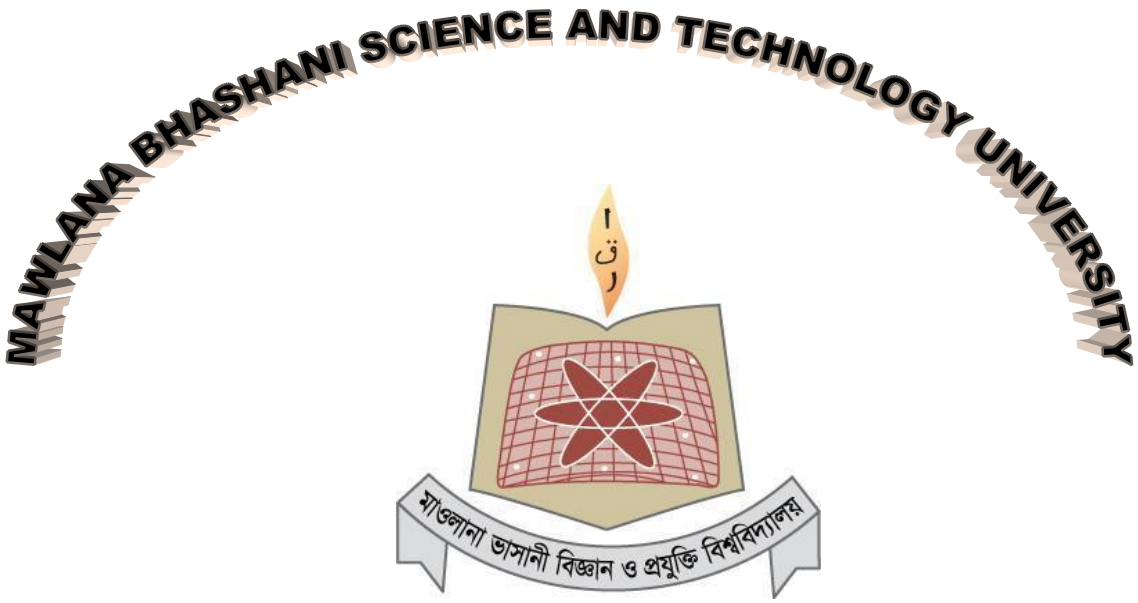

Lab Report: 01

Report Name: Introduction to Python

Course code: ICT-3208
Course title: Computer Networks Lab

Date of Performance: / /2021

Date of Submission: 08/01/2021

SUBMITTED BY

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SUBMITTED TO

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Experiment No: 01
Experiment Name: Introduction to Python
Objectives:

- Setup python environment for programing,
- Learn the basics of python,
- Create and run basic examples using python.

Theory: Python is an easy to learn, powerful programming language. It has efficient high-level data structures and a simple but effective approach to object-oriented programming. Python's elegant syntax and dynamic typing, together with its interpreted nature, make it an ideal language for scripting and rapid application development in many areas on most platforms.

Methodology:
Setup of Python Environment:
STEP 1: Open Eclipse and setup a correct access to Internet (This is required only in RMIT network). In order to set up Manual Proxy follow the instructions (see also figure 1):

a) Go to Windows > Preferences > General > Network Connections.
b) Change Active Provider to Manual.
c) Input proxy details, including username/password if required.
   Host: proxy.rmit.edu.au
   Port: 8080
   Username/password: No required
d) Clear SOCKS proxy.
e) Restart Eclipse.

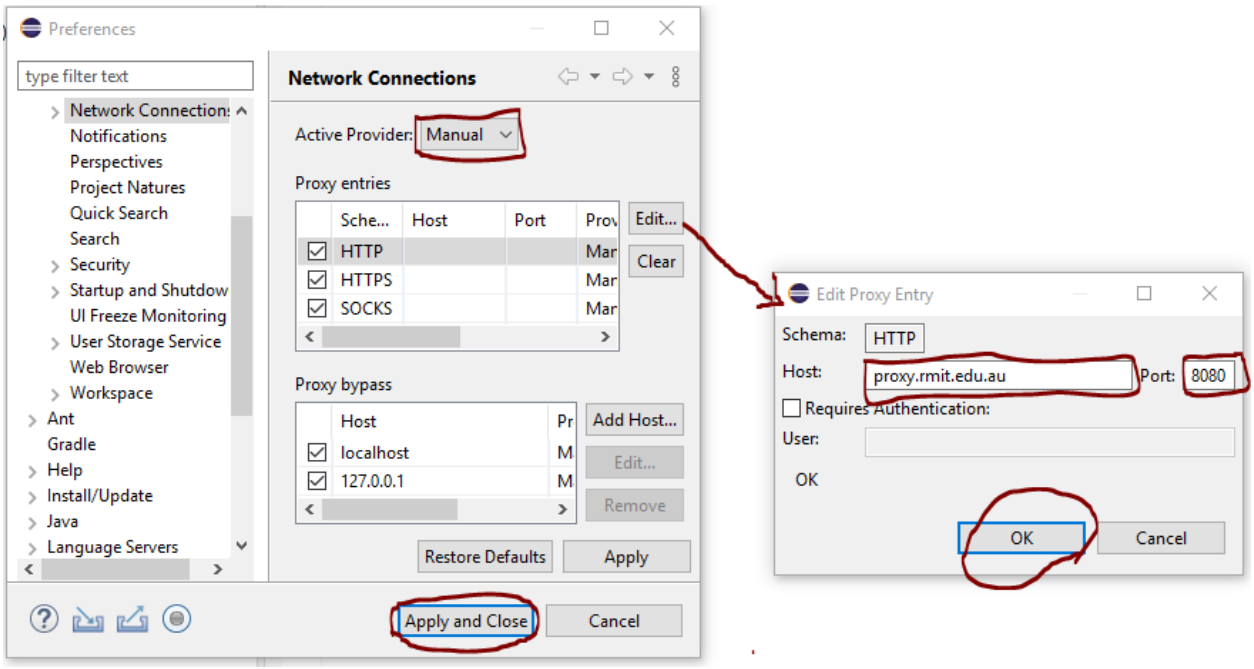


Figure 1. Eclipse setup for Internet

STEP 2: Installing python environment using Eclipse Graphical Interface1 .

a. To install PyDev and PyDev Extensions using the Eclipse Update Manager, you need to use the Help > Install New Software... menu (note that in older versions, this would be the 'Find and Install' menu) as shown in the following figure:

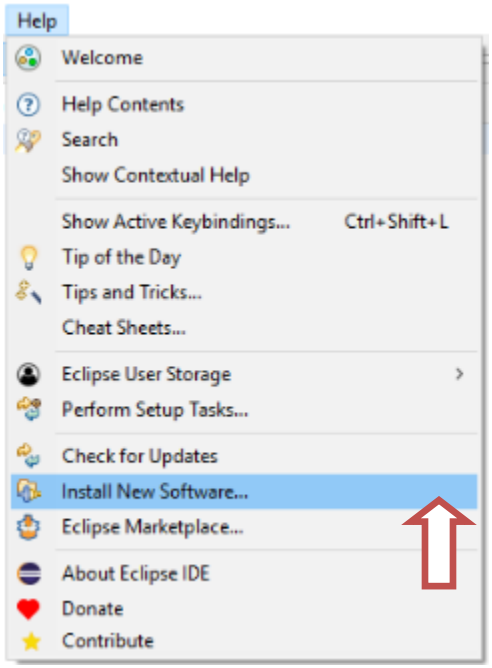


Figure 2. Step 2.

b.

In the next screen, add the update site(s) you want to work with (see the figure below). The available update sites are (see Figure 3):

https://pydev.org/updates

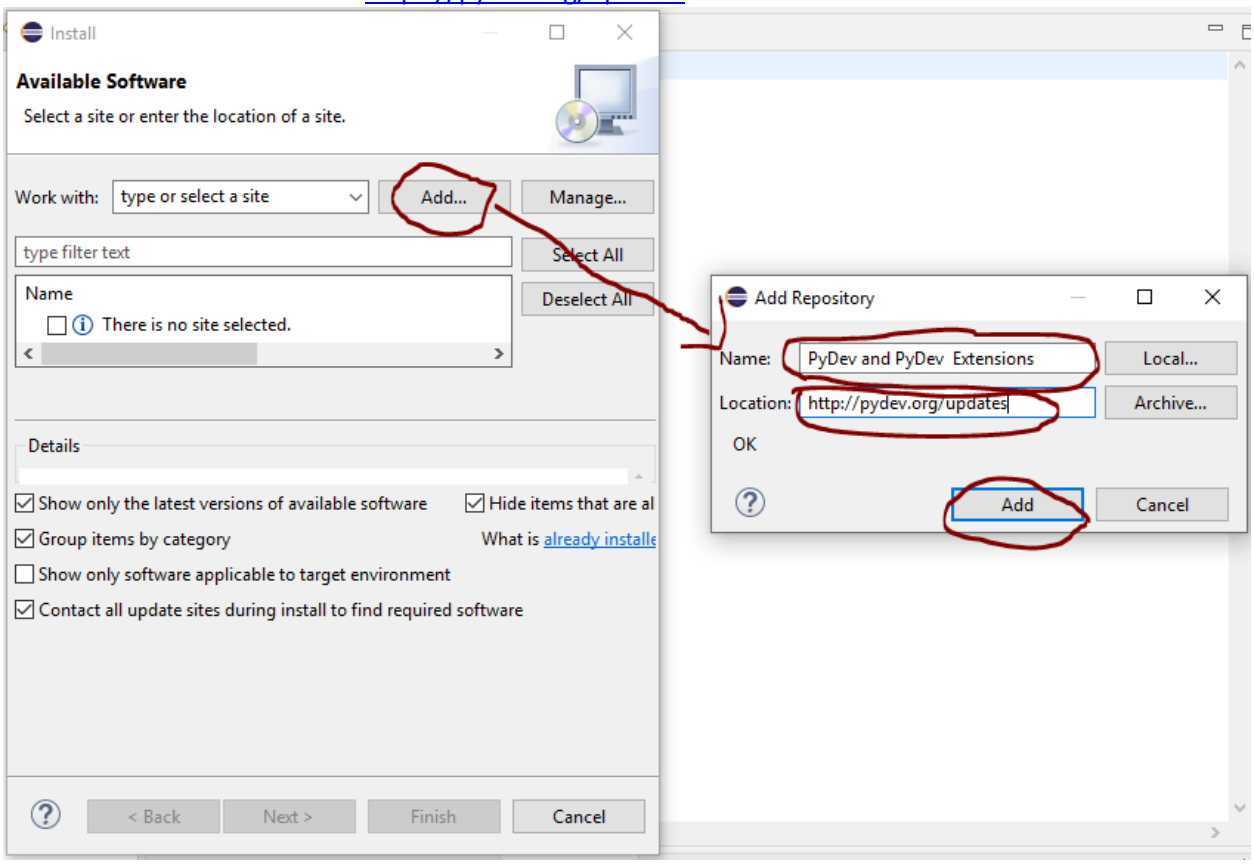


Figure 3. Set up Python on Eclipse

c.

After entering the update sites, select the update site you entered or select "All available sites" and add a filter for PyDev, so that it shows the contents of all the update sites that have PyDev, then select what you want to install and click 'Next' (see Figure 4).

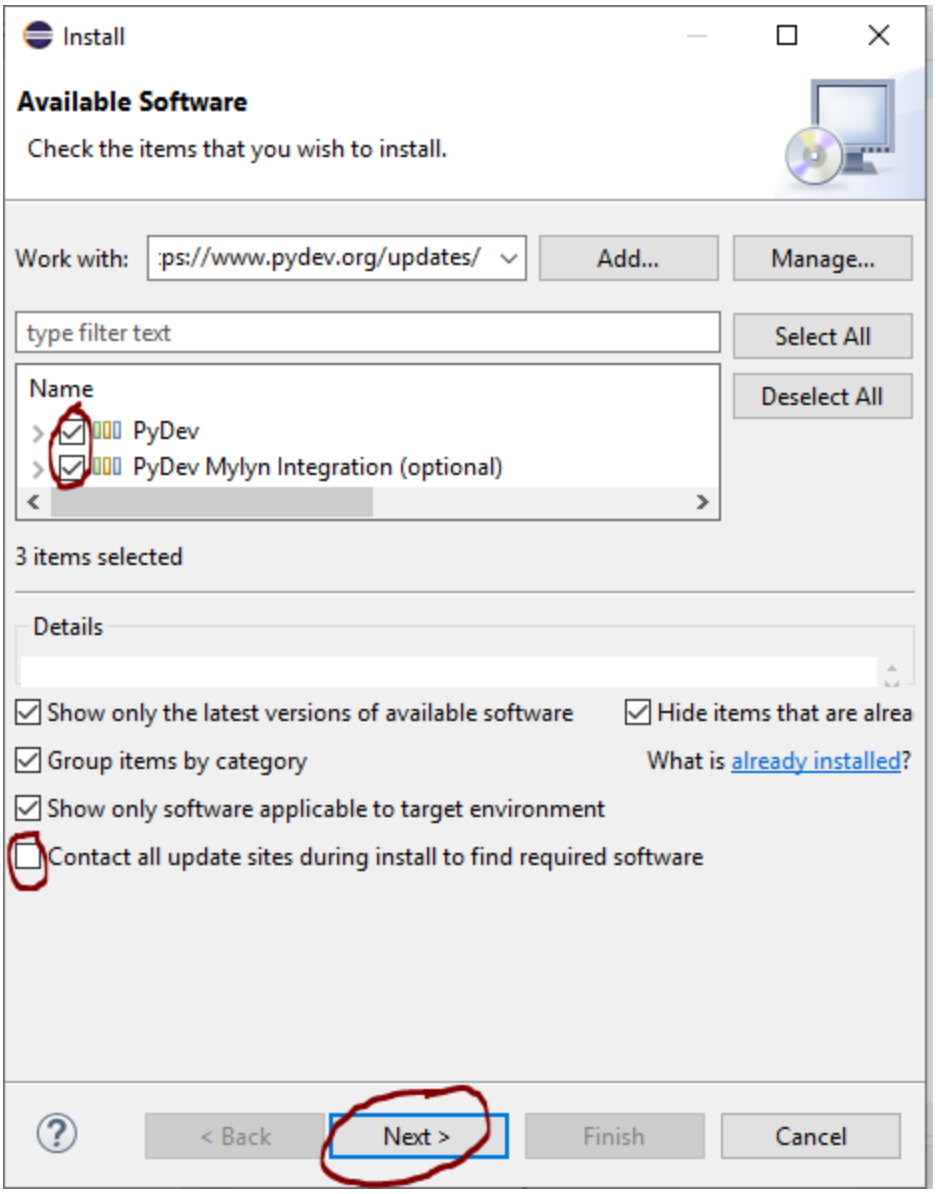


Figure 4. Set up Python on Eclipse.

d.

Then, UNCHECK the 'Contact all update sites during install to find required software' and press 'Next' again to confirm your selection (see Figure 5).

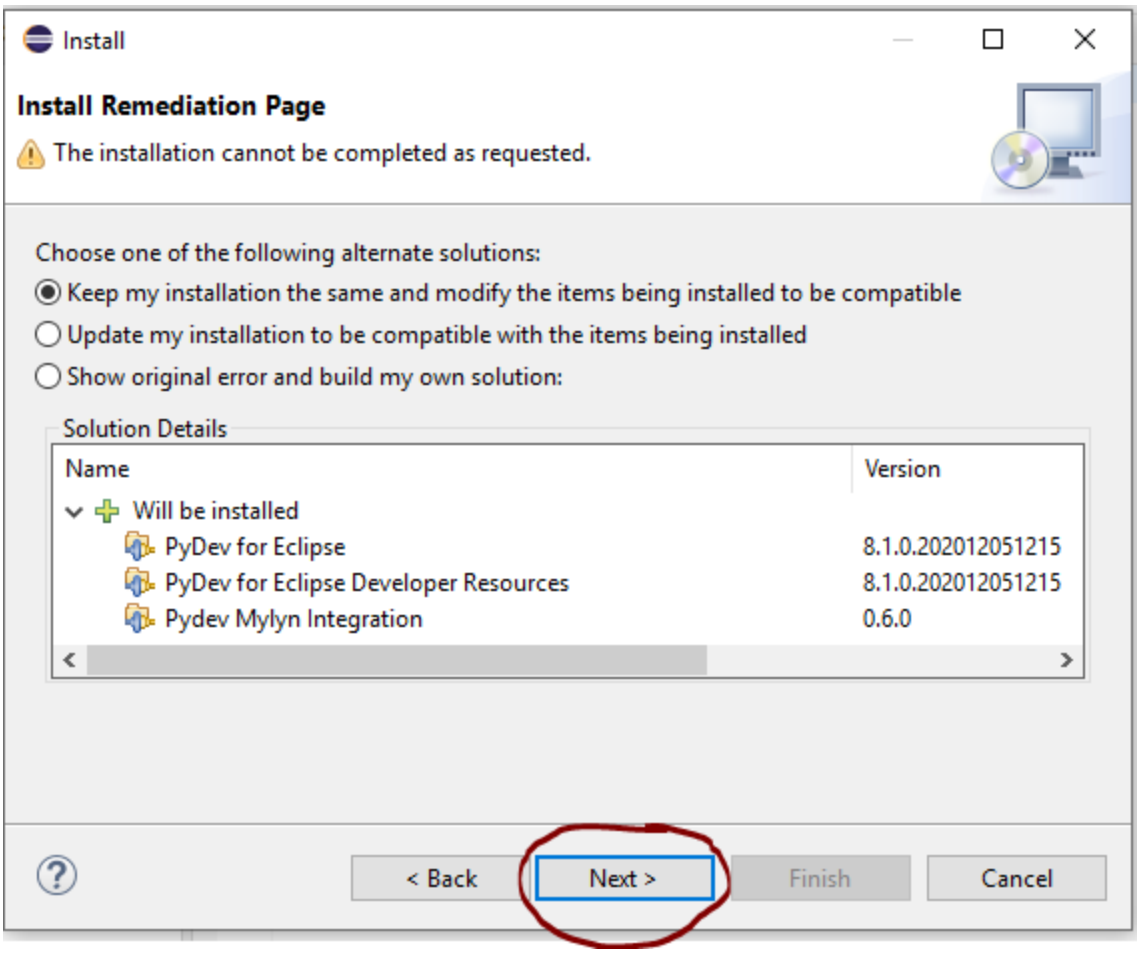


Figure 5. Set up Python on Eclipse.

e.

And finally, read the license agreement and if you accept, select the accept radio button and click 'Finish' (see Figure 6).

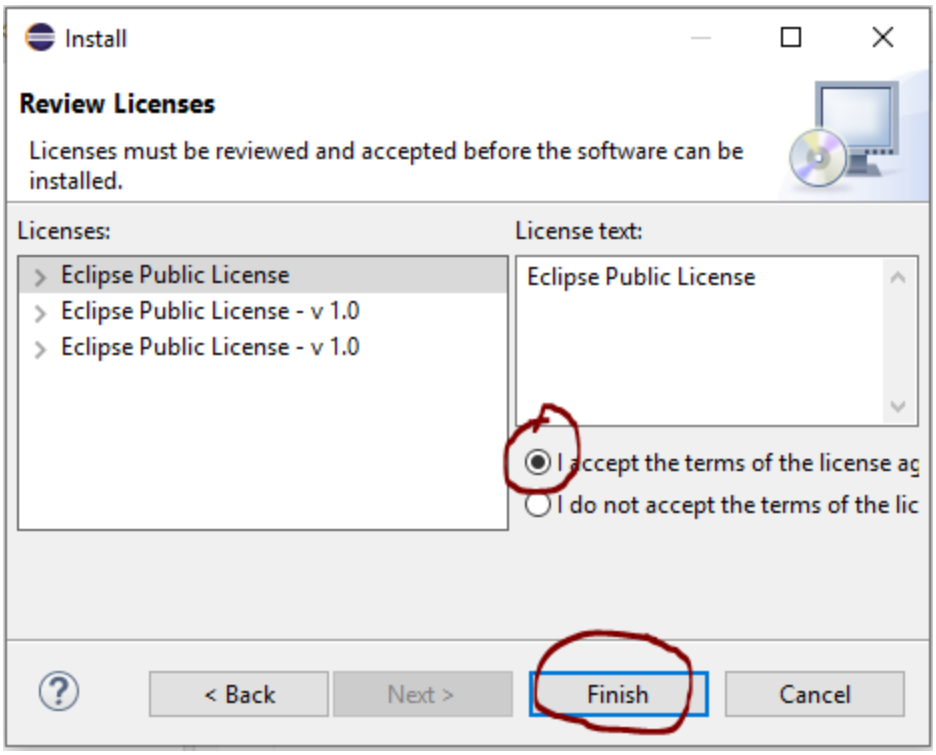


Figure 6. Set up Python on Eclipse

STEP 2: Checking the installation: You can verify if it is correctly installed going to the menu 'window> preferences' and checking if there is a PyDev item under that (see Figure 7). After that eclipse will display the graphical interface for python perspective, the main components are (see Figure 8):

- Project space is the section where all your python projects are visualized,
- Project Editor is the section where python scripts can be edited,
- Console allows the visualization of results father running a python script,

- Run bottom allows to run a python script,

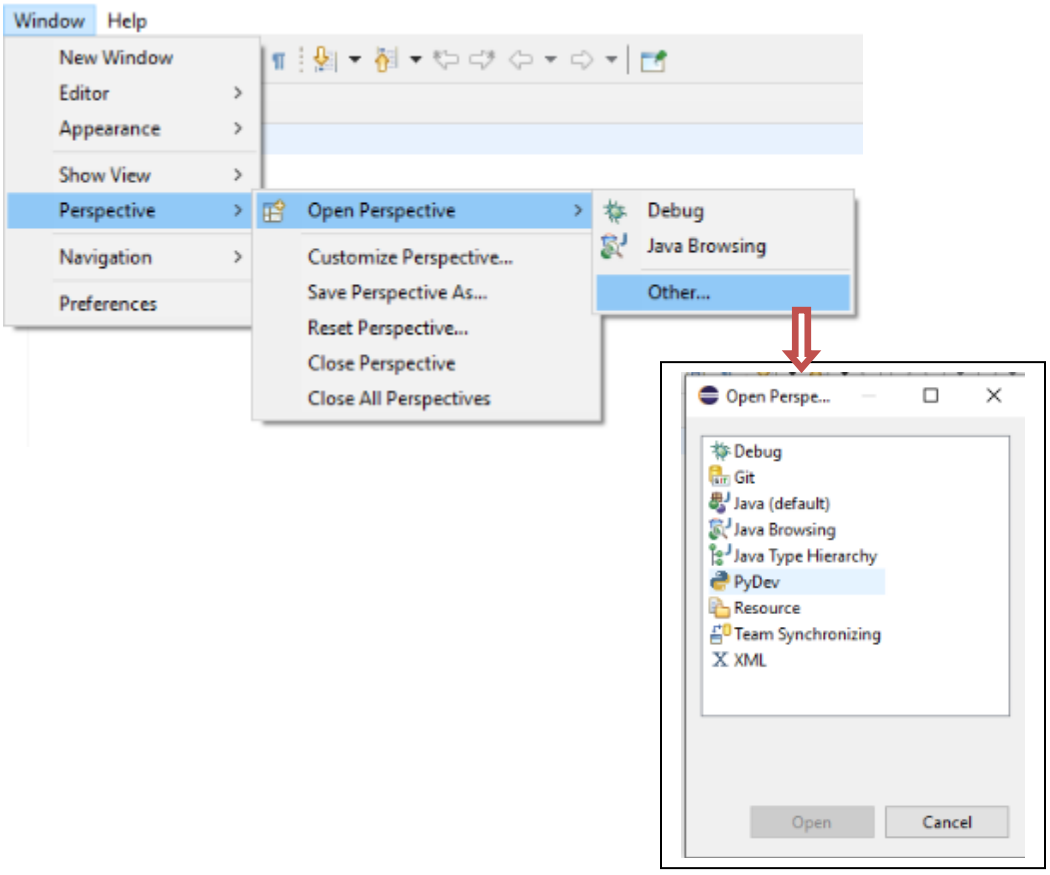
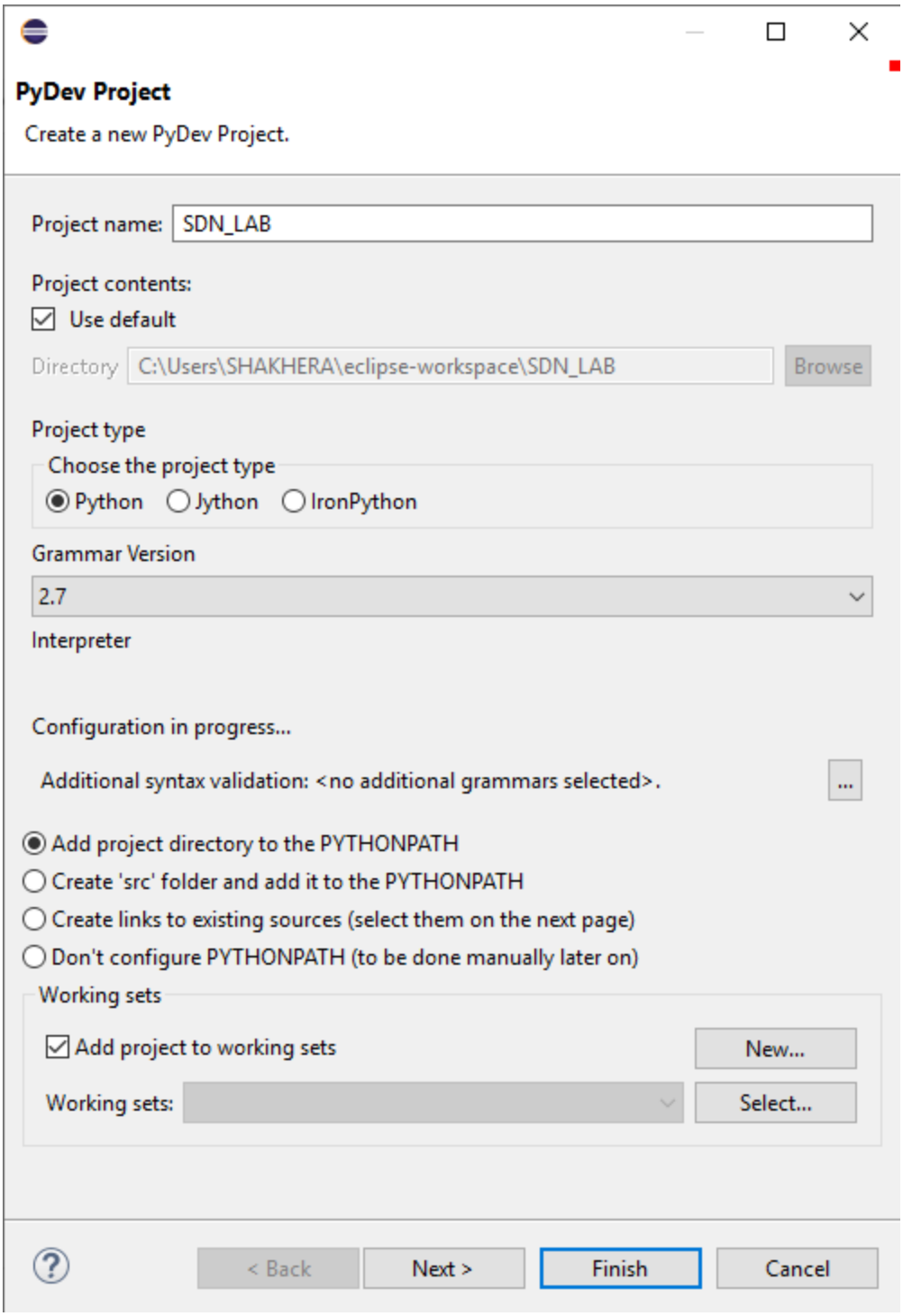


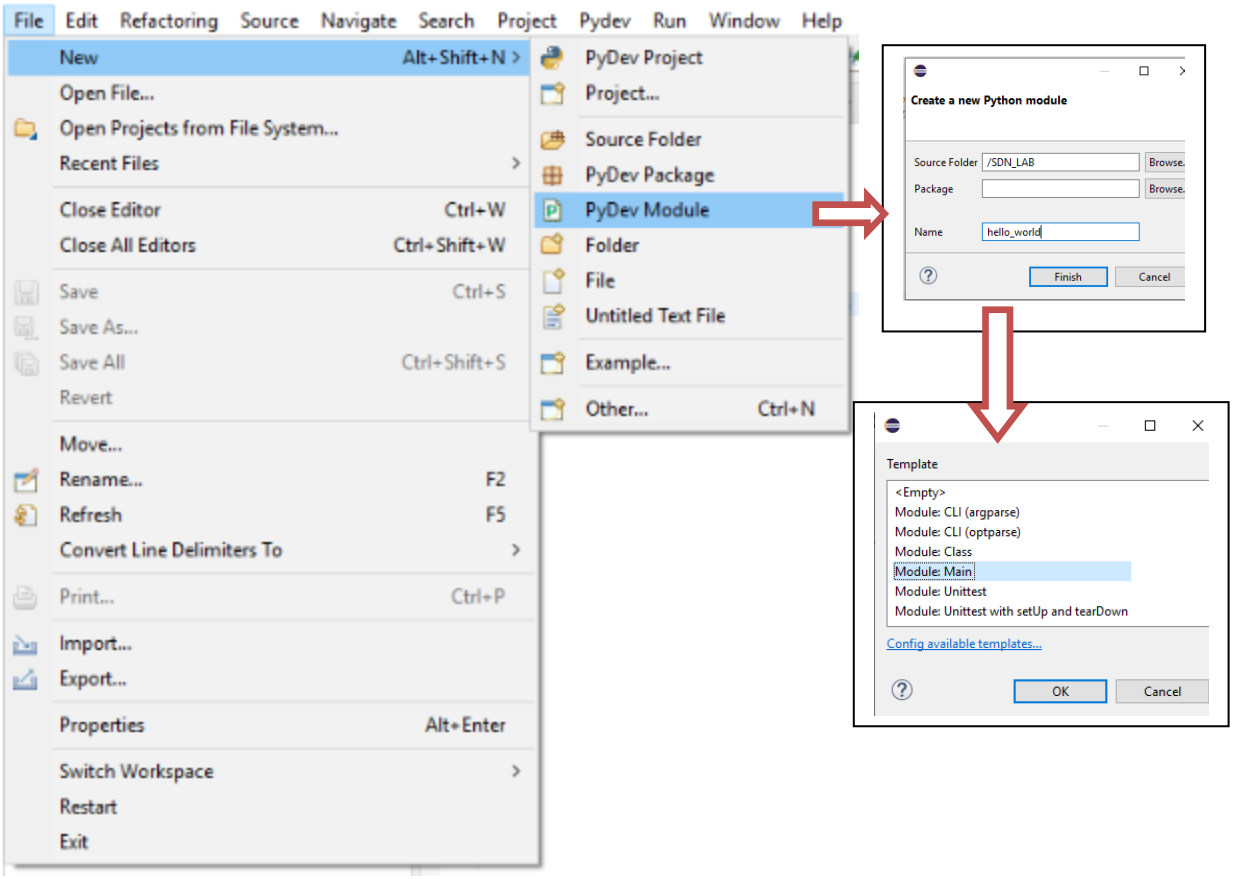
Figure 7. Python perspective in Eclipse.

Exercises:

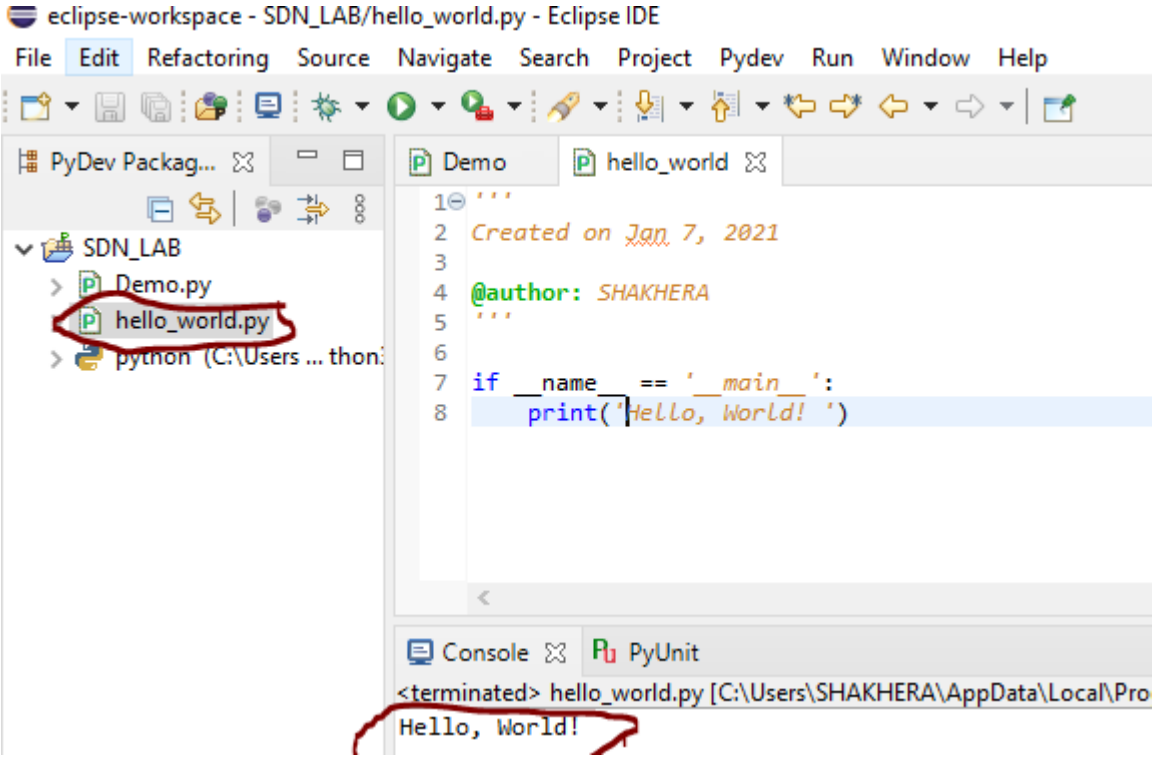
Exercise 4.1.1: Create a python project, click in **File > New > PyDev Project**. Provide a name for the project (SDN_LAB_1 for the fits lab), then select the version of python to be used and select to add the project to working set as shown below:



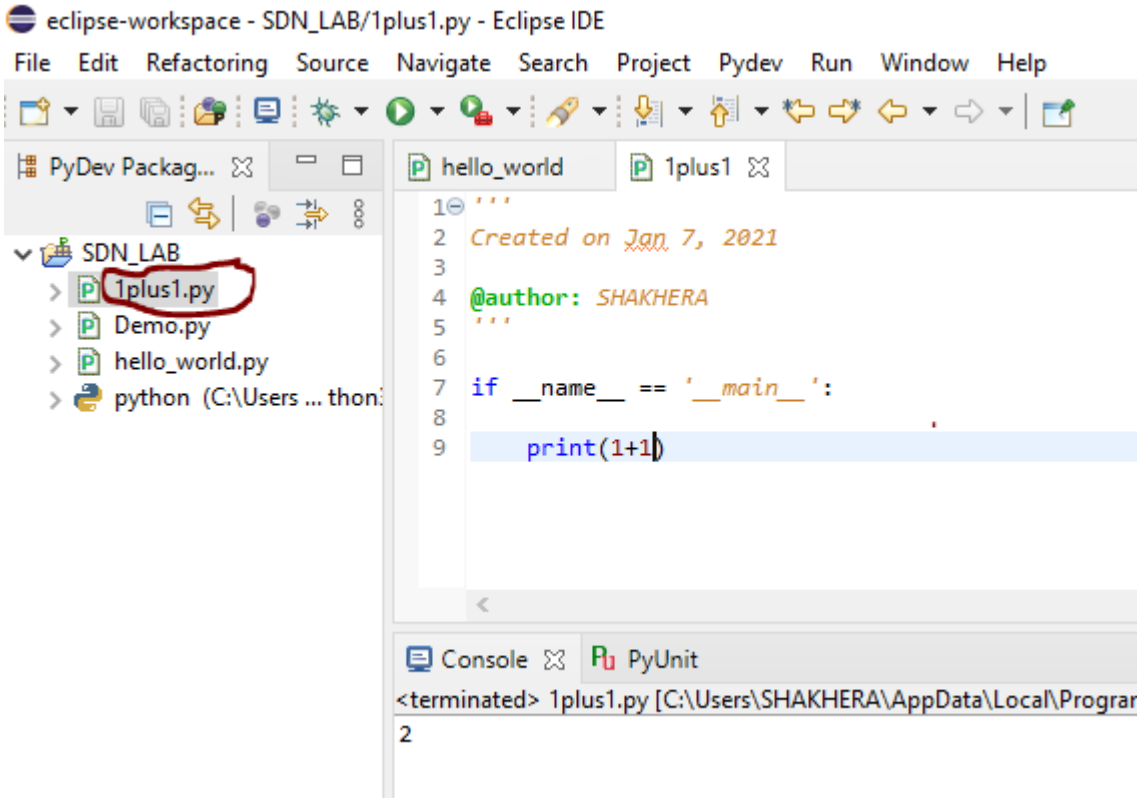
Create a python script, click in **File > New > PyDev Module**. Select the folder source name. Then, provide a name for the project (Hello_world), then select empty module or main module as shown below:



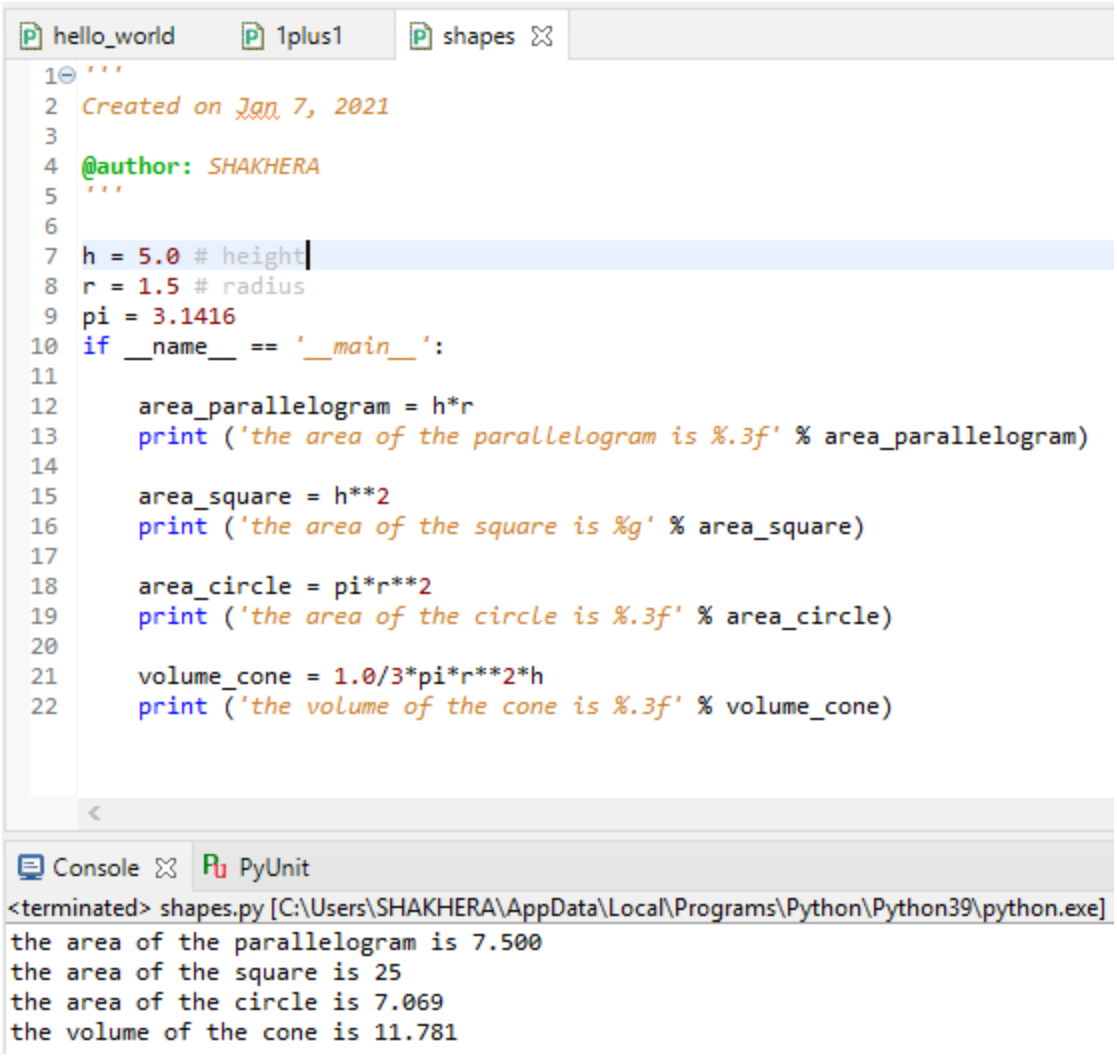
Exercise 4.1.2: Write a Hello World



Exercise 4.1.3: Compute 1+1



Exercise 4.1.4: Type in program text



Section 4.2.1: Create and run basic example.

hello_world | 1plus1 | shapes | *operator

```
'''
Created on Jan 7, 2021

@author: SHAKHERA
'''
if __name__ == '__main__':

    x = int(input('Enter first num : '))
    y = int(input('Enter second num : '))
    plus = x+y
    print('Plus of {0} and {1} is = {2}' .format(x,y,plus))
    minus = x-y
    print('Minus of {0} and {1} is = {2}' .format(x,y,minus))
    multiply = x*y
    print('Multiply of {0} and {1} is = {2}' .format(x,y,multiply))
    power = x**y
    print('Power of {0} and {1} is = {2}' .format(x,y,power))
    divide = x/y
    print('Divide of {0} and {1} is = {2}' .format(x,y,divide))
    floor = x//y
    print('Divide and Floor of {0} and {1} is = {2}' .format(x,y,floor))
    modulo = x%y
    print('Modulo of {0} and {1} is = {2}' .format(x,y,modulo))
    left_shift = x<<y
    print('Left Shift of {0} and {1} is = {2}' .format(x,y,left_shift))
    right_shift = x>>y
    print('Right Shift of {0} and {1} is = {2}' .format(x,y,right_shift))
    bit_wise_and  = x&y
    print('Bit-wise AND  of {0} and {1} is = {2}' .format(x,y,bit_wise_and))
    bit_wise_or  = x|y
    print('Bit-wise OR  of {0} and {1} is = {2}' .format(x,y,bit_wise_or))
    bit_wise_xor  = x^y
    print('Bit-wise XOR  of {0} and {1} is = {2}' .format(x,y,bit_wise_xor))
```

hello_world | 1plus1 | shapes | operator

```
34      less_than  = x<y
35      print('Less than  of {0} and {1} is = {2}' .format(x,y,less_than))
36      greater_than  = x>y
37      print('Greater than  of {0} and {1} is = {2}' .format(x,y,greater_than))
38      less_or_equal  = x<=y
39      print('Less than or equal to  of {0} and {1} is = {2}' .format(x,y,less_or_equal))
40      great_or_equal  = x>=y
41      print('Greater than or equal to  of {0} and {1} is = {2}' .format(x,y,great_or_equal))
42      equal  = x==y
43      print('Equal to  of {0} and {1} is = {2}' .format(x,y,equal))
44      not_equal  = x!=y
45      print('Not equal to  of {0} and {1} is = {2}' .format(x,y,not_equal))
```

Console | PyUnit

```
<terminated> operator.py [C:\Users\SHAKHERA\AppData\Local\Programs\Python\Python39\python.exe]
Enter first num : 5
Enter second num : 8
Plus of 5 and 8 is = 13
Minus of 5 and 8 is = -3
Multiply of 5 and 8 is = 40
Power of 5 and 8 is = 390625
Divide of 5 and 8 is = 0.625
Divide and Floor of 5 and 8 is = 0
Modulo of 5 and 8 is = 5
Left Shift of 5 and 8 is = 1280
Right Shift of 5 and 8 is = 0
Bit-wise AND  of 5 and 8 is = 0
Bit-wise OR  of 5 and 8 is = 13
Bit-wise XOR  of 5 and 8 is = 13
Less than  of 5 and 8 is = True
Greater than  of 5 and 8 is = False
Less than or equal to  of 5 and 8 is = True
Greater than or equal to  of 5 and 8 is = False
Equal to  of 5 and 8 is = False
Not equal to  of 5 and 8 is = True
```

Exercise 4.2.2: The if statement:

hello_world | 1plus1 | shapes | operator | if

```
'''
Created on Jan 8, 2021

@author: SHAKHERA
'''

if __name__ == '__main__':
    num1 = 33
    num2 = int(input('Enter the num : '))

    if(num1==num2):
        print('Equal')
    else:
        print('Wrong')
```

Console | PyUnit

```
<terminated> if.py [C:\Users\SHAKHERA\AppData\Local\Programs\Python\Python39\python.exe]
Enter the num : 34
Wrong
```

Exercise 4.2.3: The while Statement

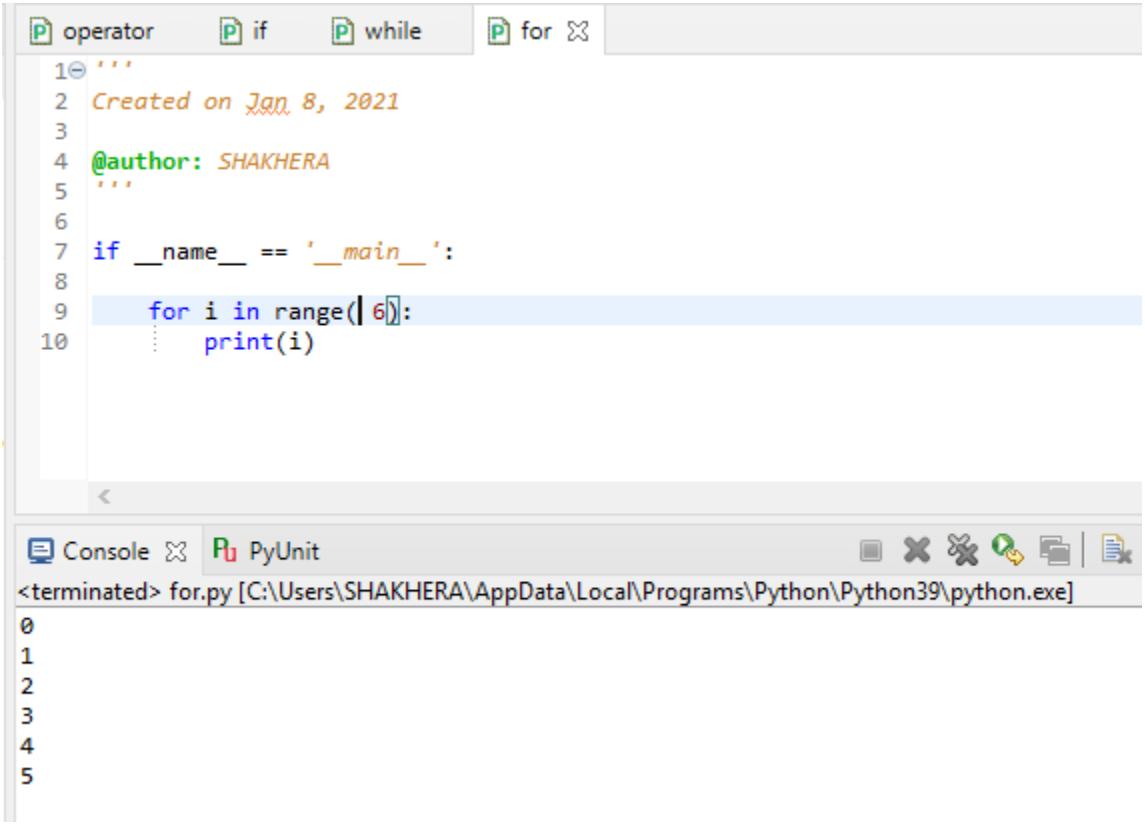
operator | if | while

```
'''
Created on Jan 8, 2021

@author: SHAKHERA
'''

if __name__ == '__main__':
    num1 = 33
    num2 = int(input('Enter the num : '))

    while(num1<=num2):
        print(num1)
        num1=num1+1
```

Console | PyUnit

```
<terminated> while.py [C:\Users\SHAKHERA\AppData\Local\Programs\Python\Python39\python.exe]
Enter the num : 40
33
34
35
36
37
38
39
40
```

Exercise 4.2.4: The for Statement



Question 5.1: Explain what is eclipse? And why we use it for programing on python?

Answer:

Eclipse is an integrated development environment (**IDE**) used in computer programming. It contains a base workspace and an extensible plug-in system for customizing the environment. ... It was one of the first **IDEs** to run under GNU Classpath and it runs without problems under IcedTea.

For python development under Eclipse you can use the PuDev Plugin which is an open source project. So, we use it for programming on python.

Question 5.2: Explain three main characteristics of python that you test in the lab?

Answer:

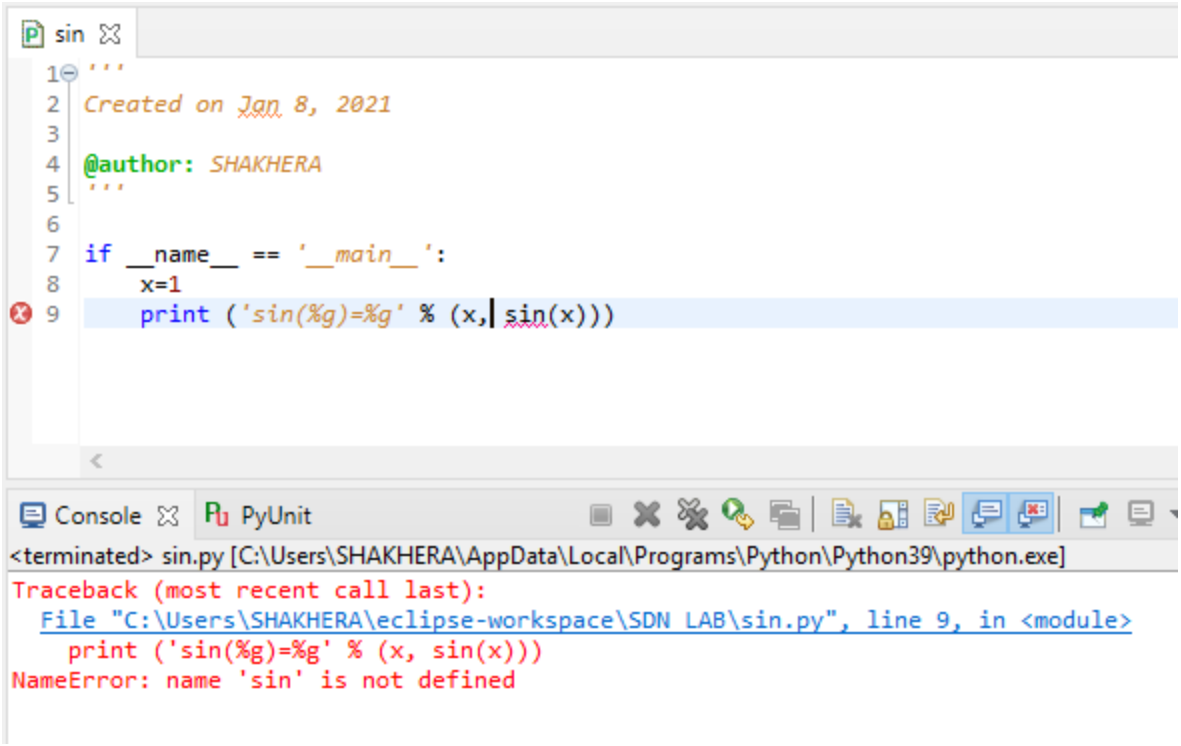
Features in Python

There are many features in Python, some of which are discussed below –

1. Easy to code:
Python is a very developer-friendly language which means that anyone and everyone can learn to code it in a couple of hours or days. As compared to other object-oriented programming languages like Java, C, C++, and C#, Python is one of the easiest to learn.
2. Open and Free Source:
Python is an open-source programming language which means that anyone can create and contribute to its development. Python has an online forum where thousands of coders gather daily to improve this language further. Along with this python is free to download and use in any operating system, be it Windows, Mac or Linux.
3. Python is Portable language:
Python language is also a portable language. For example, if we have python code for windows and if we want to run this code on other platforms such as Linux, Unix, and Mac then we do not need to change it, we can run this code on any platform.

Question 5.3: Which is the difference between empty module and main module when creating a python script?
Answer:
A module is a file containing Python code. Python modules can be managed using functions, classes etc.
A module name is the file name with the .py extension. When we have a file called empty.py empty is the module name. The __name__ is a variable that holds the name of the modules being executed called also the main module, has a special name: '__main__'. With this name it can be referenced from the Python code.

Question 5.4: Find error(s) in a program Suppose somebody has written a simple one-line program for computing
sin(1): x=1; print 'sin(%g)=%g' % (x, sin(x))
Create this program and try to run it. What is the problem? Which is the correct code?
Answer:



In this program we can see sin is not defined. To run mathematical functions such as sin, cos, tan, exp, log, etc, we must importing a module, say math, is to write,

import math

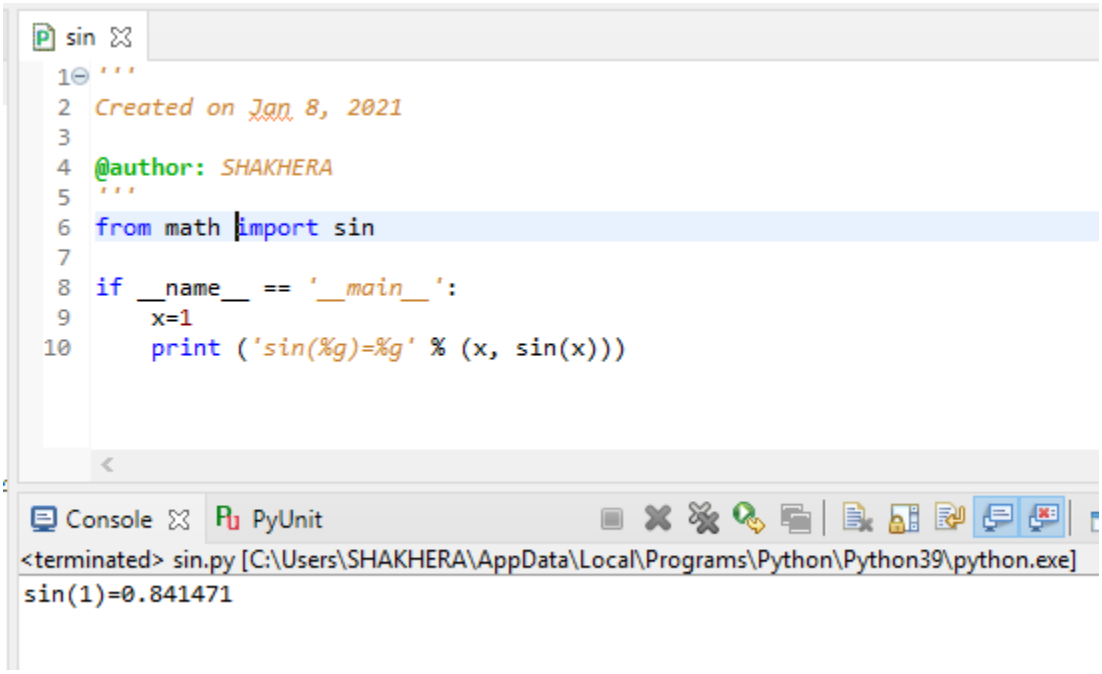
More than one function can be imported:

from math import sqrt, exp, log, sin

Sometimes one just writes,

from math import *

So, correct code is:



Question 5.5: Create a python program that combines at least 4 operators and one statement (if, while or for)
Answer:

simple_example

```
Created on Jan 8, 2021

@author: SHAKHERA
'''

if __name__ == '__main__':
    num = int(input('Enter num of element : '))
    b = []
    for i in range(0, num):
        a = int(input('Enter the elements : '))
        b.append(a) # Adding the elements
    sum1 = 0
    sum2 = 0
    sum3 = 0
    for j in b:
        if(j>0):
            if(j%2==0):
                sum1=sum1+j
            else:
                sum2 =sum2+j
        else:
            sum3 = (sum3+j)*(-1)
    print('sum of all positive even numbers: ',sum1)
    print('sum of all positive odd numbers: ',sum2)
    print('sum of all negative numbers without sign : ',sum3)
```

Console PyUnit

```
<terminated> simple_example.py [C:\Users\SHAKHERA\AppData\Local\Programs\Python\Python39\python.exe]
Enter num of element : 4
Enter the elements : -12
Enter the elements : 33
Enter the elements : 68
Enter the elements : 13
sum of all positive even numbers:  68
sum of all positive odd numbers:  46
sum of all negative numbers without sign :  12
```

Discussion: Python has a simple syntax similar to the English language. Python has syntax that allows developers to write programs with fewer lines than some other programming language. Python runs on an interpreter system, meaning that code can be executed as soon as it is written.

Python is a language that is remarkably easy to learn, and it can be used as a stepping stone into other programming languages and frameworks. If you're an absolute beginner and this is your first time working with any type of coding language, that's something you definitely want.

In this lab, we can learn setup the python in eclipse, and can execute a python code successfully.