Mawlana Bhashani Science and Technology University

Lab-Report

Course Title : Computer Networks Lab
Lab Report No: 02
Lab Report Name: Programming with Python

Submitted by

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Theory:

Python Functions: Functions are a convenient way to divide your code into useful blocks, allowing us to order our code, make it more readable, reuse it and save some time. Also functions are a key way to define interfaces so programmers can share their code. They allow you to give a name to a block of statements, allowing you to run that block using the specified name anywhere in the program and any number of times. This is known as calling the function.

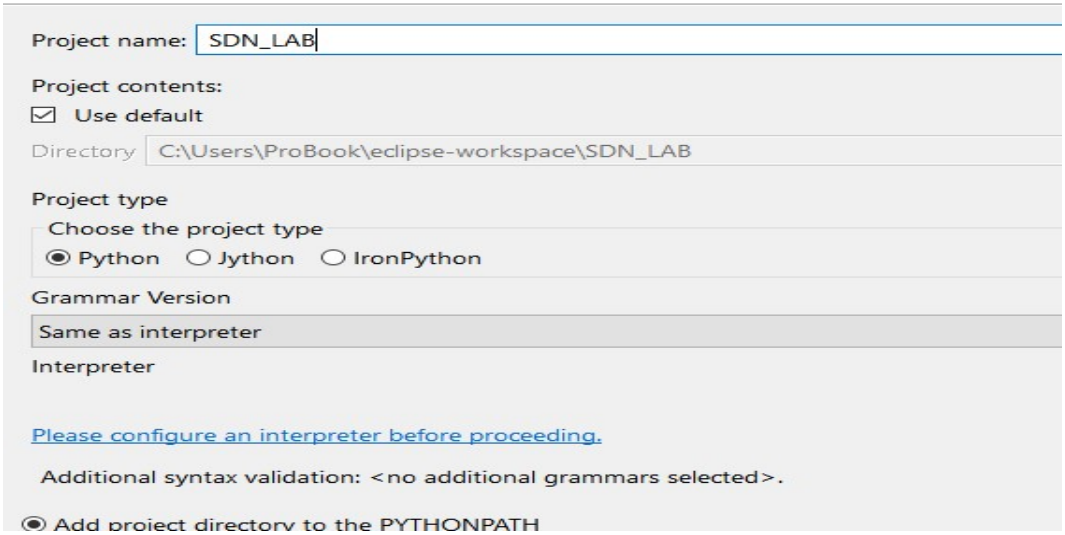
Local Variables: Variables declared inside a function definition are not related in any way to other variables with the same names used outside the function (variable names are local to the function). This is called the scope of the variable. All variables have the scope of the block they are declared in starting from the point of definition of the name.

The Global Statement: Variables defined at the top level of the program are intended global. Global variables are intended to be used in any functions or classes). Global statement allows defining global variables inside functions as well.

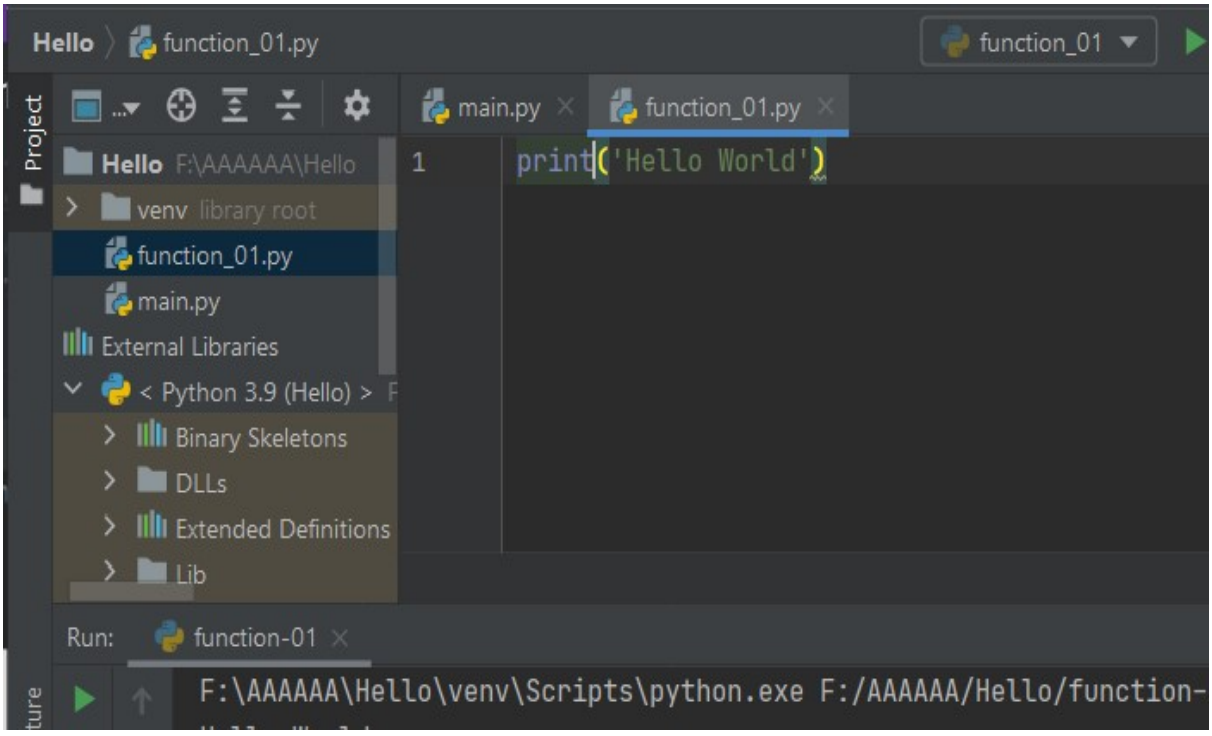
Modules: Modules allow reusing a number of functions in other programs.

Exercises:

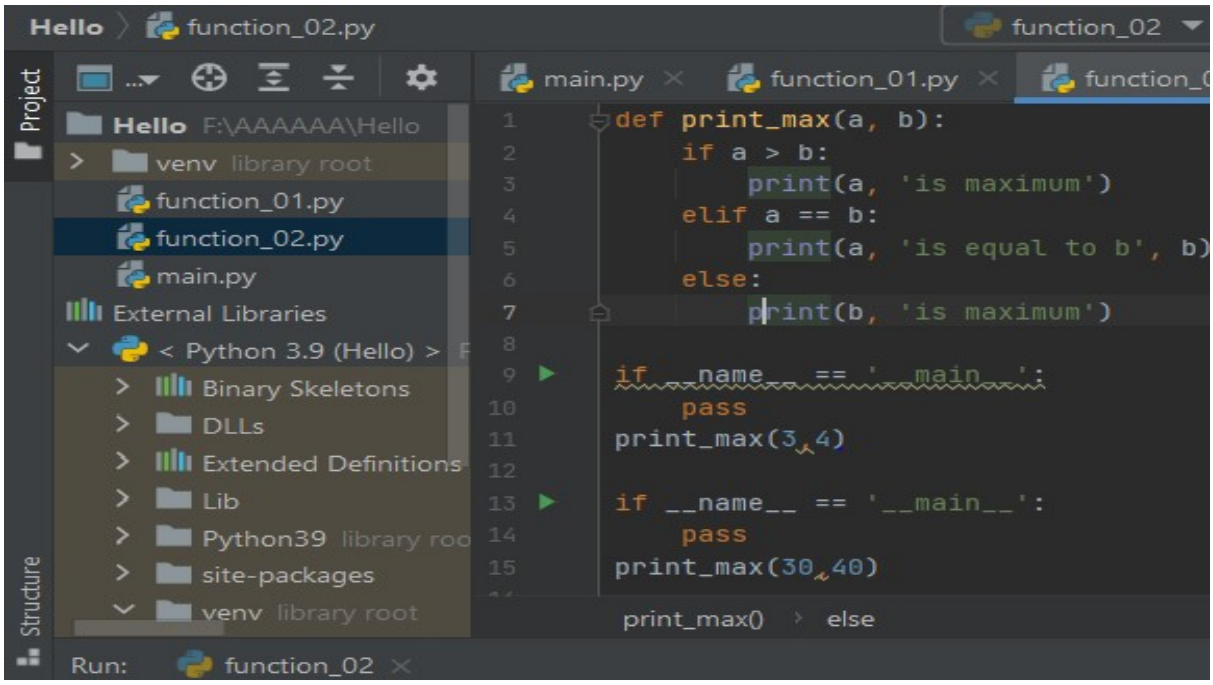
Exercise 4.1.1: Create a python project using with SDN_LAB



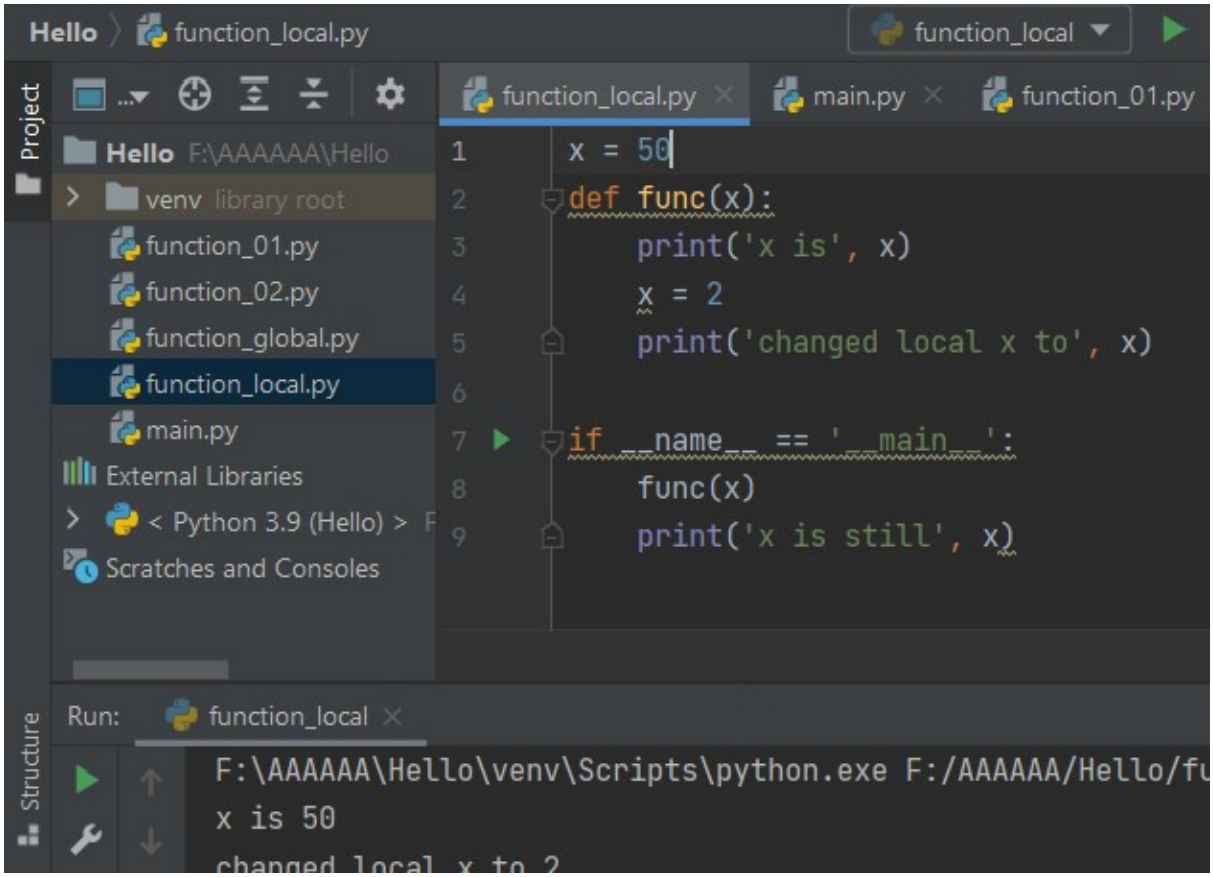
Exercise 4.1.2: Python function (save as function_01.py)



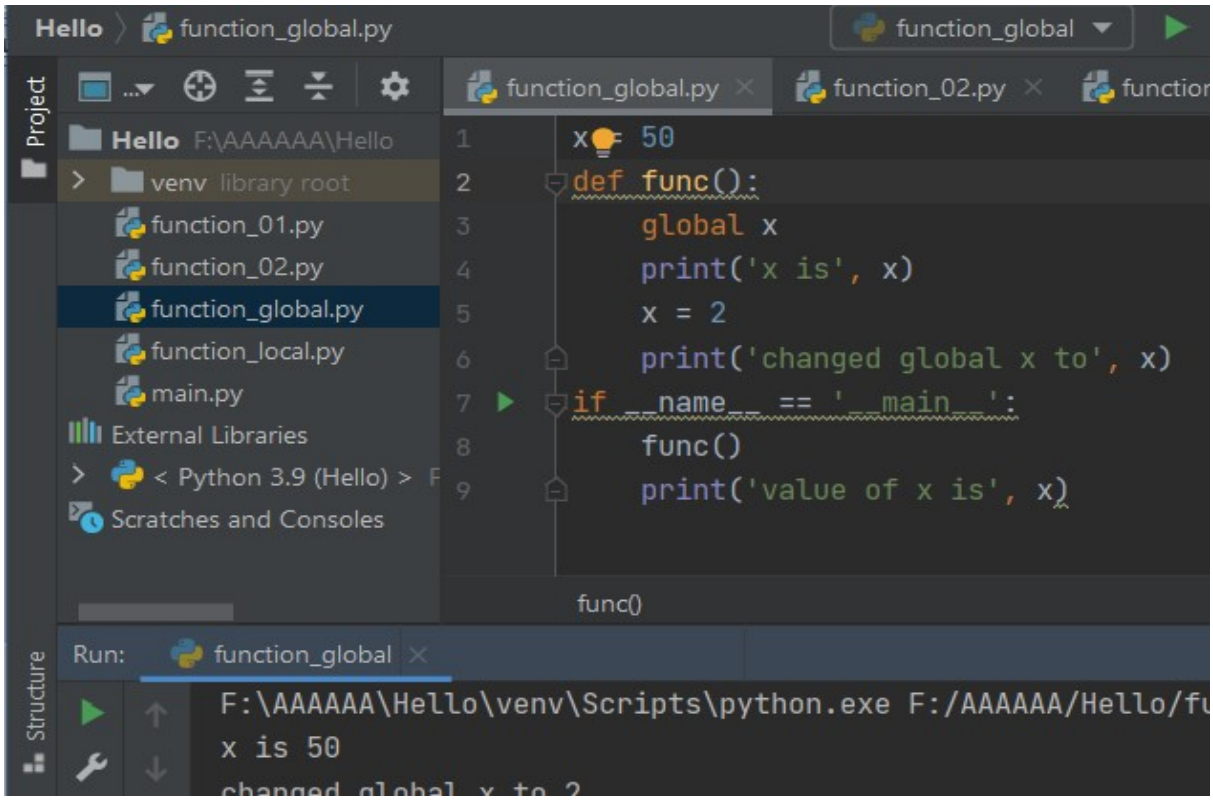
Exercise 4.1.3: Python function (save as function_02.py)



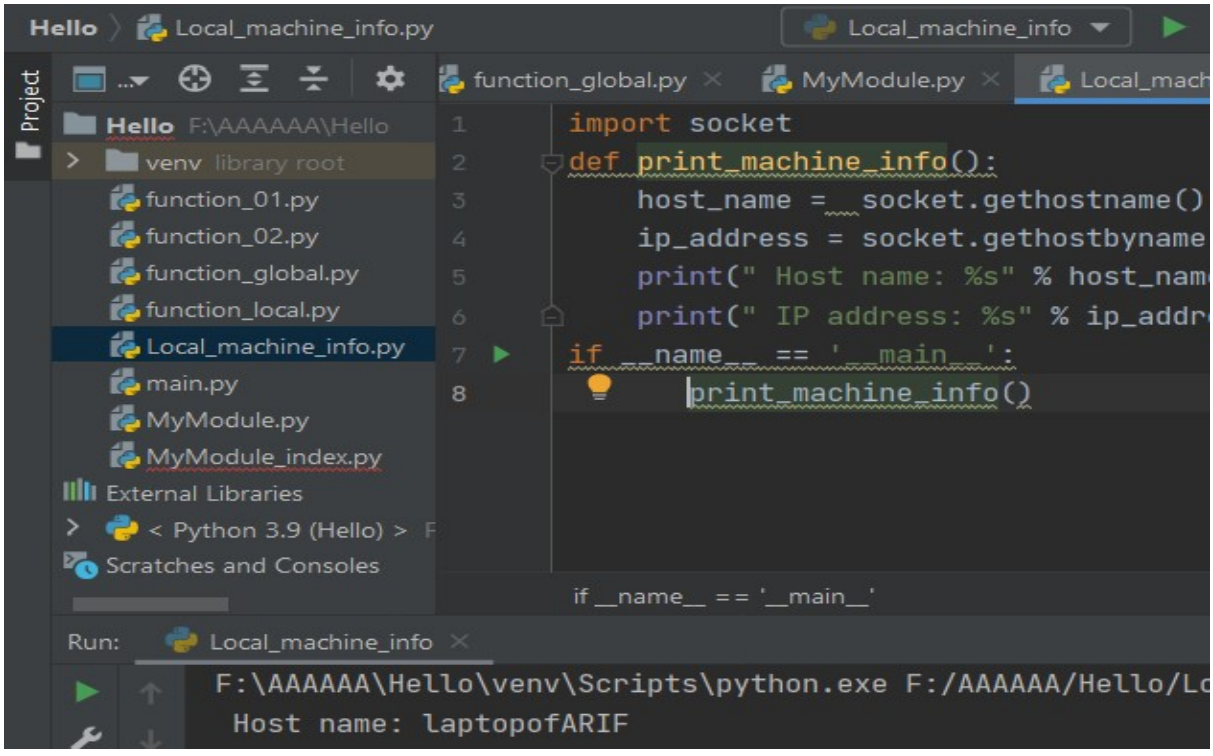
Exercise 4.1.4: Local variable (save as function_local.py)



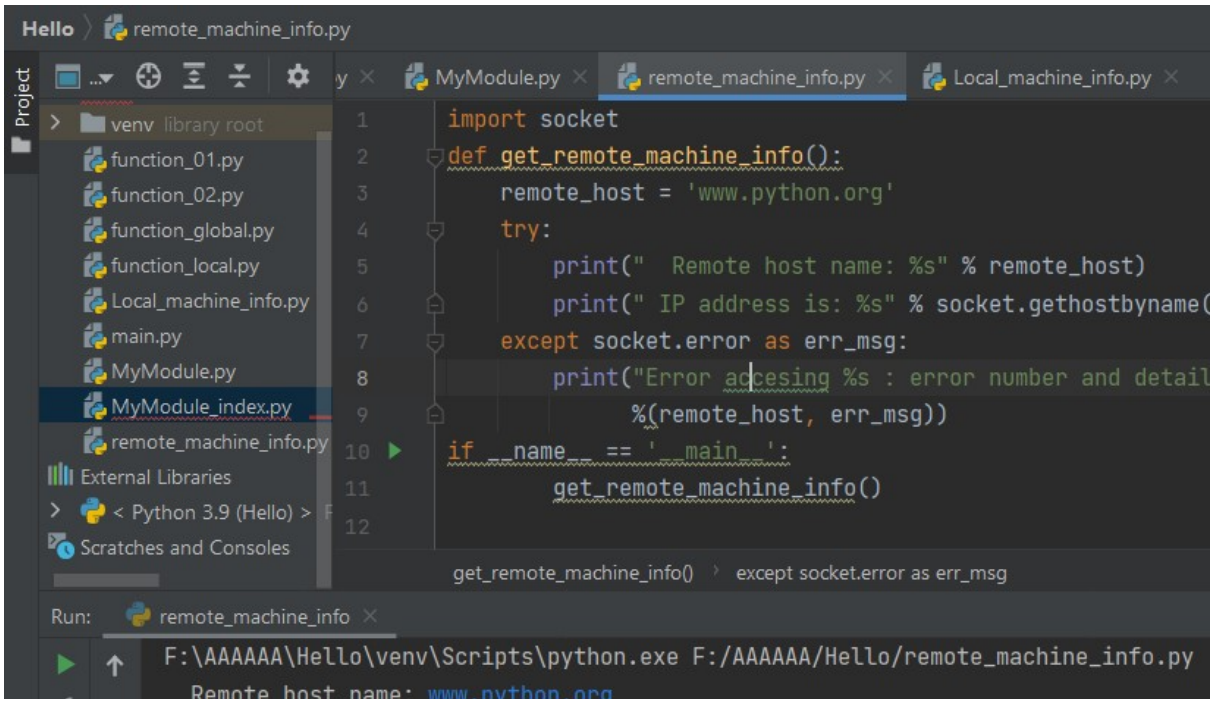
Exercise 4.1.5: Global variable (save as function_global.py)



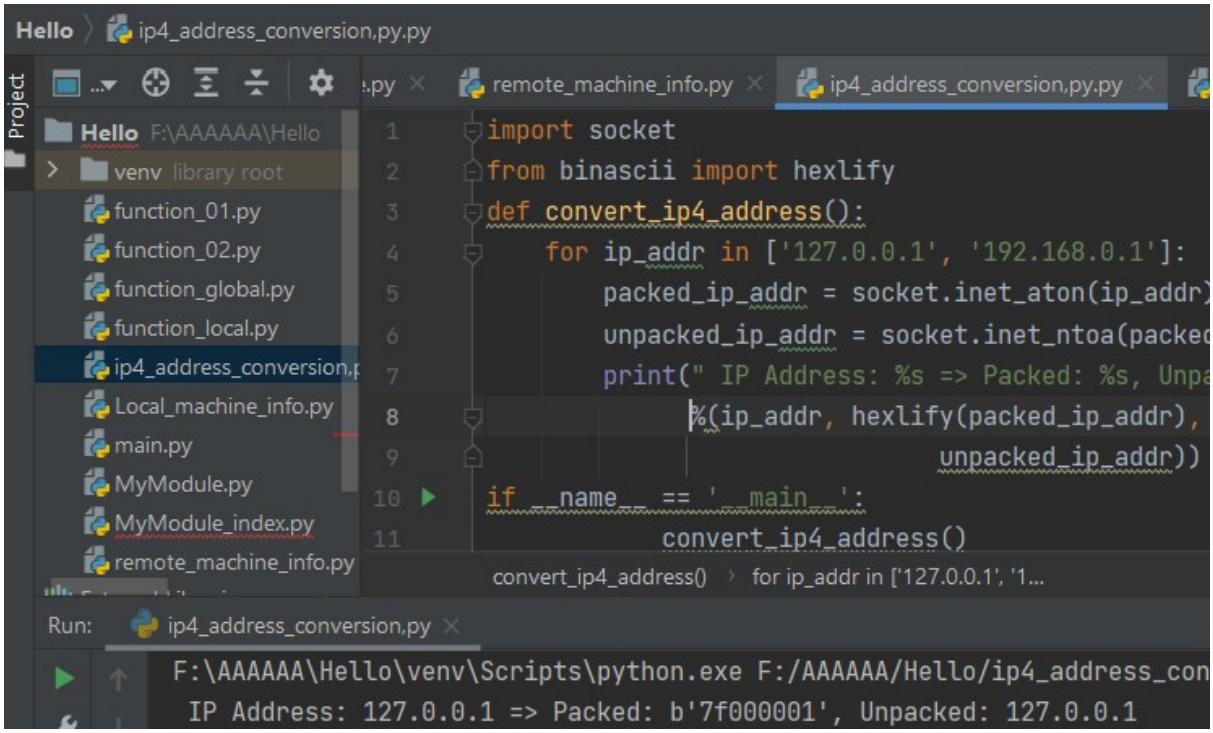
Exercise 4.2.1: Printing your machine's name and IPv4 address



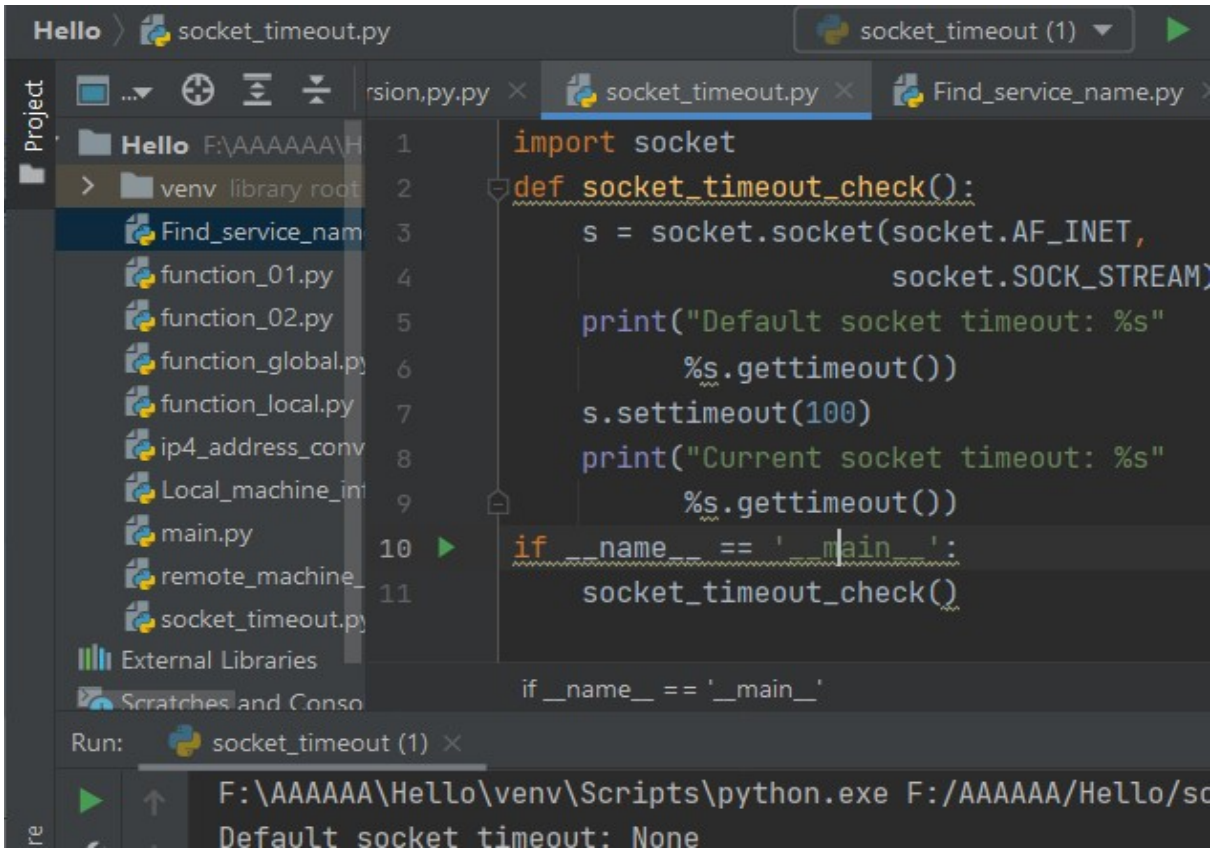
Exercise 4.2.2: Retrieving a remote machine's IP address



Exercise 4.2.3: Converting an IPv4 address to different formats



Exercise 4.2.4: Setting and getting the default socket timeout

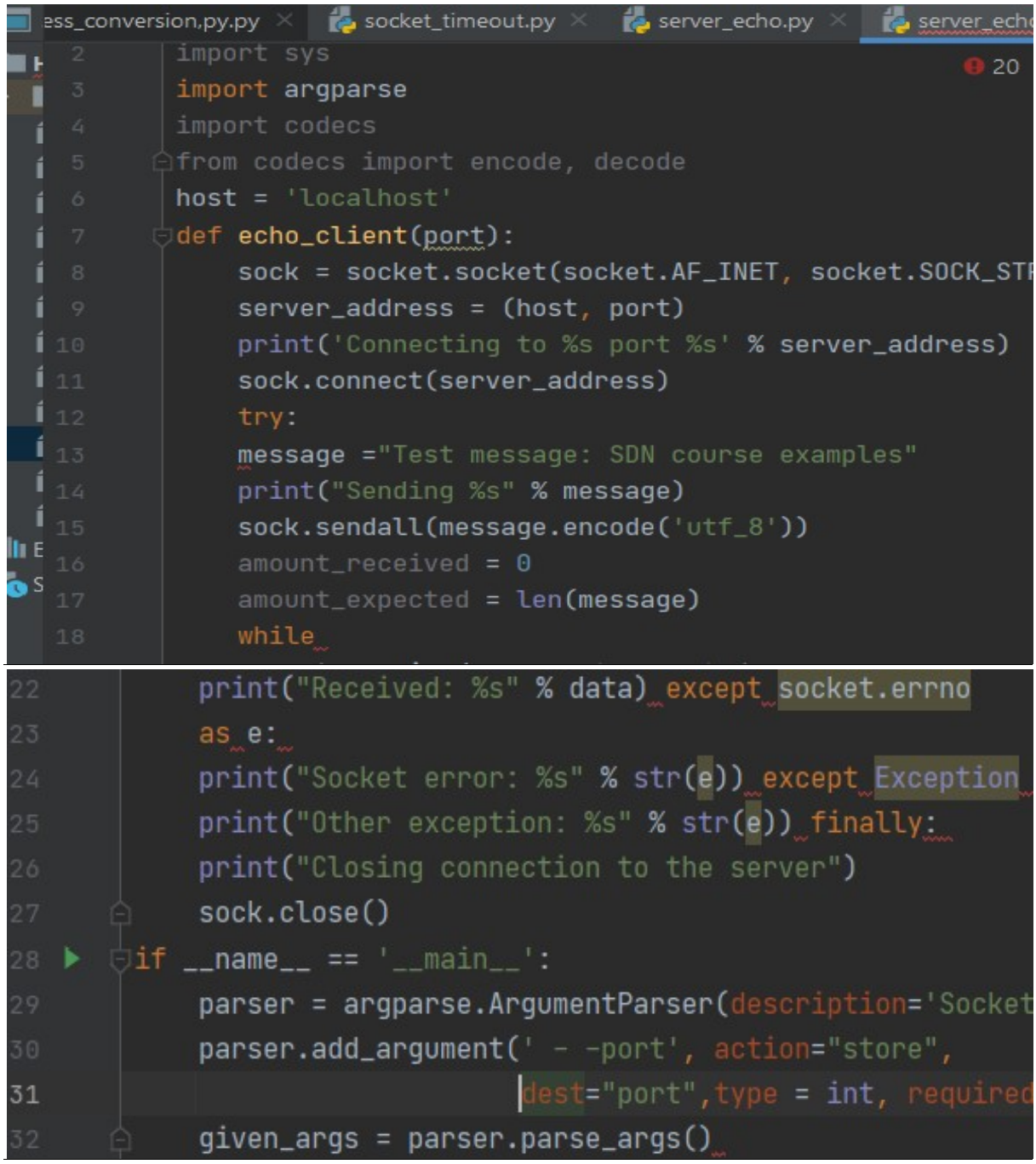


Exercise 4.2.4: Writing a simple echo client/server application (Tip: Use port 9900)

Server Code:

```
import socket
import sys
import argparse
import codecs
from codecs import encode, decode
host = 'localhost'
data_playload = 4096
backlog = 5
def echo_server(port):
    sock = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
    sock.setsockopt(socket.SOL_SOCKET, socket.SO_REUSEADDR, 1)
    server_address = (host, port)
    print('Starting up echo server on %s port %s' %server_address)
    sock.listen(backlog)
while True:
    print('Waiting to receive message from client')
    client, address = sock.accept()
data = client.recv(data_playload)
if data:
    print('Data : %s' % data)
client.send(data)
print('Sent %s bytes back to %s' % (data, address))
client.close()
if __name__ == '__main__':
```

Client Code:


ess_conversion.py.py
socket_timeout.py
server_echo.py
server_echo
20
import sys
import argparse
import codecs
from codecs import encode, decode
host = 'localhost'
def echo_client(port):
sock = socket.socket(socket.AF_INET, socket.SOCK_STR
server_address = (host, port)
print('Connecting to %s port %s' % server_address)
sock.connect(server_address)
try:
message ="Test message: SDN course examples"
print("Sending %s" % message)
sock.sendall(message.encode('utf_8'))
amount_received = 0
amount_expected = len(message)
while
print("Received: %s" % data) except socket.errno
as e:
print("Socket error: %s" % str(e)) except Exception
print("Other exception: %s" % str(e)) finally:
print("Closing connection to the server")
sock.close()
if __name__ == '__main__':
parser = argparse.ArgumentParser(description='Socket
parser.add_argument(' - -port', action="store",
dest="port",type = int, required
given_args = parser.parse_args()

Conclusion: Python plays an essential role in network programming. The standard library of Python has full support for network protocols, encoding, and decoding of data and other networking concepts, and it is simpler to write network programs in Python than that of C++. There are two levels of network service access in Python.

These are:

- Low-Level Access
- High-Level Access

In the first case, programmers can use and access the basic socket support for the operating system using Python's libraries, and programmers can implement both connection-less and connection-oriented protocols for programming.

Application-level network protocols can also be accessed using high-level access provided by Python libraries. These protocols are HTTP, FTP, etc.

A socket is the end-point in a flow of communication between two programs or communication channels operating over a network. They are created using a set of programming requests called socket API (Application Programming Interface). Python's socket library offers classes for handling common transports as a generic interface.

Sockets use protocols for determining the connection type for port-to-port communication between client and server machines. The protocols are used for:

- Domain Name Servers (DNS)
- IP addressing
- E-mail
- FTP (File Transfer Protocol) etc.