# **Python 01: Linear Programs**

**Step-01 : What is a program?**

Goals of the exercise;

1. Understand the concept of (*computer and non-computer*) programs.
2. Experience your first taste of Python without knowing all the details.

**1. What is a general definition of a program? Provide some (non-computer) examples.**  
To understand the concept of computer and non-computer programs I read BRef-01 Chapter 01  
I have two examples from the book. That's knitting. Knitting has patterns and looks like a computer program but isn't. Same goes for cookies. A set of instructions. For as far as I understand a program is a set of instructions that the computer will perform/execute.   
  
**Step-02 : Everything starts with Data?**

Goals of the exercise;  
 1. understand the general concepts of computer hardware: Hard disk, RAM, CPU, IO.  
 2. understand value, variable, primitive data types (int, str, float, boolean).  
 3. understand the concept of mutability (some data types are mutable and some are not).  
 4. implement Python programs containing: variables, assigning values, print.

1. **What are the main hardware elements of a computer?**  
   HDD or SSD, CPU, RAM , Motherboard and PSU
2. **What is an Operating System and why do we need it?**

Operating system is a important software that the computer runs to manage the memory and processes as well as all software and hardware. It allows you to speak with the computer without writing any computer language.

1. **How data (values) are stored / extracted / computed in a computer**

A collection of 8 bits is a byte. 32 bits is 4 bytes etc. Each individual data value in a 'data set'   
 is usually stored using one or more bytes of memory. RAM is a temporary memory system. RAM will be used to store information that needs to be used quickly. Like a short term memory.

1. **What is a value? What is a variable?**

A variable is in simple words a box where you can store values in. A *value* is one of the basic things a program works with, like a letter or a number.

1. **What is a *type*? Provide five examples.**  
   Boolean, Integer(int), String(str), float(double), list. You have lots of built-in data types.
2. **How can you define a variable in Python?**

{Variable name} = {value} ; For example `variable1 = 21`. Now variable1 holds the value 21(int);

1. **Define some variables in Python that are not permitted in Python. Experiment with breaking various rules in defining variables. Analyse the error message.**  
     
   Variables must start with a letter or underscore character. myVar or \_myVar;  
   Variables cannot start with a number;  
   Variable can only contain alpha-numeric characters and underscores  
   Variables names are case-sensitive;

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1. **How can you assign a value to a variable? How can we express that two items are equal?**  
     
   **1. Make a variable name for example 'myVar1`. Then you just type `=` and the value.**  
   **Example: myVar1 = "test" ; myInt1 = 2. So what if I wanna know if the the two items are equal to each other ? If statements and operators can be used.**  
     
   **#Define variables;**

myVar1 = "test"

myVar2 = "test"

if myVar1 == myVar2  
 print("myVar1 and myVar2 are equal to eachother")

else:  
 print("myVar1 and myVar2 are not equal to eachother")  
  
Output:   
myVar1 and myVar2 are equal to eachother

1. **How can you identify the type of a value / variable?**

Use built-in type(); in Python everything is an object. It would probably return class type of object.

1. **Perform a free (re)-search and answer the following questions:**
2. **What are the character and string types in Python? Make examples.**

String in Python are arrays of bytes representing Unicode Characters. A String is a collection of one or more characters put in a single quote, double-q or triple quote. In python there is no character data type, a character is a string of length one.

1. **You have learned how to print something as an output of your program. How can you read something as input? What is the function? What is the type?**

Function = input() and you can store in a variable and the type is String.