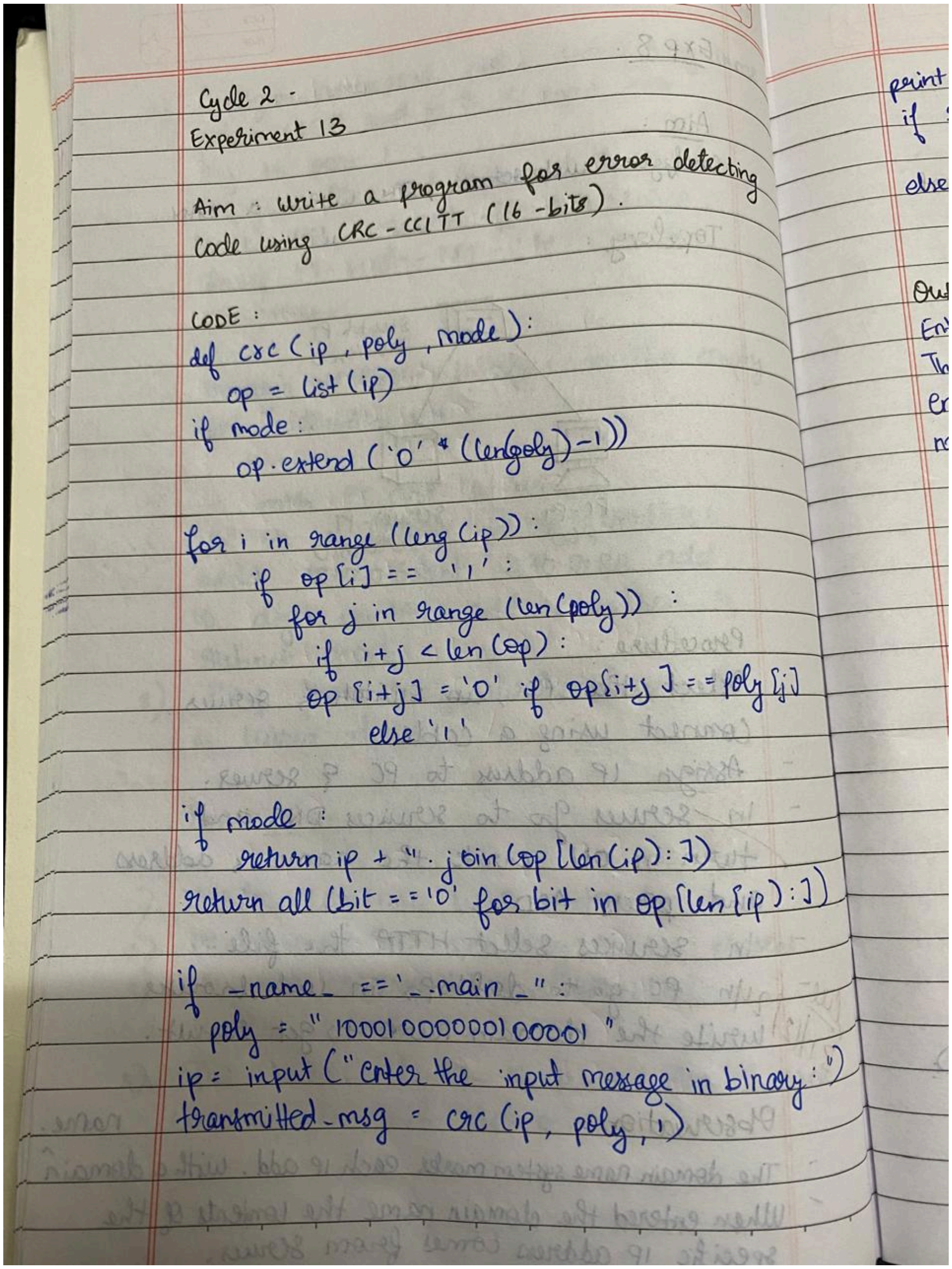
Cycle 2 - 1/1/25
Experiment 13



Cycle 2 -
Experiment 13

Aim : write a program for error detecting code using CRC - CCITT (16 -bits).

CODE :

```
def crc (ip , poly , mode ):
    op = list (ip)
if mode :
    op.extend ('0' * ((lenpoly)-1))

for i in range (leng (ip)) :
      if op [i] = = '1' :
        for j in range (len (poly))  :
          if i+j < len (op) :
          op [i+j] = '0' if op [i+j ] = = poly [j]
                else '1'

if mode :
    return ip + ''. join (op [len (ip) : ])
return all (bit = = '0' for bit in op [len [ip) : ])

if _name_  = = '_.main _" :
  poly = " 10001 0000001 00001 "
ip = input ("enter the input message in binary : ")
transmitted_msg = crc (ip , poly , 1)
```

print
if
else

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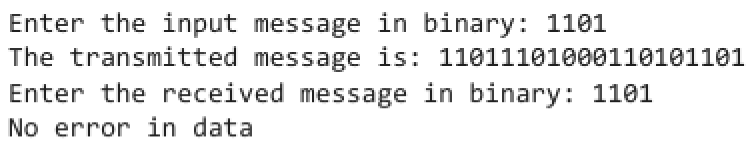
```
print(f"The transmitted message in binary : ")
if recv == ip :
        print ("No error in data")
else :
    print ("error in transmision has occured")
```

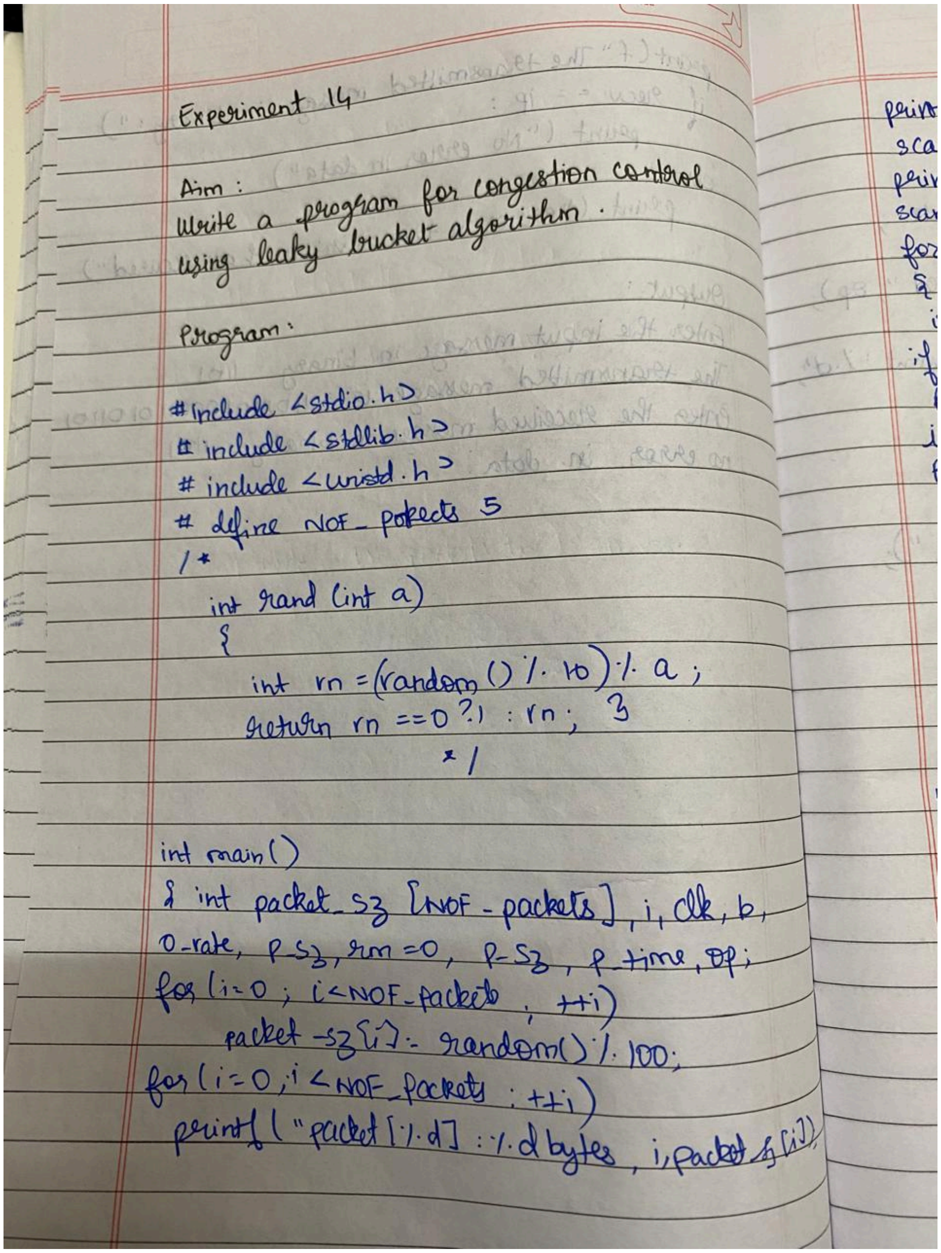
Output :

```
Enter the input message in binary : 1101
The transmitted message is : 1101110100011 01 01101
enter the received message in binary : 1101
no error in data.
```



```
Enter the input message in binary: 1101
The transmitted message is: 1101110100110101101
Enter the received message in binary: 1101
No error in data
```

Experiment 14



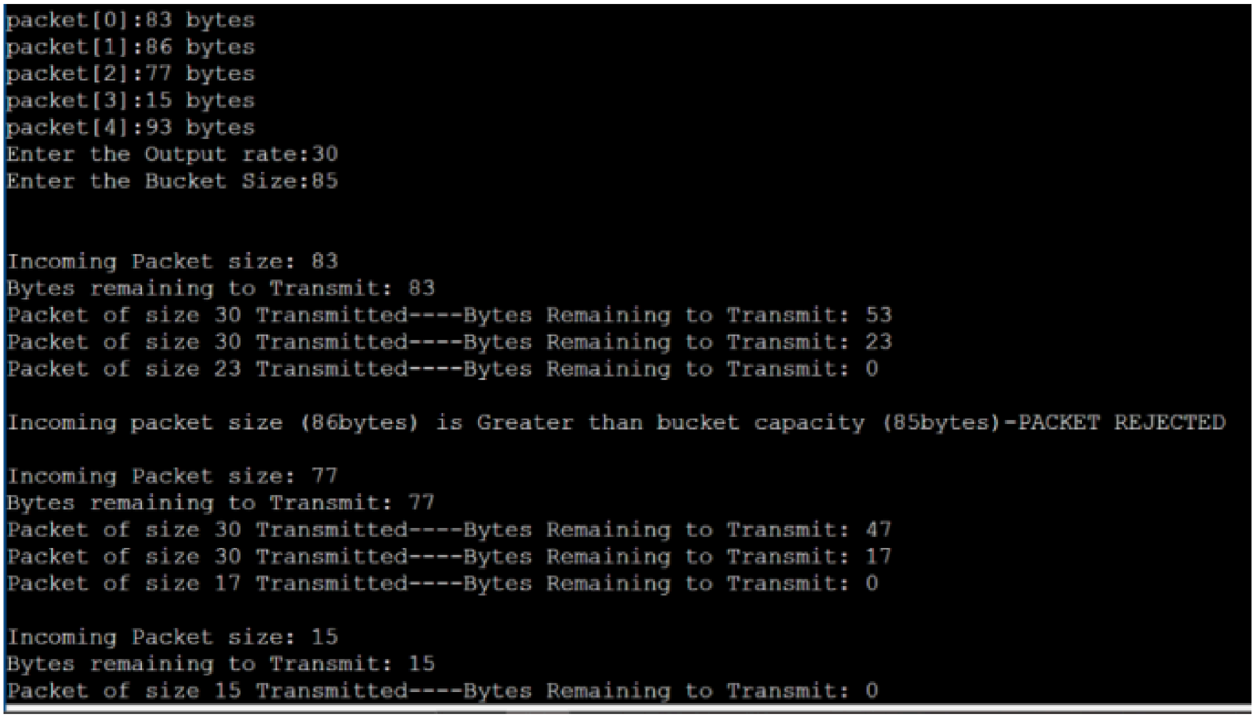
Experiment 14

Aim :
Write a program for congestion control using leaky bucket algorithm.

Program :

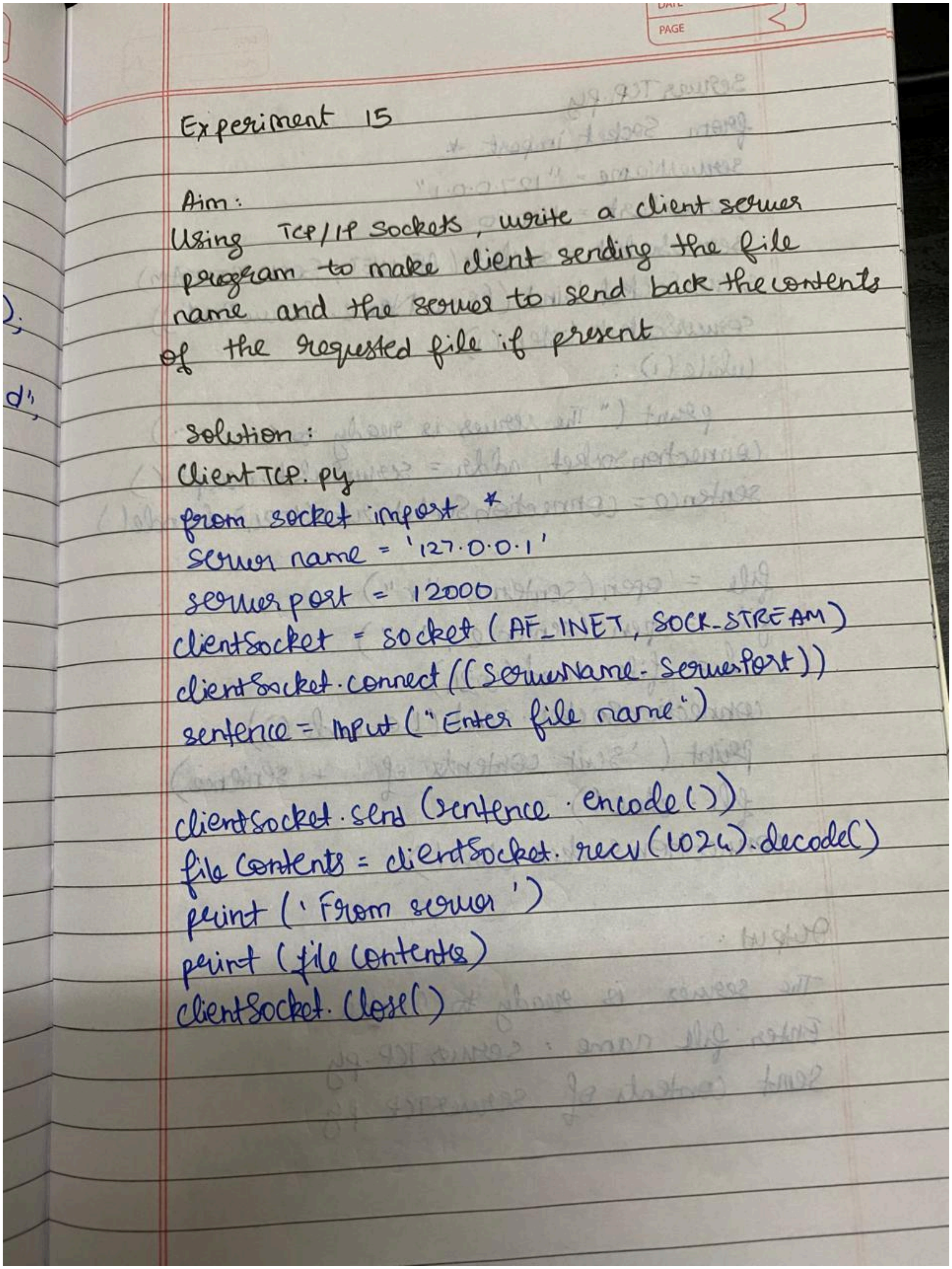
```
#include <stdio.h>
# include <stdlib.h>
# include <unistd.h>
# define NOF_ pakects 5
/*
  int rand (int a)
  {
     int rn =(random () % 10) % a ;
     return rn ==0 ?1 : rn ;  }
                 */

int main()
{ int packet_sz [NOF - packets], i, clk, b,
o_rate, p_sz, rm =0, p_sz , p_time, op;
for (i=0 ; i<NOF_packets ; ++i)
      packet -sz[i]= random() % 100;
for (i=0 ; i<NOF_packets ; ++i)
  printf ("packet [%d] : %d bytes , i, packet_s [i]);
printf ("Enter the output rate ");
scanf ("%d", &o_rate);
printf ("Enter the bucket size :");
scanf ("%d", &b_size);
for (i=0; i<NOF_packets ; ++i)
{
 if (packet_sz[i] + p_sz_rm) > b_size)
if (packet_sz[i] > b_size)
 printf ("Incoming packet size (%dbytes)
 is greater that bucket capacity (%dbytes)-
 PACKET REJECTED", packet_sz[i], b_size);
 else
 printf ("Bucket capacity exceeded -
         PACKETS REJECTED");
else
{ p_sz_rm += packet_sz[i];
printf ("Incoming packet size : %d",
            packet_sz[i]);
printf ("Bytes remaining to transmit : %d",
            p_sz_rm);

while (p_sz_rm >0)

{ sleep(1);
   if (p_sz_rm)
   {
```

```
if (p_sz_rm <= o_rate)
  op = p_sz_rm, p_sz_rm = 0;
else
  op = o_rate, p_sz_rm = o_rate;

printf("Packet of size %d transmitted", op);

printf("-- Bytes remaining to transmit : %d",
           p_sz_rm);
         }
  else
  {
   printf("No packets to transmit !!");
          }}
             }}}
```



```
packet[0]:83 bytes
packet[1]:86 bytes
packet[2]:77 bytes
packet[3]:15 bytes
packet[4]:93 bytes
Enter the Output rate:30
Enter the Bucket Size:85


Incoming Packet size: 83
Bytes remaining to Transmit: 83
Packet of size 30 Transmitted----Bytes Remaining to Transmit: 53
Packet of size 30 Transmitted----Bytes Remaining to Transmit: 23
Packet of size 23 Transmitted----Bytes Remaining to Transmit: 0

Incoming packet size (86bytes) is Greater than bucket capacity (85bytes)-PACKET REJECTED

Incoming Packet size: 77
Bytes remaining to Transmit: 77
Packet of size 30 Transmitted----Bytes Remaining to Transmit: 47
Packet of size 30 Transmitted----Bytes Remaining to Transmit: 17
Packet of size 17 Transmitted----Bytes Remaining to Transmit: 0

Incoming Packet size: 15
Bytes remaining to Transmit: 15
Packet of size 15 Transmitted----Bytes Remaining to Transmit: 0
```

Experiment 15



Experiment 15

Aim:
Using TCP/IP Sockets, write a client server program to make client sending the file name and the server to send back the contents of the requested file if present

Solution:
Client TCP. py

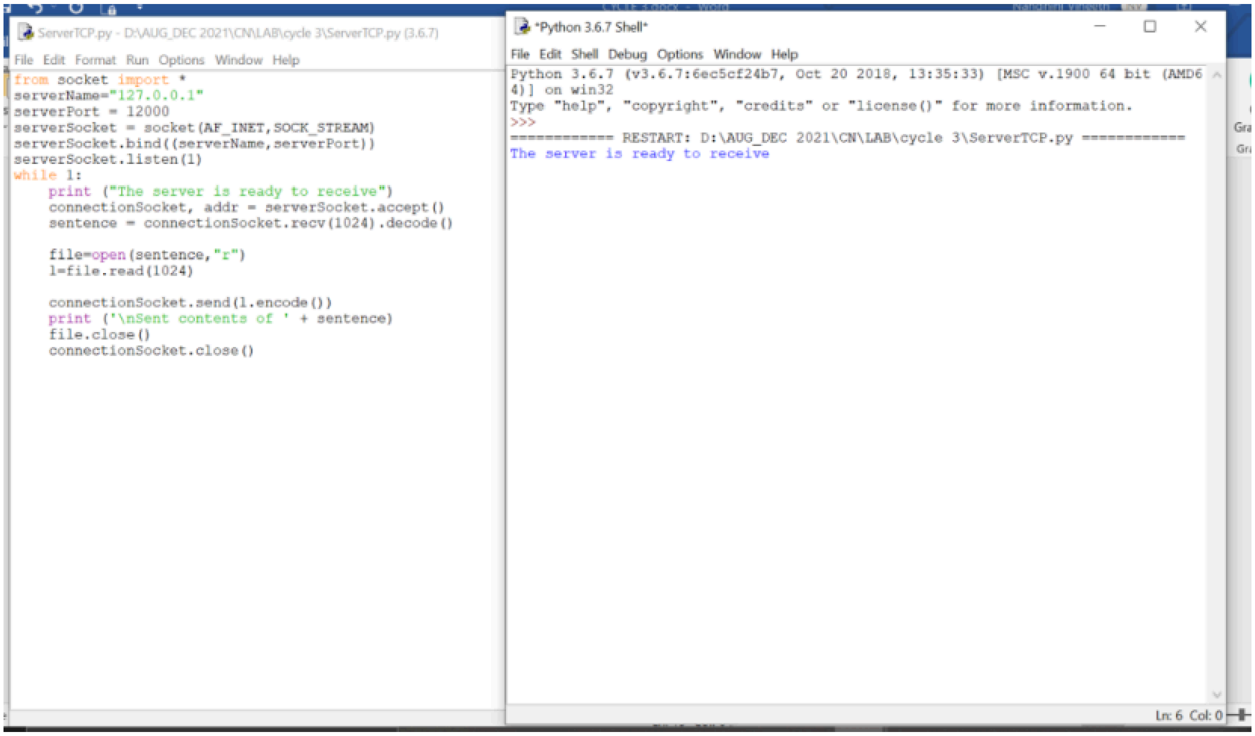
```
from socket import *
server name = '127.0.0.1'
serverport = 12000
clientSocket = socket (AF_INET, SOCK_STREAM)
clientSocket.connect((ServerName- ServerPort))
sentence = input ("Enter file name")

clientSocket.send (sentence . encode())
file contents = clientSocket. recv(1024).decode()
print ('From server')
print (file contents)
clientSocket. close()
```

serverTCP.py

```
from Socket import *
serverName = "127.0.0.1"
serverPort = 12000
serverSocket = socket(AF_NET, SOCK_STREAM)
serverSocket.bind((serverName. serverPort))
serverSocket.listen(1)
while(1):
    print("The server is ready to recieve")
connectionsocket, addr = serverSocket.accept()
sentence = connectionSocket.recv(1024).decode()

file = open(sentence, "r")
file = open(sentence, "r")
  l = file.read(1024)
  connectionsocket.send(l.eneode())
  print('sent contents of ' + sentence)
  file.close()
connection socket.close()
```

Output:

```
The server is ready to recieve
Enter file name : server TCP.py
Sent contents of serverTCP.py
```



ServerTCP.py - D:\AUG_DEC 2021\CN\LAB\cycle 3\ServerTCP.py (3.6.7)
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Python 3.6.7 Shell
File Edit Shell Debug Options Window Help
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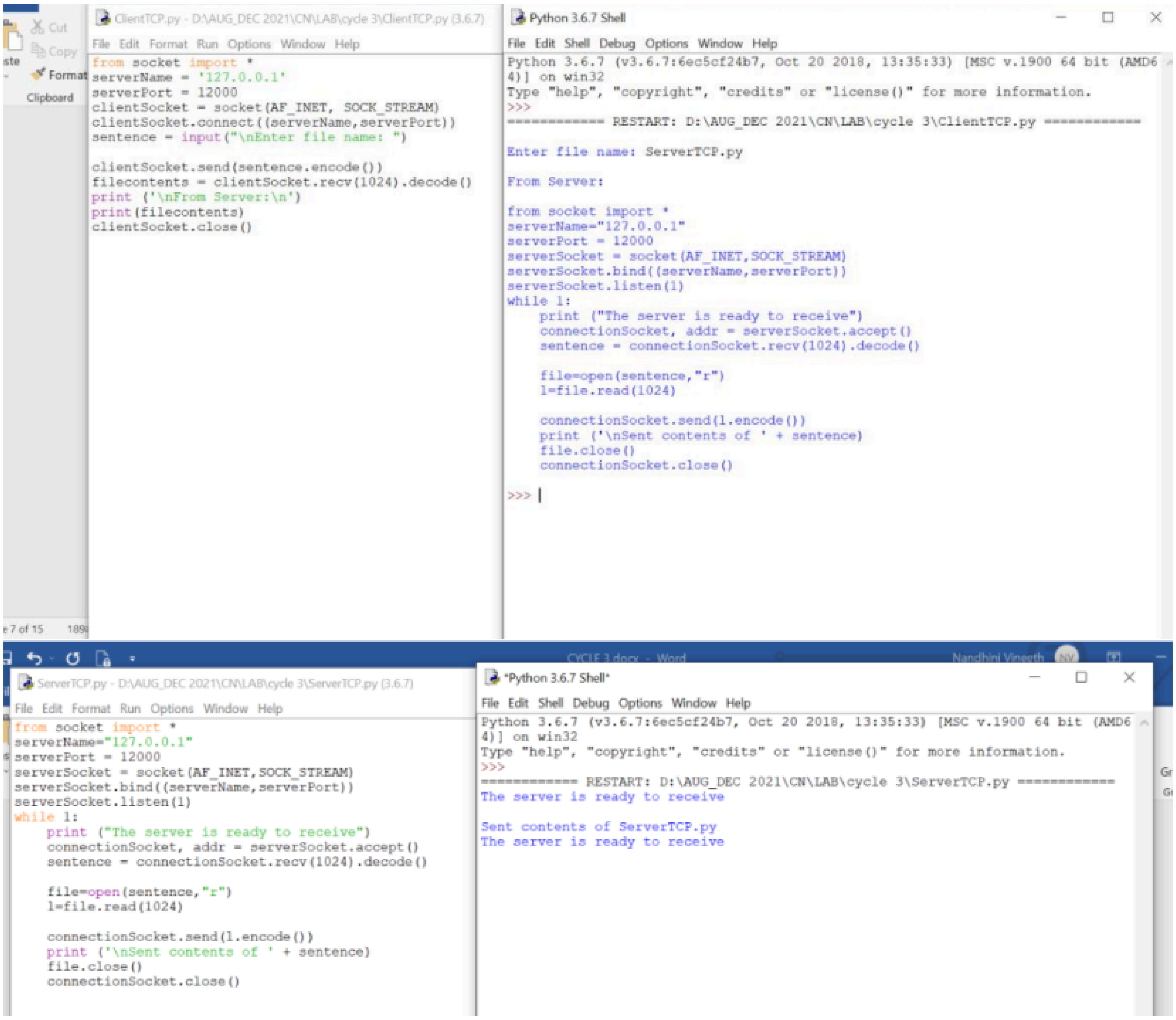
```
from socket import *
serverName="127.0.0.1"
serverPort = 12000
serverSocket = socket(AF_INET,SOCK_STREAM)
serverSocket.bind((serverName,serverPort))
serverSocket.listen(1)
while 1:
    print ("The server is ready to receive")
    connectionSocket, addr = serverSocket.accept()
    sentence = connectionSocket.recv(1024).decode()

    file=open(sentence,"r")
    l=file.read(1024)

    connectionSocket.send(l.encode())
    print ('\nSent contents of ' + sentence)
    file.close()
    connectionSocket.close()
```

```
Python 3.6.7 (v3.6.7:6ec5cf24b7, Oct 20 2018, 13:35:33) [MSC v.1900 64 bit (AMD6
4)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
============ RESTART: D:\AUG_DEC 2021\CN\LAB\cycle 3\ServerTCP.py ============
The server is ready to receive
```


ClientTCP.py - D:\AUG_DEC 2021\CN\LAB\cycle 3\ClientTCP.py (3.6.7)
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Python 3.6.7 Shell
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CYCLE 3.docx - Word
Nandhini Vineeth
ServerTCP.py - D:\AUG_DEC 2021\CN\LAB\cycle 3\ServerTCP.py (3.6.7)
File Edit Format Run Options Window Help
Python 3.6.7 Shell
File Edit Shell Debug Options Window Help

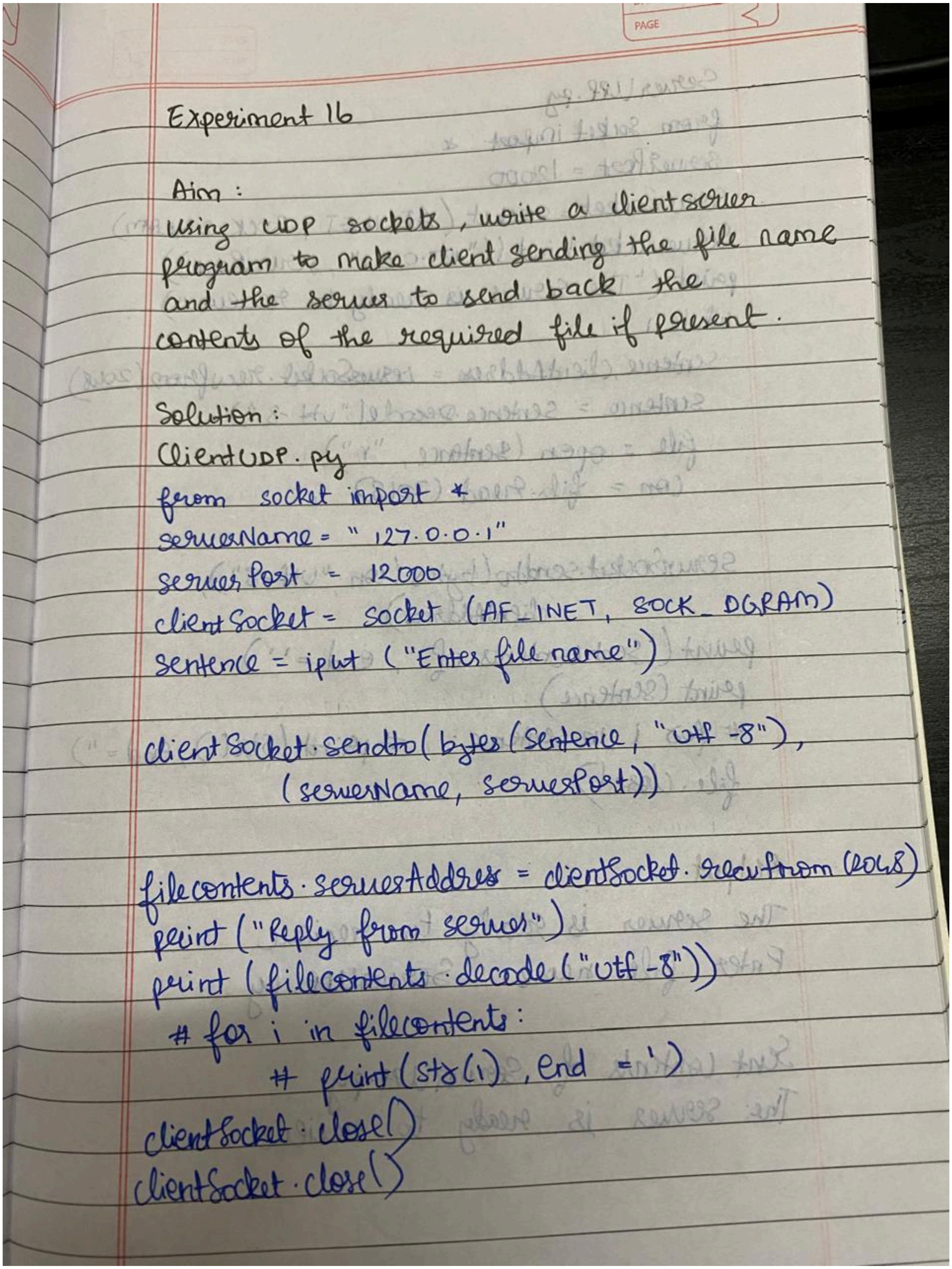
```
from socket import *
serverName = '127.0.0.1'
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_STREAM)
clientSocket.connect((serverName,serverPort))
sentence = input("\nEnter file name: ")

clientSocket.send(sentence.encode())
filecontents = clientSocket.recv(1024).decode()
print ('\nFrom Server:\n')
print(filecontents)
clientSocket.close()
```

```
Python 3.6.7 (v3.6.7:6ec5cf24b7, Oct 20 2018, 13:35:33) [MSC v.1900 64 bit (AMD6
4)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
============ RESTART: D:\AUG_DEC 2021\CN\LAB\cycle 3\ClientTCP.py ============

Enter file name: ServerTCP.py

From Server:

from socket import *
serverName="127.0.0.1"
serverPort = 12000
serverSocket = socket(AF_INET,SOCK_STREAM)
serverSocket.bind((serverName,serverPort))
serverSocket.listen(1)
while 1:
    print ("The server is ready to receive")
    connectionSocket, addr = serverSocket.accept()
    sentence = connectionSocket.recv(1024).decode()

    file=open(sentence,"r")
    l=file.read(1024)

    connectionSocket.send(l.encode())
    print ('\nSent contents of ' + sentence)
    file.close()
    connectionSocket.close()

>>> |
```

```
from socket import *
serverName="127.0.0.1"
serverPort = 12000
serverSocket = socket(AF_INET,SOCK_STREAM)
serverSocket.bind((serverName,serverPort))
serverSocket.listen(1)
while 1:
    print ("The server is ready to receive")
    connectionSocket, addr = serverSocket.accept()
    sentence = connectionSocket.recv(1024).decode()

    file=open(sentence,"r")
    l=file.read(1024)

    connectionSocket.send(l.encode())
    print ('\nSent contents of ' + sentence)
    file.close()
    connectionSocket.close()
```

```
Python 3.6.7 (v3.6.7:6ec5cf24b7, Oct 20 2018, 13:35:33) [MSC v.1900 64 bit (AMD6
4)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
============ RESTART: D:\AUG_DEC 2021\CN\LAB\cycle 3\ServerTCP.py ============
The server is ready to receive

Sent contents of ServerTCP.py
The server is ready to receive
```

Experiment 16



Experiment 16

Aim :

Using UDP sockets, write a client server program to make client sending the file name and the server to send back the contents of the required file if present.

Solution :

ClientUDP.py

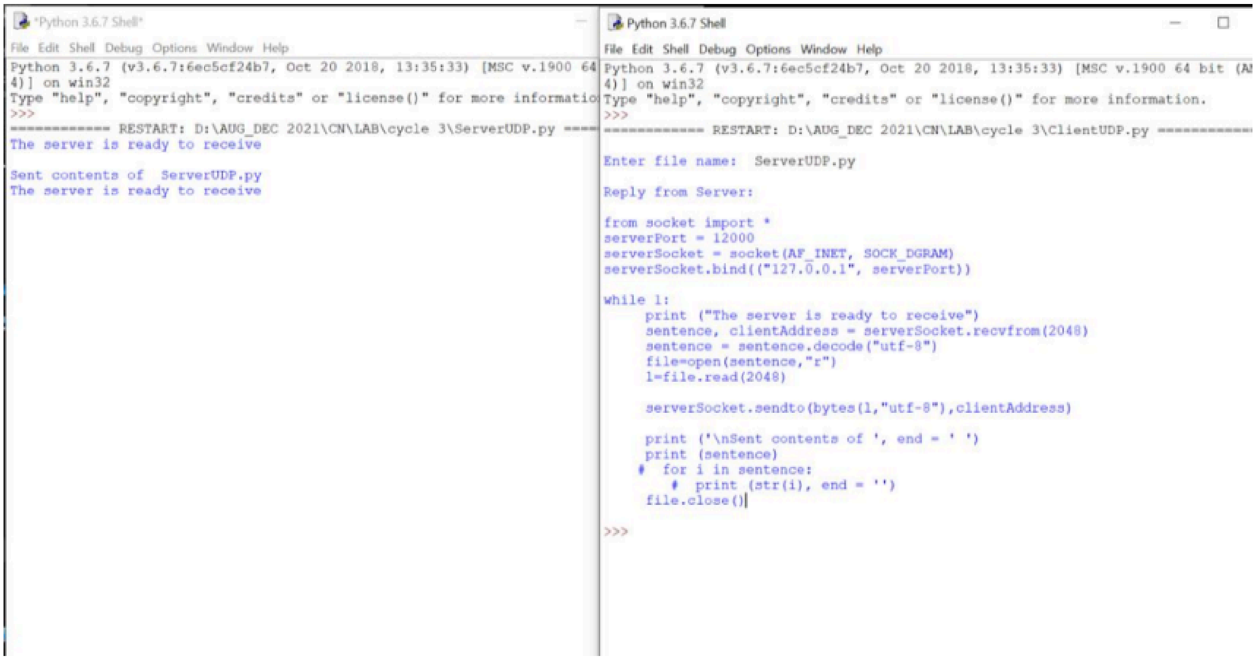
```
from socket import *
serverName = "127.0.0.1"
server Port = 12000
client Socket = socket (AF_INET, SOCK_DGRAM)
sentence = iput ("Enter file name")

client Socket.sendto(bytes(sentence, "utf -8"),
            (serverName, serverPort))

filecontents.serverAddress = clientSocket.recvfrom (2048)
print ("Reply from server")
print (filecontents.decode ("utf -8"))
 # for i in filecontents:
       # print(str(i), end ='')
clientSocket.close()
clientSocket.close()
```

ServerUDP.py

```
from socket import *
serverPort = 12000
serverSocket = socket (AF_INET, SOCK_DGRAM)
serverSocket.bind (("127.0.0.1", serverPort))
print ("The server is ready to recieve")
while 1 :
  sentence, clientAddress = serverSocket.recvfrom(20
   sentence = sentence.Decode("utf-8")
    file = open (sentence, "r")
     con = file.read (2048)

  serverSocket.sendto(bytes (con, "utf-8"),
                      clientAddress)
print ('Sent contents of', end ='')
print (sentence)
 # for i in sentence :  # print (str(i), end='')
 file.close()
```

Output :

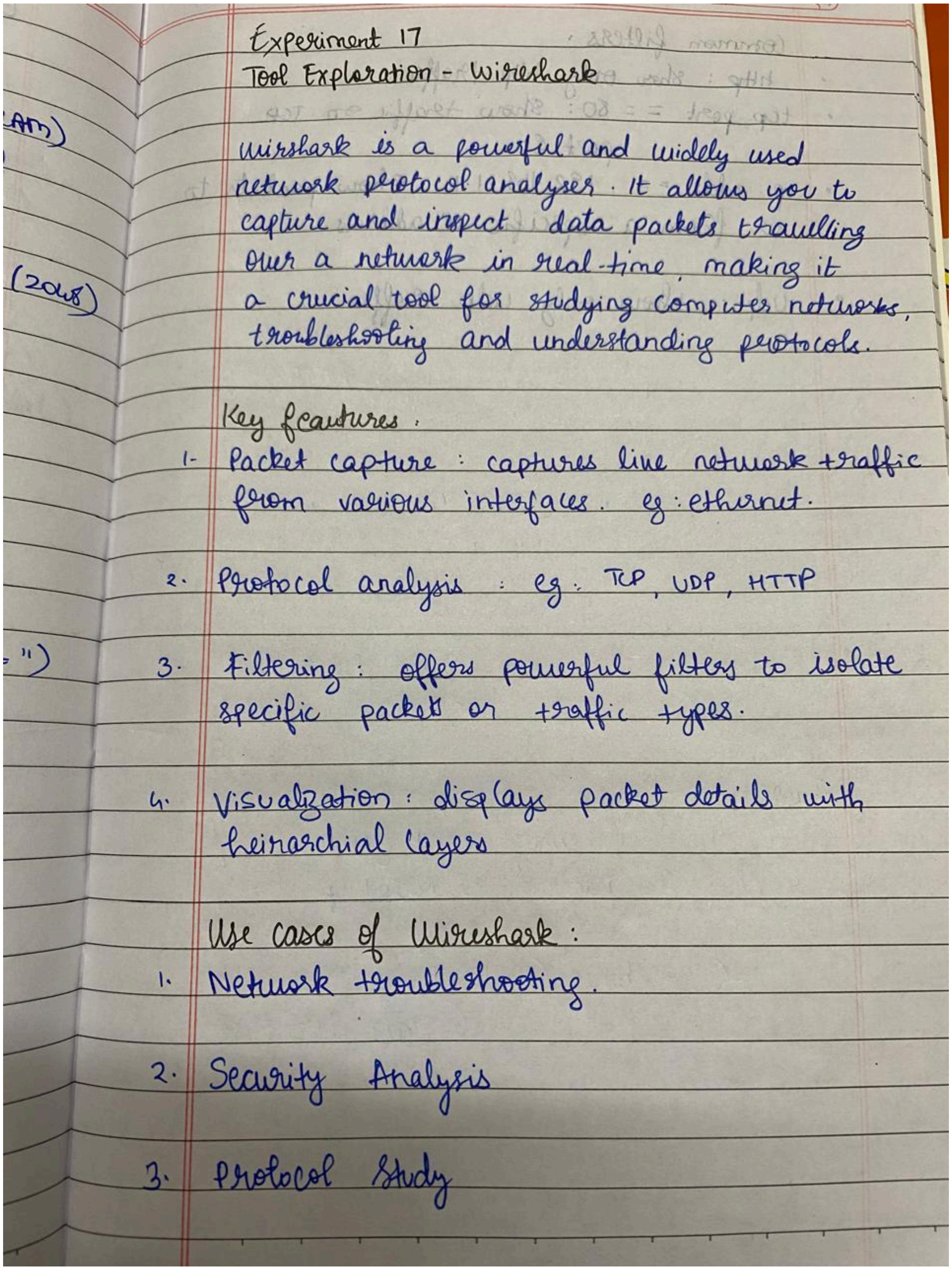
```
The server is ready to recieve
Enter file name : ServerUDP.py

Sent contents of ServerUDP.py
The server is ready to recieve.
```


Python 3.6.7 Shell
File Edit Shell Debug Options Window Help
Python 3.6.7 Shell
File Edit Shell Debug Options Window Help

```
Python 3.6.7 (v3.6.7:6ec5cf24b7, Oct 20 2018, 13:35:33) [MSC v.1900 64
4)] on win32
Type "help", "copyright", "credits" or "license()" for more informatio
>>>
============ RESTART: D:\AUG_DEC 2021\CN\LAB\cycle 3\ServerUDP.py ====
The server is ready to receive

Sent contents of  ServerUDP.py
The server is ready to receive
```

```
Python 3.6.7 (v3.6.7:6ec5cf24b7, Oct 20 2018, 13:35:33) [MSC v.1900 64 bit (AM
4)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
============ RESTART: D:\AUG_DEC 2021\CN\LAB\cycle 3\ClientUDP.py ============

Enter file name:  ServerUDP.py

Reply from Server:

from socket import *
serverPort = 12000
serverSocket = socket(AF_INET, SOCK_DGRAM)
serverSocket.bind(("127.0.0.1", serverPort))

while 1:
     print ("The server is ready to receive")
     sentence, clientAddress = serverSocket.recvfrom(2048)
     sentence = sentence.decode("utf-8")
     file=open(sentence,"r")
     l=file.read(2048)

     serverSocket.sendto(bytes(l,"utf-8"),clientAddress)

     print ('\nSent contents of ', end = ' ')
     print (sentence)
    #  for i in sentence:
        #  print (str(i), end = '')
     file.close()

>>>
```

Experiment 17



Experiment 17
Tool Exploration - Wireshark

wirshark is a powerful and widely used network protocol analyser. It allows you to capture and inspect data packets travelling over a network in real-time, making it a crucial tool for studying computer networks, troubleshooting and understanding protocols.

Key features.

1. Packet capture : captures live network traffic from various interfaces. eg: ethernet.

2. Protocol analysis : eg: TCP, UDP, HTTP

3. Filtering : offers powerful filters to isolate specific packets or traffic types.

4. Visualzation : displays packet details with heirarchial layers

Use cases of Wireshark :

1. Network troubleshooting.

2. Security Analysis

3. Protocol Study

Common filters:

- http : show only http traffic
- tcp.port == 80: show traffic on TCP port 80.
- ip.addr == 192.168.1.1: show packets to or from a specific IP address.
- udp: show only udp traffic.