Session Uno

Variables

We'll begin with the concept of variables and then move on to some simple calculations. Variables are a way of storing things in a computer program, and they can help you write useful programs. The word variable in programming describes a place to store information such as numbers, text, lists of numbers and text, and so on. Another way of looking at a variable is that it's like a label for something.

```
>>> counter = 100          # An integer assignment
>>> miles   = 1000.0       # A floating point
>>> name    = "John"       # A string

>>> print(counter)
>>> print(miles)
>>> print(name)
```

A variable can have a short name (like x and y) or a more descriptive name (age, carName, total_volume). Rules for Python variables:

• A variable name must start with a letter or the underscore character

• A variable name cannot start with a number

• A variable name can only contain alpha-numeric characters and underscores (A-z, 0-9, and_)

• Variable names are case-sensitive (age, Age and AGE are three different variables)

• Variables are case sensitive

Data Types

Python is Dynamically Typed Language. That's mean you are not required to declare variable before you use it.

```
>>> x = 5
>>> type(x)
int
```

Python will automatically detect the data type of assigned variables.

```
1       ->  int
1.0     ->  float
"1"     ->  str
[1]     ->  list
(1,2,3) ->  tuple
{"x":1} ->  dict
```

We can also assign multiple variables at once. There is some way to assign multiple variables, check the code below:

```
>>> a, b, c, d = 1, 2.0, "3", [4]
>>> type(a)
int
>>> type(b)
float
>>> type(c)
str
>>> type(d)
list

>>> x = [1, "2", {"y":3}, [4]]
>>> a, b, c, d = x
>>> print(a, b, c, d)
(1, '2', {'y': 3}, [4])
```

Basic Arithmetic Operators

The basic symbols used by Python to perform mathematical operations are called *operators*.

Addition	Subtraction	Multiplication	Division	Remainder
+	-	*	/	%

You can use parentheses to combine any number of mathematical operators for calculation.

Division Characteristics

The division operator (/) returns a float value. Such as, 3/2 = 1.5 and 4/2 = 2.0

There is another operator – integer division (//) which returns only integer value after division.

Such as, 3//2 = 1 and 4//2 = 2.

If you divide anything by zero it will throw a ZeroDivisionError.

Comments

Following is example of single line comments-

```
# This is a comment
print("This will run.")  # This won't run
```

Multiline comments –

```
# So you can't
just do this
in python
```

The right way-

```
"""
If I really hate pressing `enter` and
typing all those hash marks, I could
just do this instead
"""
```

Indentation

Python programs get structured through indentation. This principle makes it easier to read and understand other people's Python code. Many a times it is required to treat more than one statements in a program as a block. Different programming languages use different techniques to define scope and extent of block of statements in constructs like class, function, conditional and loop. In C and C++ for example, statements inside curly brackets are treated as a block. Python uses uniform indentation to mark block of statements.

Before beginning of block symbol (:) is used. First and subsequent statements in block are written by leaving additional (but uniform) whitespace (called indent). In order to signal end of block, the whitespace is dedented. Following example illustrates the use of indents in Python:

```
num = int(input("enter number"))

if num%2 == 0:
```

```
if num%3 == 0:
   print ("Divisible by 3 and 2")
else:
   print ("divisible by 2 not divisible by 3")
```

Problems:

Solve the following using python:

1. $Result = \frac{x+y}{x-y}$ Where you can change the value of x and y to get different results.

2. Make a program for Body Mass Index (BMI) calculation.

$$BMI = \frac{weight}{height^2}$$

3. Write a program to convert Celsius to Fahrenheit.

$$\frac{c}{5} = \frac{F-32}{9}$$