# **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 is knitting. Knitting has patterns and looks like a computer program but is not. 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;

USE CAMELCASING

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 want to know if 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 each other")

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

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

Use built-in type(); in Python everything is an object. It would 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.**

Strings 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.  
  
 **1. A phone number is a number. Yet we would want to save it as a text. Can you think of a**  **reason why?**

Because we are not using math with phone numbers. ( guessing ) . I don't see a reason for it to be a integer.

**2. The number in the address of your house, for example Kerkweg 8, is a number. Yet we**  **would**  **want to save it as a text. Can you think of a reason why?**

A reason I could think of is maybe it could have a letter in it as well example; 8A or 8B. Also we are not using any math.

**3. What is an example from a number we use in the real world that we do want to save as a**  **number in Python, not as a text.**

Prices , Because they might get changed when it has tax or discount .. etc.

**4. User input in Python is always considered a text, even if we just enter numbers, why would**  **it act like this?**

Because the user can input anything they want. You can convert it to a int or float.

**5. Define a variable called zipcode (postcode) and give it the value of your own zipcode. Print it**  **using print().**

Zipcode = "2908AG"

print(Zipcode)

**6. Define a variable called favorite food, give it the value "Pizza". Print it. Change the value to**  **"Roti". Print it.**

favoriteFood = "Pizza"

print(favoriteFood)

favoriteFood = "Roti"

print(favoriteFood)

**7. Finish all the exercises listed in BRef-01-Chapter 02: Things to Do**

**Step-03 : How to calculate?**

**1. Using \*\*BRef-01: Chapter 03\*\* answer the following questions:**

**1. Name basic built-in data types in Python. Use examples.**

**Basic built in data types : str, int, float**

1. **What are the basic arithmetic operations? Make a list with the meaning (semantics) of each operation.**

|  |  |  |
| --- | --- | --- |
| + | Addition | x + y |
| - | Subtraction | x - y |
| \* | Multiplication | x \* y |
| / | Division | x / y |

1. **Why \*precedences\* are important? Make examples.**

**4. How can you convert one data type to another? Name basic built-in functions.**

**Str() , int() ; x = 1 this is an int; you can do str(x) then 1 will be a string**