1. netstat
   eg: - netstat --inet -a -n
   netstat --inet -l -n
2. tcpdump
   eg: - tcpdump -i lo -n
   tcpdump “tcp port 5000 or tcp port 6000” -n

3. /etc/services

4. /proc/net/tcp, /proc/net/udp

5. lsof #list of open files (file descriptors)
   eg: - lsof -i TCP:5000

6. View Ports in Use
   sudo lsof -i -P -n | grep LISTEN, sudo kill -9 PID

7. /proc/<pid>/fd # replace <pid> with process id of tcp/udp node, check entries

#for sockets in fd table

8. strace #tracing system calls

Assignment_2: -

REST API's using WiFi

1. Interface DHT11/DHT22 to ESP32 and Display Temperature and Humidity data on web browser via REST API's

Assignment_3: -

1.Explore the Python SDK for AWS Iot to implement Pub-Sub via MQTT Protocol, Store the Message Data in Dynamo DB

Assignment_4: -

BLE Server

1.Interface DHT11/DHT22 to ESP32 via Bluetooth Low Energy and Display Temperature and Humidity data on BLE Scanner App/NRF Connect App using BLE Characteristics