



# ACCA4020

## Python – Variables, Constants and Data types

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# Variables

- A variable in Programming is like a storage box where you can keep information. You can use variables to store different types of data like numbers, text, or even more complex structures.

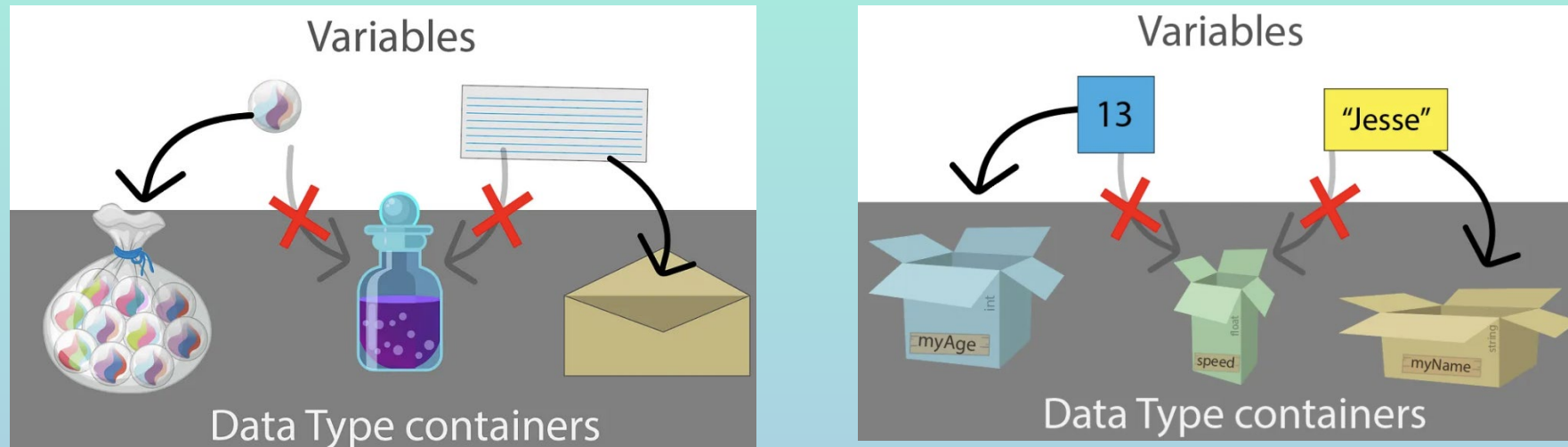


Figure 1: Variable Concepts

Interpret it?

# Variables

- A variable is a named location in memory where you can store a value that can change during the program's execution. Think of it as a box with a label, where you can put different things at different times.
- Important – In python variables do not need to be explicitly declared before they are used. This is different from other programming languages that require variable declaration before using it.
- Python is dynamically typed language i.e. the type of variable is determined at run time.
- Variables must have a value
- Type of a variable depends on the value you assign.

# Variables

## Naming variable

- Variable names can include letters, numbers, and underscores (\_).
- Variable names must start with a letter or an underscore.
- Variable names are case-sensitive (name and Name are different variables).
- Use descriptive names to make your code easier to read and understand.

# Variables

- Assigning values to a variable

VariableName = Value

## Naming variable

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## Value

- Whole numbers -2,-1,0,1,2, 456, 678, etc Integer
- Floating point numbers -2.1,-1.3,0.0,1.33,2.45, 78.567, etc floating point
- Strings “Hello”, “Goodbye”, “1”, etc string
- You can also use single quotes - ‘Hello’
- Boolean True, False Boolean

# Variables

## Exercise 1

1. Create a variable called, `Favourite_Colour` and store your favourite colour and print the value.
2. Create a variable `city` and store the name of your favourite\_city in it. Print the value. Change the value of the city variable to another city name and print it again.

# Variables

## In Python

### Example 1

```
#This is a variable called, myAge and it stores the number 25  
myAge=25  
  
# Lets the print the value of myAge  
print(myAge)
```

In this example, the variable **myAge** is used to store the value **25** and the **print** function is used to display the value of myAge.

```
25
```

```
Process finished with exit code 0
```

### Example 2

```
#Use a variable name called, myName to store your name  
myName='Smith'  
  
# Display the value of myName  
print(myName)
```

In this example, the variable **myName** is used to store the value **Smith** and the **print** function is used to display the value of myName.

# Variables

## Exercise 2

Complete the following:

An integer value , counter = value

A string value, text = value

A floating point value, cost = value

A Boolean value, isReady = value

A string value, textNumber = value

An integer value, foundDogs = value

## Exercise 3

1. Use python to create a variable called, Favourite\_Colour and store your favourite color and print the value.
2. Use python to create a variable city and store the name of your favourite\_city in it. Print the value. Change the value of the city variable to another city name and print it again.

# Constant

A constant is a value that does not change once it is assigned. In Python, there is no built-in support for constants, but by convention, we use uppercase letters to indicate that a variable should be treated as a constant.

## Example 1

```
#Storing a Constant value  
PI=3.142  
WELCOME_MESSAGE='Welcome to Programming'  
print(PI)  
print(WELCOME_MESSAGE)
```

```
3.142  
Welcome to Programming  
  
Process finished with exit code 0
```

In this example,

- the constant **PI** is used to store the value **3.142** and the **print** function is used to display the value of **PI**.
- the constant **WELOCME\_MESSAGE** is used to store the value **Welcome to Programming** and the **print** function is used to display the value of **WELOCME\_MESSAGE**.

# Data types

Data types in Python define the kind of data that can be stored and manipulated within a program. Different data types allow you to perform different operations.

Main data types in Python:

## 1. Numbers

**integers** : these are whole numbers, positive or negative, without decimals.

```
# Let print the value and data type of myAge
print(myAge)
print(type(myAge))
```

- Output - 25  
<class 'int'>

**type** function return the **data type** of the variable, **myAge** and the data type is **int** (integer).

integer = a count of something;

# Data types

Main data types in Python:

2. **float** : these are numbers (positive or negative) with decimals.

```
# Let print the value and data type of temperature
temperature=25.5
print(temperature)
print(type(temperature))
```

- Output -

```
25.5
<class 'float'>
```

**type** function return the **data type** of the variable, **temperature** and the data type is **float** (decimal numbers).

# Data types

Main data types in Python:

3. **strings** : group of characters enclosed within single ('hello') or double ("hello") quotes

```
# Display the value and type of myName  
myName='Smith'  
print(myName)  
print(type(myName))
```

- Output -

```
Smith  
<class 'str'>
```

**type** function return the **data type** of the variable, **myName** and the data type is **str** (string).

# Data types

Main data types in Python:

4. **boolean** : it represents one of two values; True or False

```
#Boolean variable  
#Let print the value and type of is_Found  
is_Found=True  
print(is_Found)  
print(type(is_Found))
```

- Output -

```
True  
<class 'bool'>
```

**type** function return the **data type** of the variable, **is\_Found** and the data type is **bool** (boolean).

# Data types

Other data types in Python:

5. List ...

6. Tuple ...

7. Dictionary ...

8. Sets ...

## **Integer**

Counting items  
Storing age, count

## **Float**

Storing measurements like  
weight, cost, height ,  
temperature etc.

## **String**

Storing and manipulating text  
data.  
Name of something

## **Boolean**

An action that might be taken,  
making decision based on  
condition or to flag

# Variables, Constants and Data types

## Exercise 5

In each of the following, determine a suitable variable name, type and a value.

1. Storing the age of a person
2. Storing the prices of a product
3. Storing name of a place
4. Calculating the minimum number of people that can be safely accommodated.
5. Storing the total area of the stadium in square meters:
6. To determine whether a door is locked or not.
7. Storing a user's phone number

# Variables, Constants and Data types

## Exercise 6

In each of the following, determine suitable variables (name, type and value):

1. The user enters the distance travelled and the time taken, and the program calculates and displays the speed.
2. The user enters the radius of a circle, and the program calculates and displays the circumference and area.
3. The user enters the number of hours worked and the hourly wage, and the program calculates and displays the total pay:

Write the code declaring the required variables