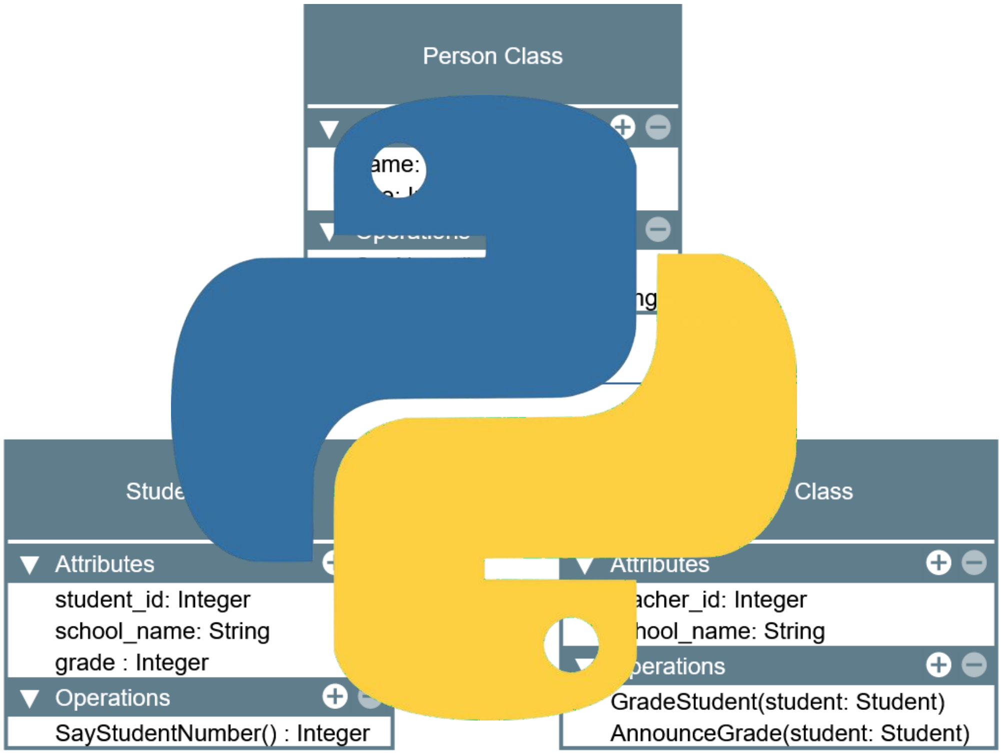
UNIVERSITY OF CALOOCAN CITY
Caloocan, 1400 Metro Manila, Philippines

COLLEGE OF ENGINEERING
Computer Engineering
2nd Semester, School Year 2024-2025



LABORATORYMANUAL

Object-Oriented Programming(CPE 103)

Laboratory ActivityNo.2.1

Literals, Operators, and Variables

Course Code:CPE103	**Program:** BSCPE
Course Title: Object-Oriented Programming	**Date Performed:** 01/25/25
Section: 1-A	**Date Submitted:** 01/31/25
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1.Objective(s):

Thisactivityaimstofamiliarizestudentsinthevariousdatatypesofpython,assignvaluestovariables,andperformoperations in a Python program.

2.IntendedLearningOutcomes(ILOs):

Thestudentsshouldbeableto:
2.1 AssigndifferentvaluestovariablesinPython
2.2 PerformdifferentoperationsavailablewithvariablesinPython

3.Discussion:

The**Python**programminglanguageisaninterpretedlanguagemeaningthelinesareevaluatedline-by-lineatruntimebecause thereisnocompiletimeatPython.ThismeansthatPythoncandynamicallyallocatememorytovariablesasneededdepending on the line of code that it interpretsthat is why Python isalso referred to as a Dynamically typed language.

Likeotherprogramminglanguagessuchas C/C++andJava,Pythoncanalsoassignvaluestospecificblocksofmemory through variables as well as perform operationssuch as but not limited to Addition, Subtraction, Multiplication, Division, and Modulo(remainder).Thisactivitywillfocusonassigningvaluesandperformingoperationsinpython.

Recall thata **variable**is a namethat points to a specific location inmemorywhere thedatais stored.Avariablecanbe allocated memory based on the datatype it is assigned with which in Python can be:**Integer**, **Float**, **Complex Number**, **Boolean**, and **String**. In Python, **lists**, **tuples**, and **dictionaries**are also referred to as data types specifically sequences. More informationcanbefoundhere(https://docs.python.org/3.8/reference/datamodel.html?highlight=data%20type#objects-values-and-types). These will be discussed further in lab activities.

VariablesinPythonareassignedinthefollowingmanner:

variable_name=value

Literals refers to the raw data given in a variable or constant. Literals can besome of the following: Numeric, Complex, String, Boolean,Special.Otherliteralsarelist,tuple,dict,set,andUnicodeliterals.

4.MaterialsandEquipment:

Desktop Computerwith Anaconda Python /Python
ColabWindowsOperatingSystem

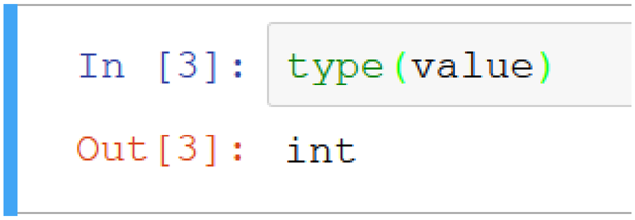
5.Procedure:

PerformtheactivityusingtheJupyterNotebook
ThisactivitycanbedoneeitherlocallyonAnaconda’sJupyterNotebookoronlinethroughGoogleCollaboratorywhichoffers afreeJupyterNotebookenvironmentforGoogleUsers.IPythonNotebookfiles(.ipynb)thataresavedintheGoogleDrivecan beopenedonGoogleCollaboratory.AdditionalguidesareavailableontheIPythonNotebooktemplatefilethatisprovidedwit h thisactivity.Ifthetemplateisnotpresent,thesearethevaluablelinksforreference:

https://jupyter-notebook.readthedocs.io/en/stable/examples/Notebook/Notebook%20Basics.htmlhttps://colab.research.google.com/notebooks/welcome.ipynbhttps://colab.research.google.com/notebooks/markdown_guide.ipynb

AssigningvariablesofdifferentdatatypesinPython

1. Inanemptycell,declareavariable**value**andassignitthevalueof5thendisplayitsvalueusingprint().
2. Createanewcellandtypethecommand:type(value)thenrunthecell.Theoutputshouldbeliketheimage below.



```
In [3]:  type(value)

Out[3]:  int
```

3. Inanewcell,usethesamevariable**value**andassignitthevalueof5.0thenprintthevalue.
4. Repeatstep2.
   Note: Youmaychoosetodecidehowyouexecutethecodeinthecellsforthenexttasksintheprocedure.
5. Repeatthesestepsforthefollowingvalues:
   a. 2+3j
   b. ‘HelloWorld’
   c. “HelloWorld”
   d. True
   e. False
   f. [1,2,3,4,5]
   g. (1,2,3,4,5)
   h. {‘name’:‘Your_name’}
   i. None
6. Re-assignthe**value**variabletobeequalto5.
7. Declareanewvariablenamed**value2**tobeequalto-6.

PerformingOperationswithPython

1. Using**value**and**value2**.Typethecommand:print(**value**+**value2**)
2. Repeatstep1forthefollowingvaluesof**value**and**value2**:
   Hint:Youmaytryusingthisassignment ***value,value2=5,-6***intheNotebookforthefollowingsteps:
   a. value,value2=5.0,6
   b. value,value2=-5,6.1
   c. value,value2=“Hello”,‘world’
   Note:Modifythecodesothathelloandworldwouldbeseparated.
   d. value,value2=[1,2,3],[4,5,6]
   e. value,value2=(1,2,3),(4,5,6)
   f. value,value2={"name":"Royce"},{"age":2}
   Note:Observetheoutputscarefullyandtryrepeatingthemusingsubtraction.

3. Usingvalue,value2=30,4.Typethecommands:
   a. print(value*value2)
   b. print(value2**2)
   c. print(value2**3)
   d. print(value*value2+value2**2+1)
   e. print(value/value2)
   f. print(value%value2)

ReceivingInputDatausingPython

Data can be received through keyboard input in Python by using the input() function. The input function has the following syntax:

input("MessageName")

The"MessageName"isanoptionalStringparameterthatcanbecustomizedtoprompttheuserforamessageinstead of having toprint a messageprompt separately. The default return value of theinput() functionis a String containingthe value received from the keyboard. This value can be assigned to a variableshown in the example below:

name=input("Enteryourname:")

AssigningInputDatatoaVariable

Findingaperson'sBMI(metric)

1. Declareanewvariablenamed**name**andassignitthevalue**input("Enteryourname")**
2. Createanothervariablenamed**weight**andassignitthevalue**input("Enteryourweight(kg):")**
3. Createanothervariablenamed**height**andassignitthevalue**input("Enteryourmeters(m):")**
4. Declareanothervariablecalled**bmi**andassignittheformula$bmi=\frac{weight}{height^2}$
5. Addresstheerrorsdisplayedstep#4.YoucanaccomplishthisbyconvertingtheStringinputtoanotherdatatype. An example would be:

   weight=input("Enteryourweight(kg)")
   weight=float(weight)

   Orsimply**weight=**float(input("Enteryourweight(kg):"))

   Therearemanyfunctionsavailablethatcanconvertonedatatypetoanother.Someofwhicharethefollowing:
   int(),float(),str()

   Otherfunctionswhichmaybeusedinthelaterlabactivitiesare:complex(real,imaginary),list(),tuple(),set(),dict(), ord(), bin(), hex(), oct().

6. Printthe persons's name,weight,height, and
   bmiName: John Ray
   Weight:60
   Height:1.6764
   BMI=21.3499

   Guide:5.5feet~1.6764m

Hint: Youcancombinetwovaluesbyconvertingtheoutputvaluetoα StringandConcatenating(Addition)theoperator on two strings.

```
print(“Value:“+str(12))
```

Youmayexploremanyothermethodstoformatvaluesontotheprint()functioninPython.Anotherexampleis the following:

```
print(“Value:“,12)
```

6.SupplementaryActivity:

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Tasks

1. **WritethePythonequivalentcodeofthefollowingCcode:**

```
intmain(){
    float base = 0, height = 0, area = 0;
    printf(“Enterthebaseofthetriangle:“); scanf(“%f”,
    &base);
    printf(“Entertheheightofthetriangle:“);
    scanf(“%f”, &height);
    area= (1/2)*base*height;
    print(“Theareaofthetriangleis%f”,area);
}
```

2. **WriteaprogramthatwouldconvertCelsiustoFahrenheitgiventheformula:F=(C×9/5)+32 Example of conversion:**

0°C=32°F
-20°C=-4°F

3. **Writeaprogramthatcandeterminethedistancebetweentwopointsgiventhecoordinatesusingthe formula:**

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 -}$$

$y_1)^2$**Hint/Rule:Nolibraryorpackageisneededtoimplementthisequation.**

Example:x2,y2=-3,3andx1,y1=2,2d=5.099019514

Questions:

1. **Give one major difference in syntax that Python has with other languages such as C?**
   One major difference in syntax between python and C language is that python used indentation while C language used curly brackets to define code blocks.
2. **How does variable assignment differ in Python compared with other languages such as C?**
   In python you don’t need to declare the type of variable before assigning a value while C language must have to declared the type and types are fixed.
3. **Try assigning variable names that start with numbers, and special characters. Is the assigning of variables that start with numbers accepted by Python? For Special Characters? Is there an exception for variables special characters?**
   No, in python, variables name must not have numbers and special characters except underscore.
4. **Do the assignment operators (+,-,*,/,%,**) work for all data types? Why or Why not?**
   Assignment operators are not working on all data types since it have a specific function Operator works for numbers but have restrictions in other type of data.
5. **How does the * operator differ from the ** operator?**
   The symbol * is used to multiple the number from the assigned value, while ** acts as power rule or a number multiple by itself.

7.Conclusion:

In conclusion, Python punctuate simplicity, flexibility, and readability. It is more easy to understand but requires the use of dynamic typing and flexible operators. C language on the other hand has a strict structure and type enforcement, it requires manual memory input of data.

8.AssessmentRubric: