PYTHON BASICS

VARIABLES AND TYPES

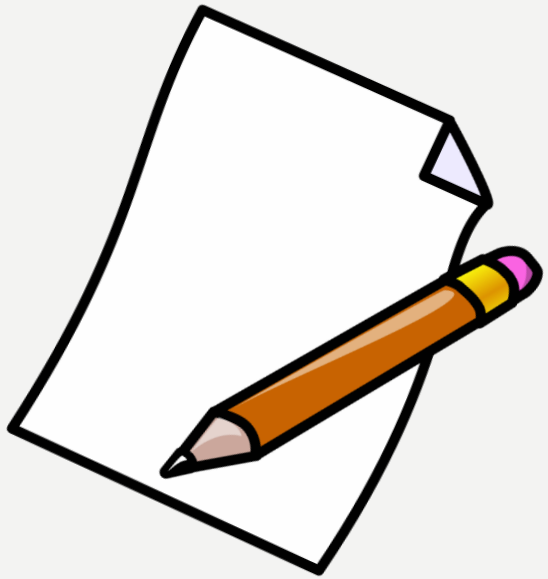
BEFORE WE BEGIN...

PYTHON IS INTERPRETED

- Before we dive into the features of Python it is worth mentioning that Python is an interpreted language.
  - interpreted means that Python looks at each instruction, one at a time, and turns that instruction into something the computer understands.
- That means that you can simply open the Python interpreter and enter instructions one-at-a-time.

YOUR TWO BEST FRIENDS WHEN PROGRAMMING

- These are your two best friends when programming
  - You might not think much of them at first but when the programming assignments become more difficult your friendship will shine ☺

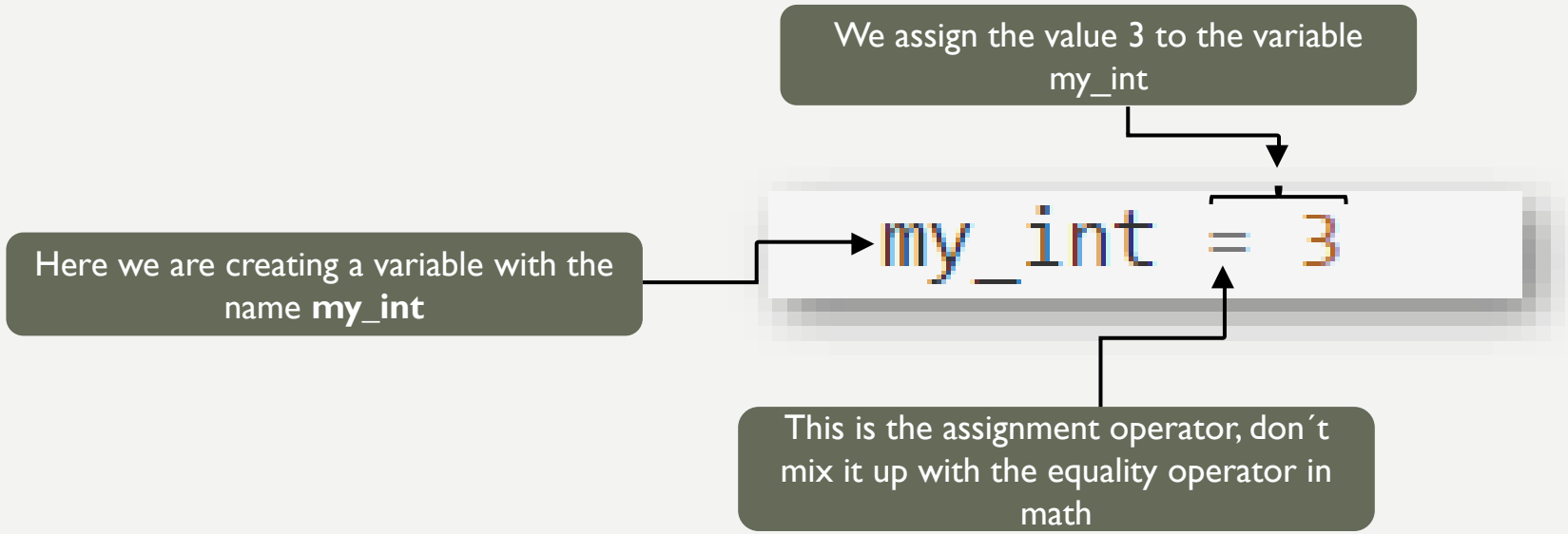


VARIABLES

- Variable(ísl. Breyta)
- What is a variable?
  - **Variables** are used to store information/data that we will need to reference and manipulate in a computer program.
  - **Variables** provide a way of labeling data with a descriptive name (also called an identifier), so our code will be easier to understand.
  - Their purpose is to label and store data in memory. This data can then be used throughout the lifetime of your program.

VARIABLES

- This is an example of a variable **declaration** and **assigment**



VARIABLES

- Internally Python maintains a list of pairs:
  - Each pair consists of
    - The variable's name
    - The variable's value
- A variable is created when a value is assigned the first time. It associates a name and a value
- we say that the variables name references the variables value

VARIABLES

- Here you can see a simple program that creates two variables

This variable has the name my_int and stores the value 3

This variable has the name my_other_int and stores the value 5

```
1 my_int = 3
2 my_other_int = 5
3
```

This is the list of pairs!

The name of the variable	The value stored in the variable
my_int	3
my_other_int	5

VARIABLES

- Can we change the value of a variable?
  - Yes we can!

This variable has the name my_int and stores the value 3

This variable has the name my_other_int and stores the value 5

This variable has the name my_int and stores the value 567

```
1 my_int = 3
2 my_other_int = 5
3 my_int = 567
```

When we reach line 3 the value of the variable my_int will be updated from 3 to 567

This is the list of pairs!

The name of the variable	The value stored in the variable
my_int	567
my_other_int	5

VARIABLES

- There are several rules we must follow when creating variables!
  - Variables names must start with a letter or an underscore, such as:
    - _my_variables = 4
    - my_variable_ = 57
  - The remainder of your variable names may consist of letters, numbers and underscores.
    - Password1 = "abrakadabra"
    - N00b = 64
    - the_answer_to_life = 42
  - Variable names are case sensitive
    - my_var and MY_VAR are not the same variable!

VARIABLES

- The naming convention we will be using for variables is as follows
  - We use lowercase letter (except for classes, that comes later)
  - If the variable name is more than one word we use underscores between words

```
1   my_int = 3
2   the_answer_to_life = 42
3   my_favorite_food = "pizza"
```

VARIABLES

- There are some words in Python that are reserved (often called keywords)
  - Those words can not be used as variable names
- Here is a list of some of the reserved words in Python
  - and, del, from, not, while, as, elif, global, or, with, assert, else, if, pass, yield, break, except, import, print, class, exec, in, raise, continue, finally, is, return, def, for, lambda, try

VARIABLES AND TYPES

- These are the data types
  - Integer: whole numbers such as 0, 2, 987, -3, -56 and so on…
  - Float: 1.2, 3.14, -4.3 and so on
  - Bool (boolean): can either store **True** and **False**
  - String: Characters, words and sentences are called string in programming. They are denoted with double quotes "" or single quotes ''
  - List: Lists are denotes using the square brackets []. The values contained within a list are separated by a comma like this [1, 2, 3, 4]
- More types will come later

VARIABLES AND TYPES

- Here are 8 variables with different types

The type of my_int is int

The type of pi is float

The type of my_favorite_food and my_other_favorite_food is string

The type of prgramming_is_fun and the_summer_was_great is boolean

The type of names and numbers is list

```
1  my_int = 3
2  pi = 3.14
3  my_favorite_food = "pizza"
4  my_other_favorite_food = 'double cheeseburger from Burger King'
5  programming_is_fun = True
6  the_summer_was_great = False
7  names = ['Jack', "Jill", 'John Doe']
8  numbers = [5, 3, 87, 3]
```

VARIABLES AND TYPES

- You are not required to state what type a variable should hold when creating a variable
  - The Python interpreter will figure it out
- The type a variable holds can change
- Do note that knowing the type of the variable you are working with can be important for using the correct operation on a variable
  - Thus proper naming is important!
- It is ok if your variables have long names, the only thing that matters is that the names are descriptive!

VARIABLES AND TYPES

- Here are a couple of things that is common to forget

The quotes must match! If you start your string with double quotes you must end it with double quotes! The same goes for single quotes.

```
my_favorite_food = "pizza"
my_other_favorite_food = 'double cheeseburger from Burger King'
```

True must have an uppercase T and False must have an uppercase F

```
programming_is_fun = True
the_summer_was_great = False
```

COMMENTS

- A comment begins with a # (pound sign, hash tag)
- This means that from the # to the end of that line, nothing will be interpreted by Python.
- With comments you can write information that will help those who read your code understand it
  - But even though comments can be very helpful you should always try to write clean code by using descriptive variable names and so on

Lines 1 and 2 only hold comments explaining what the code in following line will do

```
1  # this variable will store the
2  # name of the user's favorite movie
3  favorite_movie_str = input("What is you favorite movie? ")
```

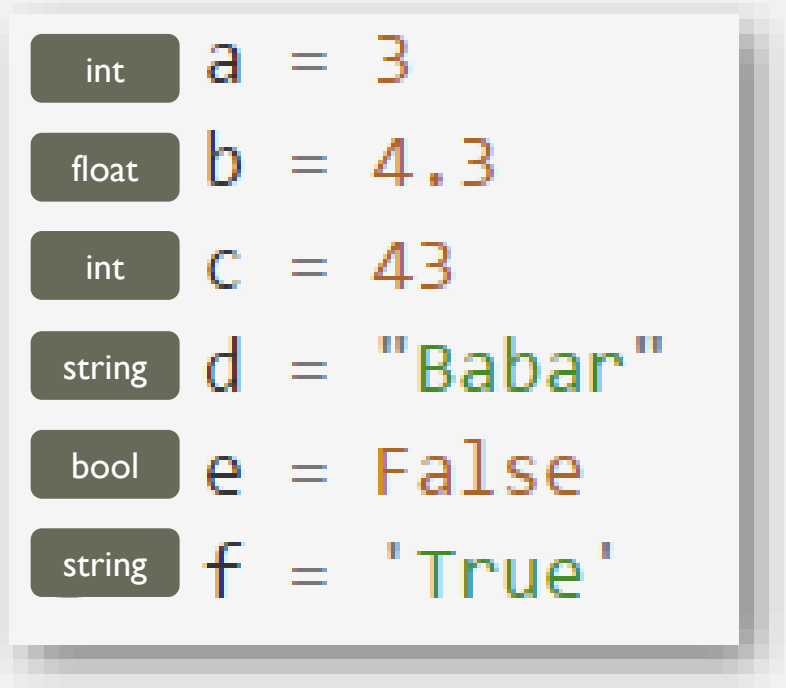
POP QUIZ

- What are the types of each variable?

```
1   a = 3
2   b = 4.3
3   c = 43
4   d = "Babar"
5   e = False
6   f = 'True'
```

POP QUIZ

- Solution



POP QUIZ

- Which lines are valid and which lines are invalid?

```
1   a = "Babar'
2   b = 'Hello there!'
3   c = "I´m Batman"
4   d = true
```

POP QUIZ

- Solution