Practical 6

Aim: - Setup a TCP server and client on a raspberry pi using Python modules to send messages and execute shell commands from within python such as starting another application

Socket programming is a way of connecting two nodes on a network to communicate with each other. One socket (node) listens on a particular port at an IP, while other socket reaches out to the other to form a connection. Server forms the listener socket while client reaches out to the server.

We must connect an LED with Raspberry Pi on Pin no 13 with positive leg of LED and negative leg can be inserted in any of the ground connection once the connection is done. We can code.
Before we start, we the coding part, one must install socket for Raspberry Pi
sudo apt-get install socket

Open a python editor and type the following code for TCPserver.py

```
import socket
import RPi.GPIO as GPIO
from subprocess import call
# GPIO Setting Up
GPIO.setmode(GPIO.BCM)
GPIO.setup(13, GPIO.OUT)

# Create a Server Socket and wait for a client to connect
server_socket = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
server_socket.bind(('', 6666))
print ("UDPServer Waiting for client on port 6666")

# Define moving functions

def FW():
    GPIO.output(13,True)
    print ("On")
    call(["ls", "-l"])


def STOP():
    GPIO.output(13,False)
    print ("Off")
    call(["ls", "-all"])

options = {    "0" : FW,
               "3" : STOP,
}

# Recive data from client and decide which function to call
while True:
    dataFromClient, address = server_socket.recvfrom(256)
    dataFromClient = dataFromClient.rstrip()
    #print(dataFromClient.decode())
    options[dataFromClient.decode()]()
```

Once the program is typed, execute it by typing

sudo python3 TCPserver.py

Write another program for TCPClient.py

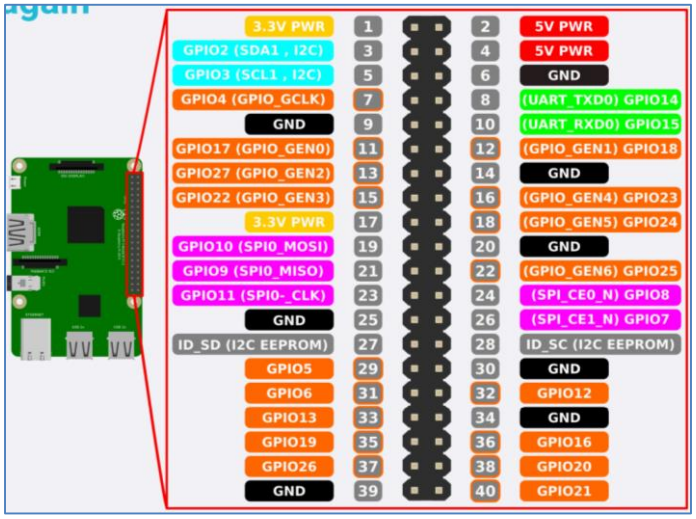
```
import socket
client_socket = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
try:
     while 1:
          data = input("Enter Data :")
# IPADRESS = RPi IP address
# 6666 = Number Port
          client_socket.sendto(data.encode(), ('192.168.0.202',6666))
          print ("Sending request")

except Exception as ex:
    print (ex)
    raw_input()

client_socket.close()
```

Execute the TCPClient on another command prompt by typing

sudo python3 TCPClient.py

Let's look at the connections, the following diagram shows us the GPIO pin diagram. Take an LED and connect the LED as shown in the diagram.

The positive leg of LED is connected to GPIO13 pin and negative leg can be connected to any ground connection.



Now one can see the output on server command prompt and client command prompt. On Client command prompt as we type 0 the LED will be turn on and when we type 3 the LED will be turn off.