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Lab report no : 03
Name of the lab report: Socket programming

Objectives:

- ✔ learn server and client
- ✔ learn socket programming
- ✔ learn TCP,UDP.

Theory:

Sockets are the endpoints of a bidirectional communications channel. Sockets may communicate within a process, between processes on the same machine, or between processes on different continents.

Sockets may be implemented over a number of different channel types: Unix domain sockets, TCP, UDP, and so on. The *socket* library provides specific classes for handling the common transports as well as a generic interface for handling the rest.

Server socket methods:

- ✔ **s.bind()**

  This method binds address (hostname, port number pair) to socket.

- ✔ **s.listen()**
  This method sets up and start TCP listener

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- ✔ **s.accept()**

  This passively accept TCP client connection, waiting until connection arrives (blocking).

Client socket methods:

- ✔ **s.connect()**

  This method actively initiates TCP server connection.

General Socket Methods:

- s.recv()

  This method receives TCP message
- s.send()

  This method transmits TCP message
- s.recvfrom()

  This method receives UDP message
- s.sendto()

  This method transmits UDP message
- s.close()

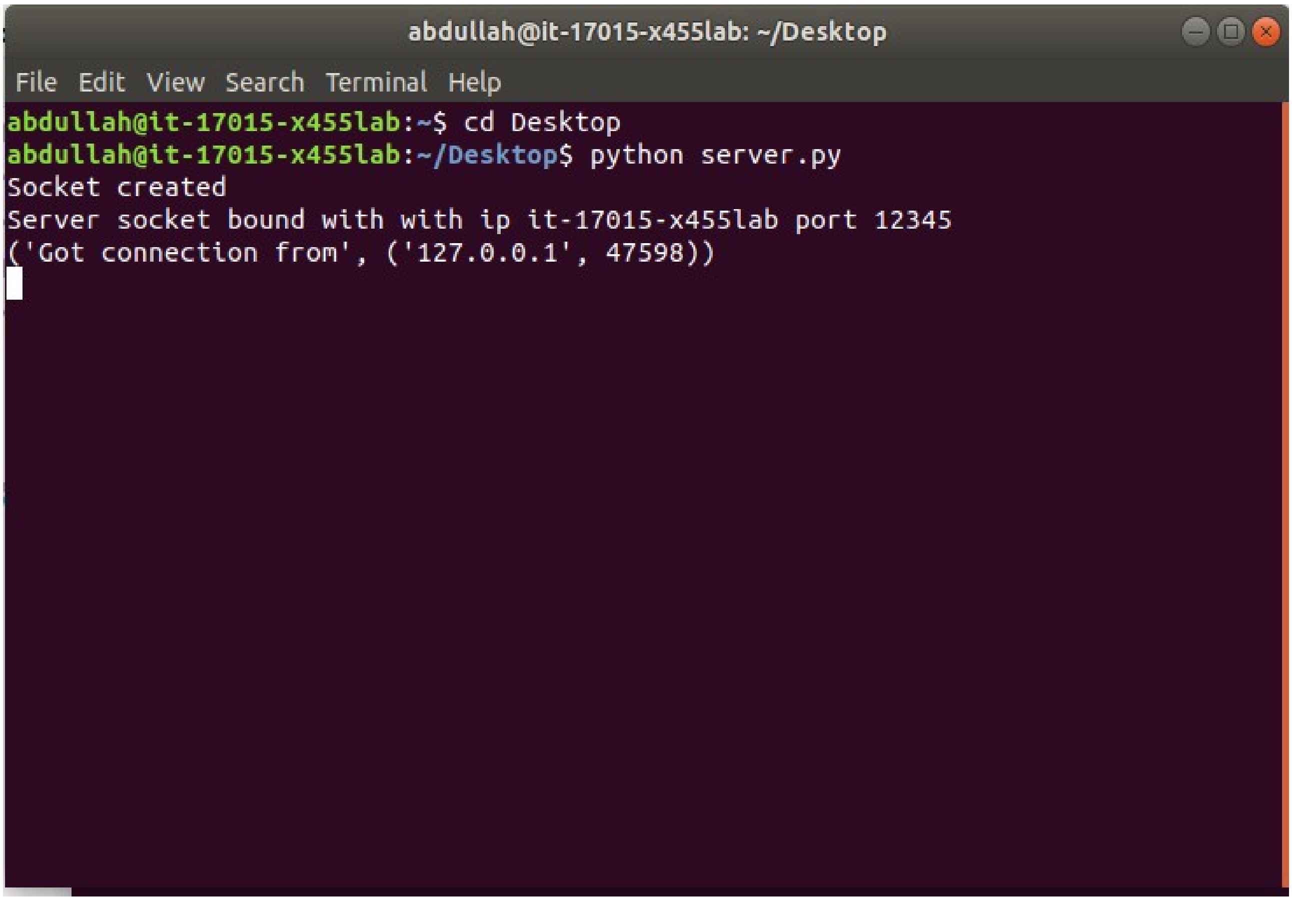
  This method closes socket
- socket.gethostname()

  Returns the hostname.

Simple server program:

```
import socket                                              # Import socket module
s = socket.socket(socket.AF_INET,socket.SOCK_STREAM)
print('Socket created')                                    # Create a socket object
host = socket.gethostname()                                 # Get local machine name
port = 12345                                                # Reserve a port for your service.
s.bind((host, port))
print("Server socket bound with with ip {} port {}".format(host, port))
                                                               # Bind to the port
s.listen(5)                                                    # Now wait for client connection.
while True:
   c, addr = s.accept()                                        # Establish connection with client.
   print('Got connection from', addr)
   c.send('Thank you for connecting')
   c.close()
```

Output:



abdullah@it-17015-x455lab: ~/Desktop
File Edit View Search Terminal Help

```
abdullah@it-17015-x455lab:~$ cd Desktop
abdullah@it-17015-x455lab:~/Desktop$ python server.py
Socket created
Server socket bound with with ip it-17015-x455lab port 12345
('Got connection from', ('127.0.0.1', 47598))
```

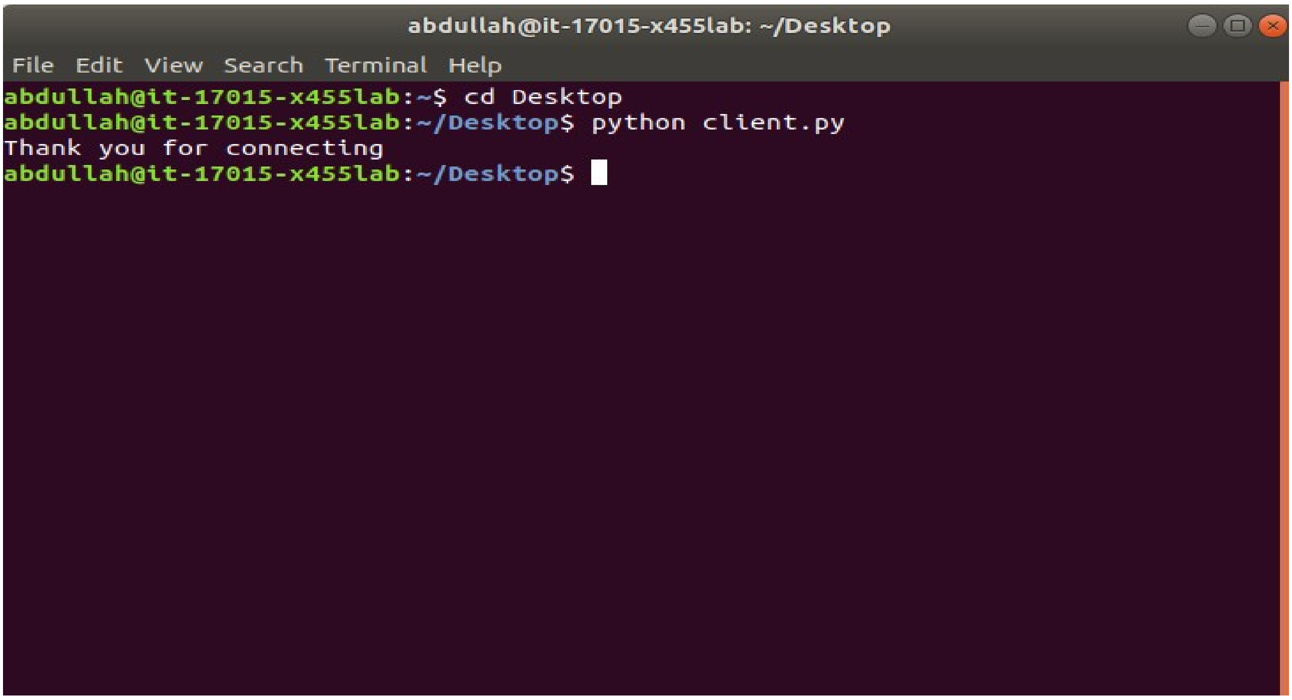
Simple client programming:

```
import socket                                               # Import socket module

s = socket.socket(socket.AF_INET,socket.SOCK_STREAM)        # Create a socket object
host = socket.gethostname() # Get local machine name
port = 12345                                                # Reserve a port for your service.

s.connect((host, port))
msg=s.recv(1024)
print (msg.decode('utf-8'))
s.close()                                                   # Close the socket when done
```

Client Output:



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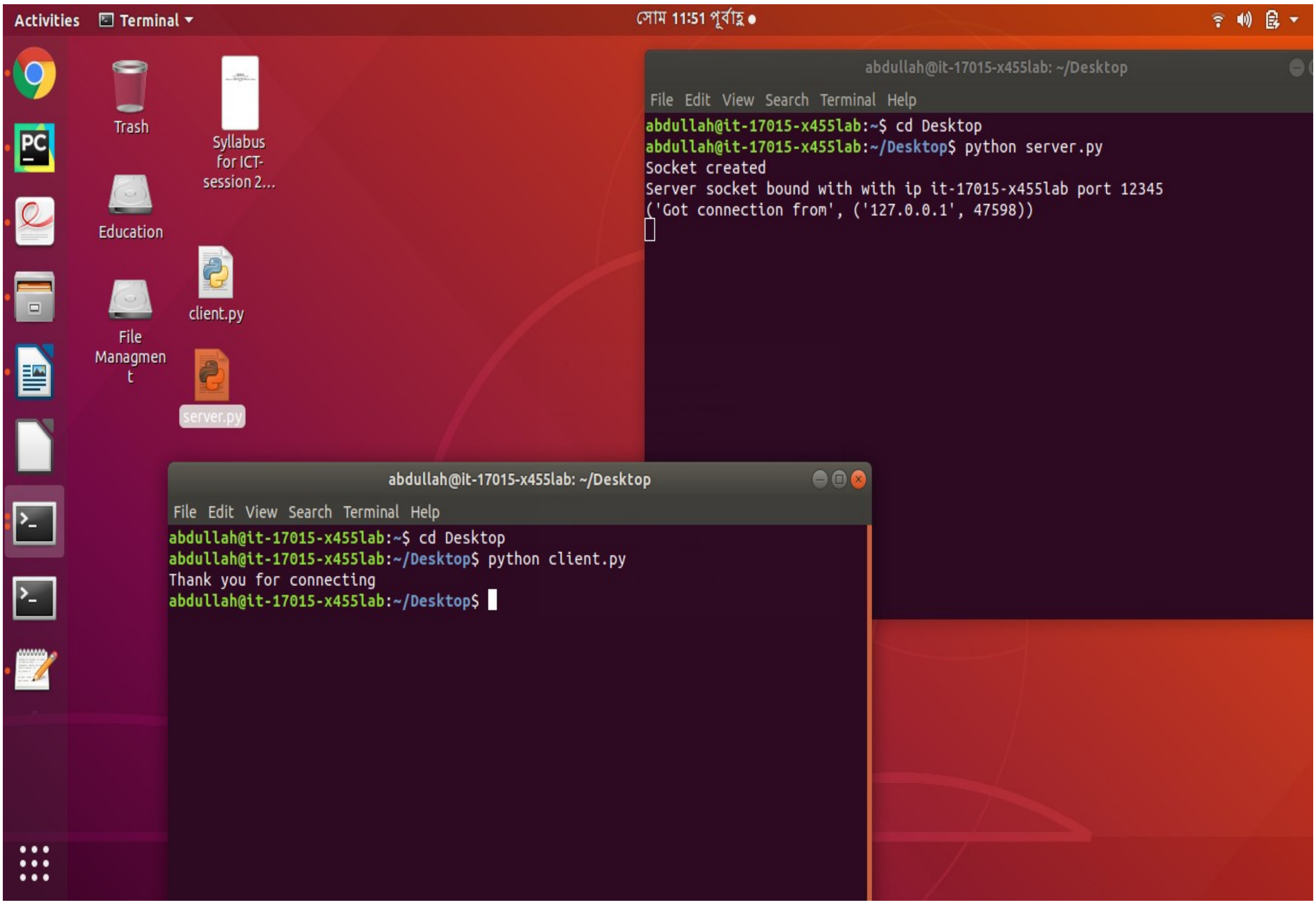
```
abdullah@it-17015-x455lab:~$ cd Desktop
abdullah@it-17015-x455lab:~/Desktop$ python client.py
Thank you for connecting
abdullah@it-17015-x455lab:~/Desktop$ 
```

Server and client output:



Activities
Terminal
সোম 11:51 পূর্বাহ্ন
Trash
Syllabus for ICT-session 2...
Education
client.py
File Managment
server.py
abdullah@it-17015-x455lab: ~/Desktop
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```
abdullah@it-17015-x455lab:~$ cd Desktop
abdullah@it-17015-x455lab:~/Desktop$ python server.py
Socket created
Server socket bound with with ip it-17015-x455lab port 12345
('Got connection from', ('127.0.0.1', 47598))
```

abdullah@it-17015-x455lab: ~/Desktop
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```
abdullah@it-17015-x455lab:~$ cd Desktop
abdullah@it-17015-x455lab:~/Desktop$ python client.py
Thank you for connecting
abdullah@it-17015-x455lab:~/Desktop$ 
```