MAWLANA BHASHANI SCIENCE AND TECHNOLOGY UNIVERSITY

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Lab Report No	**:**	**06**
Lab Report Name	**:**	Programing with Python
Course Name	**:**	Computer Networks Lab
Course Code	**:**	ICT - 3208

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Objective :

The objective of this lab is to:

- Understand how python function works
- Understand the use of global and local variables
- Understand how python modules works

Learning the basis of networking programing with python

Theory: Python is an exceptionally basic programming language so regardless of whether you are new to programming, you can learn python without confronting any issues. Python is allowed to download and utilize. This implies you can download it for nothing and use it in your application.

Python is a broadly useful language now and then alluded to as utilitarian which is intended to be easy to peruse and compose. The point that it is anything but a mind boggling language is significant. The fashioners set less of an accentuation on regular grammar, which makes it simpler to work with, in any event, for non-software engineers or designers.

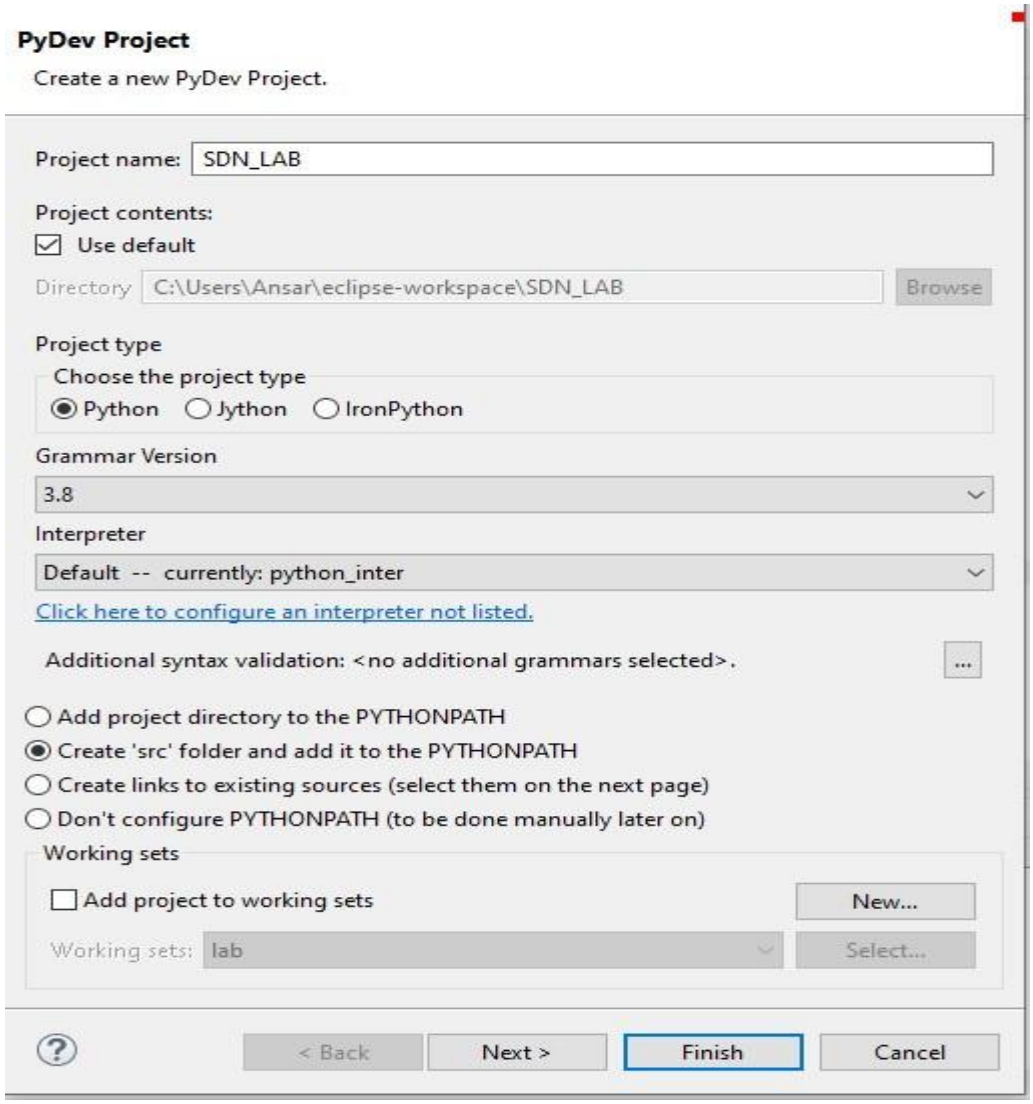
Moreover, in light of the fact that it's considered really all inclusive and used to meet different improvement needs, it's a language that offers a ton of choices to software engineers all in all. On the off chance that they start working with Python for one work or vocation, they can undoubtedly bounce to another, regardless of whether it's in a disconnected industry. The language is utilized for framework tasks, web improvement, worker and authoritative instruments, sending, logical demonstrating and considerably more.

In any case, shockingly, numerous engineers don't get Python as their essential language. Since it's so natural to utilize and learn, they pick it as a second or third language. This might be another motivation behind why it's so well known among engineers.

Additionally, for reasons unknown one of the greatest tech organizations on the planet Google utilizes the language for some of their applications. They even have a designer entry gave to Python, with free classes offered including works out, address recordings and then some.

What's more, the ascent in the utilization of the Django system for web improvement and a decrease in notoriety of PHP has additionally added to Python's prosperity, at the same time, at last, it's the ideal tempest the perfect measure of designer and authority uphold, just as request.

Exercise 4.1.1: Create a python project using with SDN_LAB Ans:

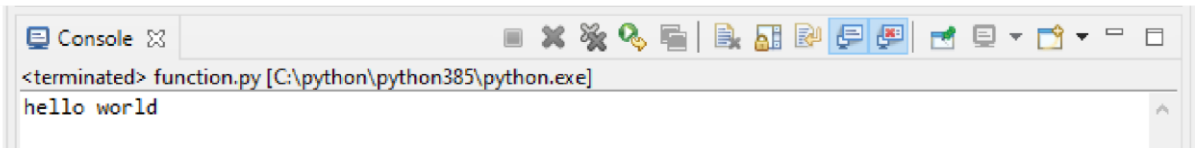


Exercise 4.1.2: Python function (save as function.py)

Create python scrip using the syntax provided below.

```
def say_hello():  print('hello world')


if __name__ == '__main__':     say_hello()
```

The output of this code is:

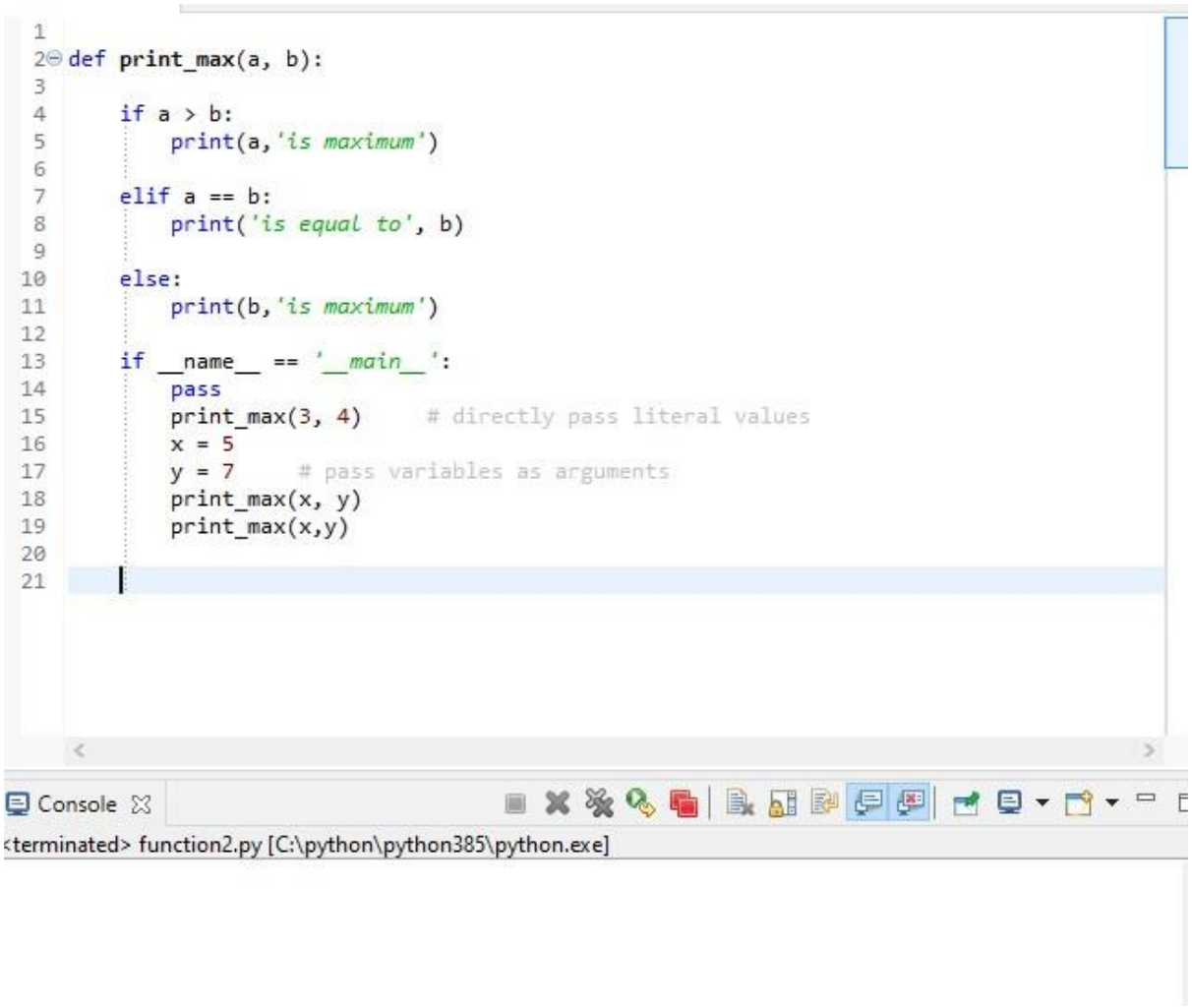


Exercise 4.1.3: Python function (save as function_2.py) Create python scrip using the syntax provided below. def print_max(a, b):

```
if a > b:

print(a, 'is maximum')

elif a == b:

 print(a, 'is equal to', b)      else:

print(b, 'is maximum')          if

__name__ == '__main__':

pass      print_max(3, 4)     # directly pass literal values

x = 5

y = 7     # pass variables as arguments      print_max(x, y)
```

Which is the output of this function? Does the function need any parameter?

Ans: The code does not show any output. May be there is some problem in this code.



This function does not need any parameter .

Exercise 4.1.4: Local variable (save as function_local.py) Create python scrip using the syntax provided below.

x = 50 def func(x): print('x is', x)

x = 2 print('Changed local x to', x)

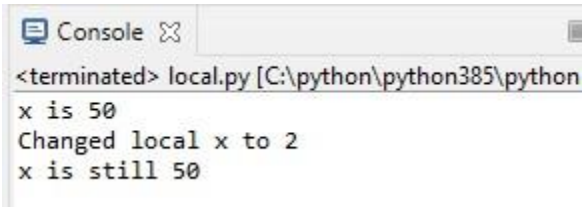
if __name__ == '__main__':

func(x)

print('x is still', x)

Which is the final value of variable x? Why variable x does not change to 2?

Ans: Output is:



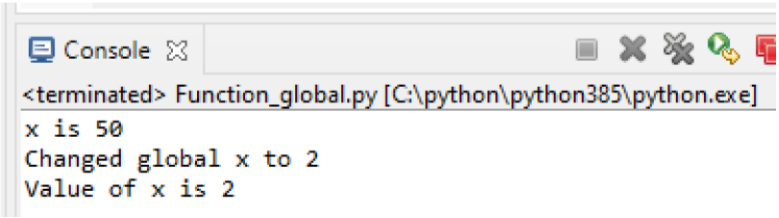
The final value of variable x is 50. It does not change because it is a global variable.

Exercise 4.1.5: Global variable (save as function_global.py) Create python scrip using the syntax provided below.

```
x = 50  def func():
global x      print('x
is', x)      x = 2

print('Changed global x to', x)  if
__name__ == '__main__':

func()      print('Value of x
is', x)
```

Which is the final value of variable x? Why variable x change this time?

Ans: Output is:



This time variable x is declared as global inside the function .So the variable x is changed.

Exercise 4.1.6: Python modules Create python scrip using the syntax provided below (save as mymodule.py).

```
def say_hi():
print('Hi, this is mymodule speaking.')
 __version__ = '0.1'
```

Create python scrip using the syntax provided below (save as module_demo.py).

import mymodule if __name__ ==

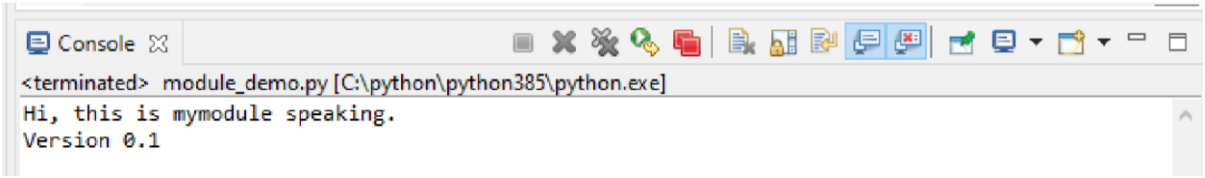
'__main__':

mymodule.say_hi() print('Version',

mymodule.__version__) Run the script,

which is the role of import?

Ans: Output is:



Python modules can get access to code from another module by importing the file/function using import.
The import statement is the most common way of invoking the import machinery, but it is not the only way.
When import is used, it searches for the module initially in the local scope by calling __import__() function

Create python scrip using the syntax provided below (save as module_demo2.py). from

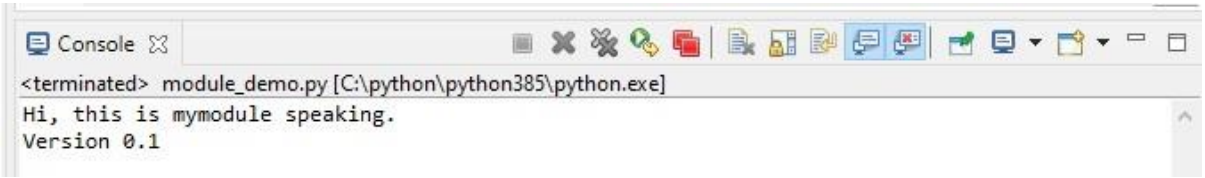
mymodule import say_hi, __version__

if __name__ == '__main__': say_hi()

print('Version', __version__)

Run the script, which is the role of from, import?

Ans: Output is :



Using **'from'** we say the module name and then using **'import'** we say what we are importing from the module.

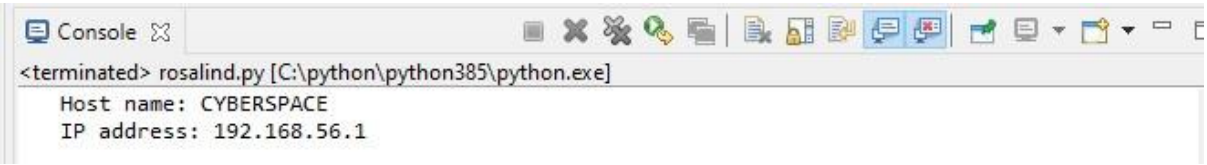
4. 2.1: Printing your machine's name and IPv4 address Create python scrip using the syntax provided below (save as local_machine_info.py): import socket

def print_machine_info():

```
host_name = socket.gethostname()      ip_address =

socket.gethostbyname(host_name) print ("   Host

name: %s" % host_name)      print ("   IP address: %s"

% ip_address)  if __name__ == '__main__':


print_machine_info()
```

Run the script, which module the program uses? Provide two additional functions of socket?

Ans:



The *type* argument specifies the socket type, which determines the semantics of communication over the socket. The following socket types are defined; implementations may specify additional socket types:

SOCK_STREAM
: Provides sequenced, reliable, bidirectional, connection-mode byte streams, and may provide a transmission mechanism for out-of-band data.

SOCK_DGRAM
: Provides datagrams, which are connectionless-mode, unreliable messages of fixed maximum length.

SOCK_SEQPACKET
: Provides sequenced, reliable, bidirectional, connection-mode transmission paths for records. A record can be sent using one or more output operations and received using one or more input operations, but a single operation never transfers part of more than one record. Record boundaries are visible to the receiver via the MSG_EOR flag.

Exercise 4.2.2: Retrieving a remote machine's IP address Create python scrip using the syntax provided below (save as remote_machine_info.py):

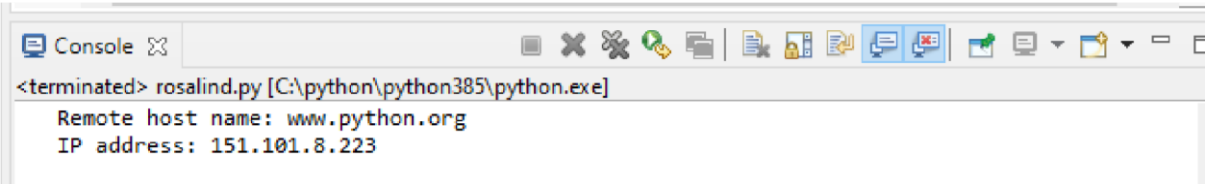
```
import socket  def

get_remote_machine_info():

remote_host = 'www.python.org'


 try:

 print ("   Remote host name: %s" % remote_host)         print ("   IP

address: %s" %socket.gethostbyname(remote_host))      except

socket.error as err_msg:
```

print ("Error accesing %s: error number and detail %s" %(remote_host, err_msg)) if

__name__ == '__main__': get_remote_machine_info()

Run the script, which is the output? Modify the code for getting the RMIT website info.

Ans:



RMIT website info:

Code: import socket

def

get_remote_machine_i

nfo(): __remote_host

= *'www.rmit.org'*

try: print ("

Remote host name: %s"

% remote_host)

print (" *IP address: %s"*

%socket.gethostbynam

e(remote_host))

except socket.error as

err_msg: print

("*Error accesing %s:*

error number and detail

%s" %(remote_host,

err_msg)) if

__name__ ==

'__main__':

get_remote_machine_i

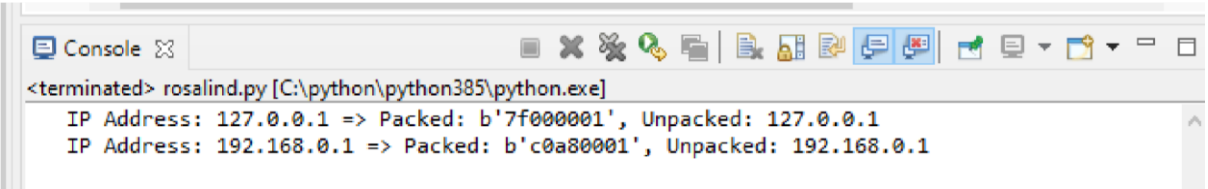
nfo() **Output:**

Exercise 4.2.3: Converting an IPv4 address to different formats Create python scrip using the syntax below (save as ip4_address_conversion.py):

```
import socket from binascii import hexlify  def
convert_ip4_address():      for ip_addr in
['127.0.0.1', '192.168.0.1']:

 packed_ip_addr = socket.inet_aton(ip_addr)        unpacked_ip_addr =
socket.inet_ntoa(packed_ip_addr)

print ("   IP Address: %s => Packed: %s, Unpacked: %s" %(ip_addr, hexlify(packed_ip_addr),
unpacked_ip_addr))   if __name__ == '__main__':

 convert_ip4_address()
```

Run the script, which is the output? How binascii works?

Ans:



Binascii:

The **binascii** module contains a number of methods to convert between binary and various ASCIIencoded binary representations. ... Convert binary data to a line of ASCII characters, the return value is the converted line, including a newline char. The length of data should be at most 45.

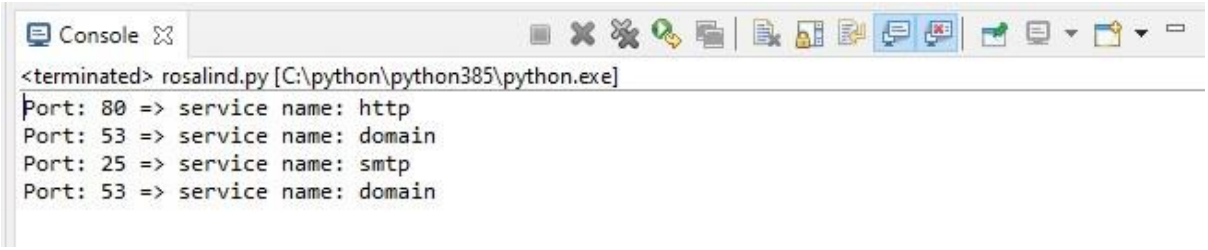
Exercise 4.2.4: Finding a service name, given the port and protocol

```
import socket  def find_service_name():        protocolname = 'tcp'        for port in [80, 25]:              print ("Port:
%s => service name: %s" %(port, socket.getservbyport(port, protocolname)))
```

```
    print ("Port: %s => service name: %s" %(53, socket.getservbyport(53, 'udp')))
 if __name__ == '__main__':
find_service_name()
```

Run the script, which is the output? Modify the code for getting complete the table:

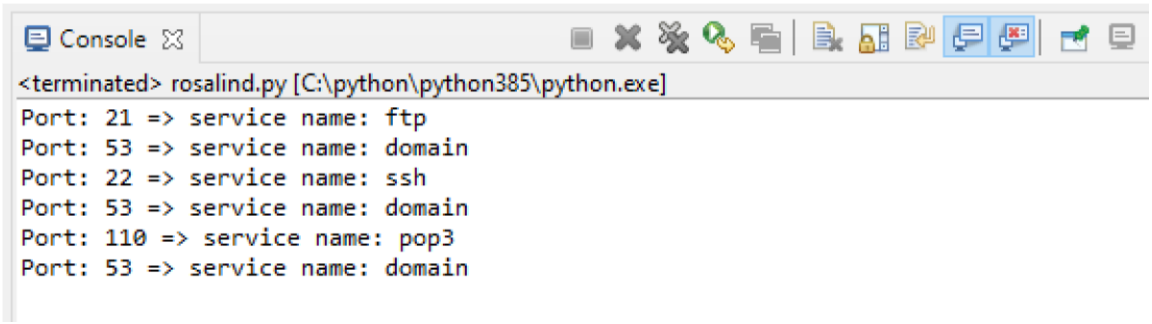
Output:



For the given port the code will be:

```
import socket  def find_service_name():        protocolname = 'tcp'        for port in [21,22,110]:                print
("Port: %s => service name: %s" %(port, socket.getservbyport(port, protocolname)))
    print ("Port: %s => service name: %s" %(53, socket.getservbyport(53, 'udp')))
 if __name__ == '__main__':
```

find_service_name() **Output:**

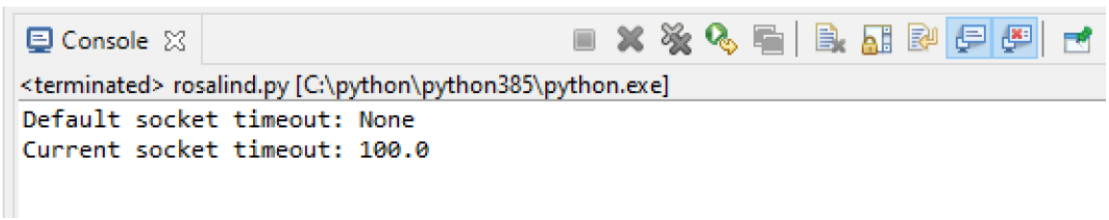


Exercise 4.2.5: Setting and getting the default socket timeout

```
import socket
 def test_socket_timeout():        s = socket.socket(socket.AF_INET,
socket.SOCK_STREAM)        print ("Default socket timeout: %s" %s.gettimeout())
   s.settimeout(100)
   print ("Current socket timeout: %s" %s.gettimeout())

if __name__ == '__main__':    test_socket_timeout()
```

Run the script, which is the role of socket timeout in real applications?

Output:



A **socket timeout** implementation should allow for setting the timeout at ... For **example**, this is how we connect to a local HTTP server on port 80 ... It can be implemented as a method that we add to IO::Socket::INET class, possibly by using a **Role**. ... The **real** version handles EINTR and other corner cases. **Exercise 4.2.6: Writing a simple echo client/server application (Tip: Use port 9900)**

Ans:

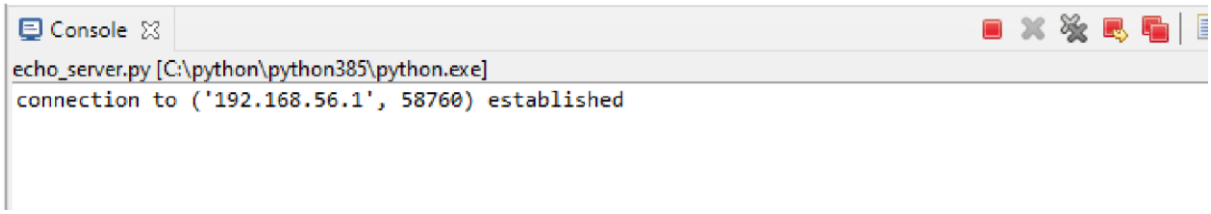
Server:

```
import socket

s= socket.socket(socket.AF_INET,socket.SOCK_STREAM)
s.bind((socket.gethostname(),1022))
s.listen(5) while True:    clt,adr =
s.accept()
  print(f"connection to {adr} established")
  clt.send(bytes("Socket programming in python","utf-8"))
```

Client:

```
import socket
s = socket.socket(socket.AF_INET,socket.SOCK_STREAM)
s.connect((socket.gethostname(),1022)) msg = s.recv(1022)
print(msg.decode("utf-8"))
```

Output:



Conclusion : In this lab we have taken in the fundamental idea of python programming and attachment programming in python. In Python we have figured out how to characterize a capacity, neighborhood and worldwide factors. Utilizing the Python program, we figured out how to recuperate our machine's hostname, IP address, and

how to recoup the IP address of a far off machine. We realize how to interface clientside and worker side utilizing the Python program.

The End