Python Basics

Session-2

3 What is “Docstrings” ?

Students, write your response!

Docstrings

- **Docstrings** are - unlike regular comments - stored as an attribute of the *function* or the *module* they document, meaning that you can access them programmatically.
- Docstring runs as **an explanatory text** of codes and it should be written between triple quotes.

```
"""...docstring text..."""
```.

Docstrings

A **symbolic** representation of the docstring.

```
def function_name():
"""
Hi, I am the docstring of this code.
If you need any information about this function or module, read me.
It can help you understand how the module or function works.
"""
.
.
.
.
.
```

The code block of the function

Docstring of the function

Docstrings

A **symbolic** representation of the docstring.

```
toaster :
"""
Hi, This toaster works with 110v electricity.
You can use it to toast bread and bagels.
Please use for less than 30 mins continuous.
Fire Hazard.
Created by Clarusway.
"""
```

Docstring of the function

The code block of the function

Docstrings

- **Displaying the docstring of a function** :

```
print(function_name.__doc__)
```

Normally, when we want to call docstring of a function or module to read. we will use `.__doc__` (the keyword `doc` enclosed by double underscores) syntax

Docstrings

- **Displaying the docstring of a function** :

```
print(function_name.__doc__)
```

Normally, when we want to call docstring of a function or module to read, we will use `.__doc__` (the keyword `doc` enclosed by double underscores) syntax

```
Hi, I am the docstring of this code.
If you need any information about this function or
module, read me.
It can help you understand how the module or function
works.
```

Docstrings

- **Displaying the docstring of the `print()` function** :

input :

```
1  print(print.__doc__)
2
```

output :

```
1  print(value, ..., sep=' ', end='\n', file=sys.stdout, flush=False)
2
3  Prints the values to a stream, or to sys.stdout by default.
4  Optional keyword arguments:
5  file:  a file-like object (stream); defaults to the current sys.stdout.
6  sep:   string inserted between values, default a space.
7  end:   string appended after the last value, default a newline.
8  flush: whether to forcibly flush the stream.
9
```

Docstrings

- **Display the docstring of the following several built-in functions on your Playground.** You don't have to know/learn what these functions used for, for now.. :

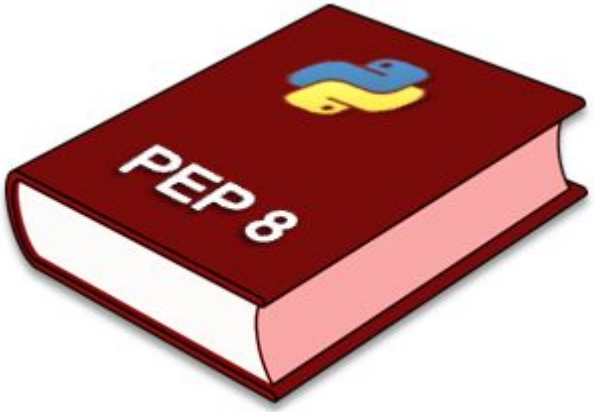
```
map()  : print(map.__doc__)
sum()  : ...
input(): ...
```

Naming Variables

Table of Contents

1 General Description

General Description



- Expert programmers care much for naming the variables well to make their codes easy to understand.

- It is important because programmers spend a lot of time reading and understanding code written by other programmers.

General Description

Tips:

- Remember, a nice and meaningful naming of variables is a skill that can be gained over time. Of course, you also need to be familiar with PEP 8 traditional rules.

Of course, the conventional rules of naming is **optional**. You can use any names you like but it is useful to follow these rules so that someone (including you) knows what you have written.

I didn't understand anything. **What can it be?**

2 Con_PEP_N_Rl

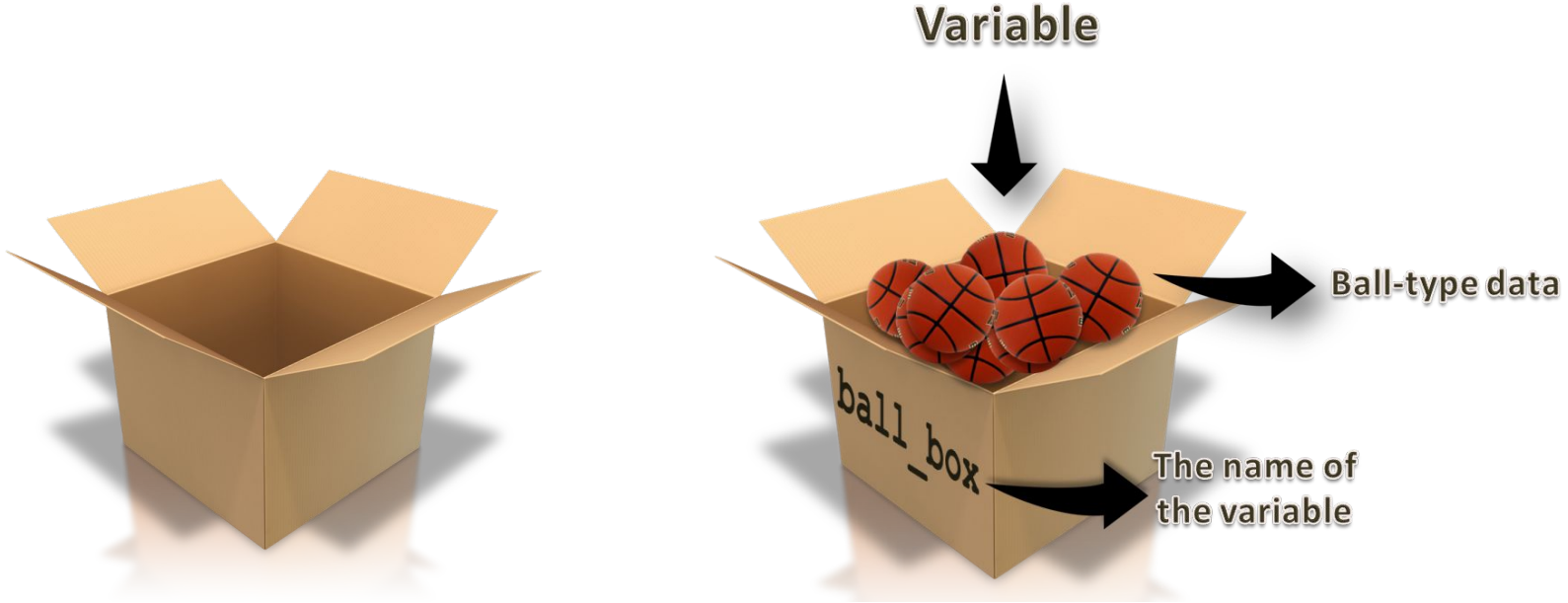
Con_PEP_N_Rl

bad example of naming a variable

2 Conventional (PEP 8) Naming Rules

Variables

- Variable is a location designated where a value can be stored and accessed later. Imagine a box where you store something. That's a variable.



Variables

Creating a variable is very simple in Python.

All you need to do is specify the variable name and then assign a value to it using 👉 =

```
variable name = value
```

```
planet = 'jupyter'
price = 140
pi_number = 3.14
```

The declaration happens automatically when you assign a value to a variable.

Variables

- **Task** 👇
  - Create 3 variables and assign different values to them.
  - Display each of them in Python Playground using `print()` function.

Variables

```
my_age = 33
your_age = 30
my_age = your_age
print(my_age)
```

What is the output? Try to figure out in your mind...

Students, write your response!

Conventional (PEP 8) Naming Rules

- **Some basic naming conventions**

  - Choose **lowercase** words and use underscore to split the words

```
variable = 3.14
```

Conventional (PEP 8) Naming Rules

- **Some basic naming conventions**

  - Do not use `'l'` **(lowercase letter "L")** as single character variable.

```
l = 3.14  # This is lowercase letter el
I = 3.14  # This is uppercase letter eye
```

Conventional (PEP 8) Naming Rules

- **Some basic naming conventions**

  - Do not use `'O'` **(uppercase letter “O”)** as single character variable.

```
time_O = '3.14'  # This is uppercase letter “O”
time_0 = '3.14'  # This is number zero
```

Some Important PEP 8 Rules

- **Some basic naming conventions (reserved words)**

- Do not use specific Python keywords (kwlist) such as :

```
False   class     finally   is       return
None    continue  for       lambda   try
True    def       from      nonlocal while
and     del       global    not      with
as      elif      if        or       yield
assert  else      import    pass     break
except  in        raise
```

Pythonic Rules

Examine these samples carefully

2me	👎	data4me	👍
Big boss	👎	first!	👎
not	👎	Not	👍
big-boss	👎	xy#@!v	👎
1453Fatih	👎	Fatih153	👍
last_name	👍	$price	👎

Some Important PEP 8 Rules

- **Some basic naming conventions**
  - The name of the variable must be legible, meaningful and relevant to the type of value

Good

```
students = ...
```

Bad

```
s = ...  or  st = ...
```

Some Important PEP 8 Rules

- **Some basic naming conventions**
  - The name of the variable must be legible, meaningful and relevant to the type of value

Good

```
students = ...
```

```
# Big Data
big_data = ...
```

Bad

```
s = ...  or  st = ...
```

```
# Big Data
b_dt = ...
```

Some Important PEP 8 Rules

- **Some basic naming conventions**
  - The name of the variable must be legible, meaningful and relevant to the type of value

Good

```
students = ...
```

```
# Big Data
big_data = ...
```

```
# Average income of February
avg_income_feb = ...
```

Bad

```
s = ...  or  st = ...
```

```
# Big Data
b_dt = ...
```

```
# Average income of February
average_income_february = ..
```

Naming Variable

```
amount of rotten fruits
```

```
the list of prime numbers
```

```
the list of mathematics exam scores
```

What can be the **Name** of these sentences as variables.

Students, write your response!

Naming variable

```
amount of rotten fruits
```

- **Good samples** :
  - `rotten_fruit_amount = 33  # kg.`
  - `amnt_fruit_rotten = 33  # kg.`
  - `amount_rotten_fruits = 33 # kg.`

Naming variable

```
the list of prime numbers
```

- **Good samples** :
  - prime_list
  - prime_no
  - list_prime
  - num_prime

Naming variable

```
the list of mathematics exam scores
```

- **Good samples** :
  - `math_scores`
  - `score_maths`

Variables

Assigning a value to a variable.

```
x = y = z = "same"

print(x)
print(y)
print(z)
```

What is the output?

Students, write your response!

Variables

The output

```
same
same
same
```

Write a Python code on Playground :

Hint : Use `int` *value of 30, 31, 28 only once.*

Which months have **31** days and which have **30** or **28**? Let's assign the number of days (30 or 31 or 28) to the months (the variables will be the name of the months) in totally ***three*** code ***lines*** then print their number of days in order of the months as follows.

```
print(january, february, march, april, may, june, july, august, september, october,
november, december)
```

```
31 28 31 30 31 30 31 31 30 31 30 31
```

Students, write your response!

Variables

⚠️ A probable answer :

```
january = march = may = july = august = october = december = 31
# multi assignments in a single line

april = june = september = november = 30

february = 28

print(january, february, march, april, may, june, july, august, september, october,
november, december)
```

If we don’t know the value of a variable, what can we assign to it? For example :

The ages of instructors :

```
thomas = 33
marry = 28
bulend = ?
isabella = 46
```

Variables

If we don’t know the value of a variable, we can assign `None` to it.

```
thomas = 33
marry = 28
bulend = None
isabella = 46
```

Variables

Assigning a value to a variable.

```
website = "apple.com"
print(website)

# assigning a new variable to website
website = "clarusway.com"

print(website)
```

What is the output?

Students, write your response!

Variables

 The output

```
apple.com
clarusway.com
```

Variables

 Assigning a value to a variable.

```
first_number = 100
second_number = first_number
print(second_number)
```

What is the output?

Students, write your response!

Variables

💡 The output

```
100
```

Variables

Assigning a value to a variable.

```
x = 15
y = 33
z = x
x = y

print(x)
print(y)
print(z)
```

What is the output?

Students, write your response!

Variables

💡 The output

```
x = 33
y = 33
z = 15
```

Variables

Assigning a value to a variable.

```
a, b, c = 5, 3.2, "Hello"

print(a)
print(b)
print(c)
```

What is the output?

Students, write your response!

Variables

 The output

```
5
3.2
Hello
```

Variables

Pay attention to the value of variables and how they change.

input :

```
1  color = 'red'  # str type variable
2  season = 'summer'
3  price = 250  # int type variable
4  pi = 3.14  # float type variable
5  color = 'blue'  # You can always assign a new value to a created variable
6  price = 100  # value of 'price' is changed
7  season = 'winter'
8
9  print(color, price, season, sep=', ')
10
```

output :

```
1  blue, 100, winter
2
```

Variables

- Pay attention to the value of variables and how they change.

```
man = "andrew"
color = "green"
age = 32
pi = 3.14
color = "yellow"
age = 44
man = "joseph"

print(man, age, color)
```

Output

```
joseph 44 yellow
```

Basic Data Types

Table of Contents

1

Introduction to Data Types

Introduction to Data Types

- Each data has a type.

- This type of data defines how you store it in memory and it also describes which process can be applied to it.

Introduction to Data Types

- **Some simple data types commonly used in Python.**
  - String,
  - Integer,
  - Float,
  - Boolean.

"2020"

str

3 Strings

"string is the most used type"

"i have 3 lb. of apple"

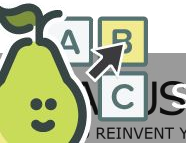
Strings

- If you want to work with any **textual** characters in your code, you have to work with strings.

```
my_text = 'being a good person'
print(my_text)
```

String type is called `str`.

```
type(variable)
```



Students choose an option

Strings

- If you want to work with any **textual** characters in your code, you have to work with strings.

```
my_text = 'being a good person'
print(my_text)
```

```
being a good person
```

String type is called `str`.

- Strings are identified as a set of characters represented in the single or double quotes.

```
type(variable)
```

Type the following values on your Playground to print them as **str** type...

- `alfred@clarusway.com`
- `632`
- `It's early`

If you finish early, work with a peer and help them finish the activity..

Students, follow the instructions on the slide

Strings

- **Let's** do some practices which cover string type.

```
1  str_number = '1923'
2  str_sign = '%(#&*?-'
3
4
5  print(str_number)
6  print(str_sign)
7  print(type(str_number), type(str_sign))
8
9
```

Strings

- **Let's** do some practices which cover string type.

```
1  str_number = '1923'
2  str_sign = '%(#&*?-'
3
4
5  print(str_number)
6  print(str_sign)
7  print(type(str_number), type(str_sign))
8
9
```

Output

```
1923
%(#&*?-
<class 'str'> <class 'str'>
```

4 Numeric Types `int` `float`

Numeric Types

- Three basic numeric types in Python :

  - Integers
  - Floats
  - Complexes

Numeric Types

- **Signed integer** types are whole numbers which don't contain decimal point.

```
my_integer = 40
negative_num = -18

print(my_integer)
print(negative_num)
```

Signed integer type is called `int`.

Numeric Types

- **Signed integer** types are whole numbers which don't contain decimal point.

```
my_integer = 40
negative_num = -18

print(my_integer)
print(negative_num)
```

```
40
-18
```

Signed integer type is called `int`.

Numeric Types

- **Floating point** types stand for real numbers with a decimal point.

```
my_float = 40.0
negative_float = -18.66

print(my_float)
print(negative_float)
```

Floating point type is called `float`.

Numeric Types

- **Floating point** types stand for real numbers with a decimal point.

```
my_float = 40.0
negative_float = -18.66

print(my_float)
print(negative_float)
```

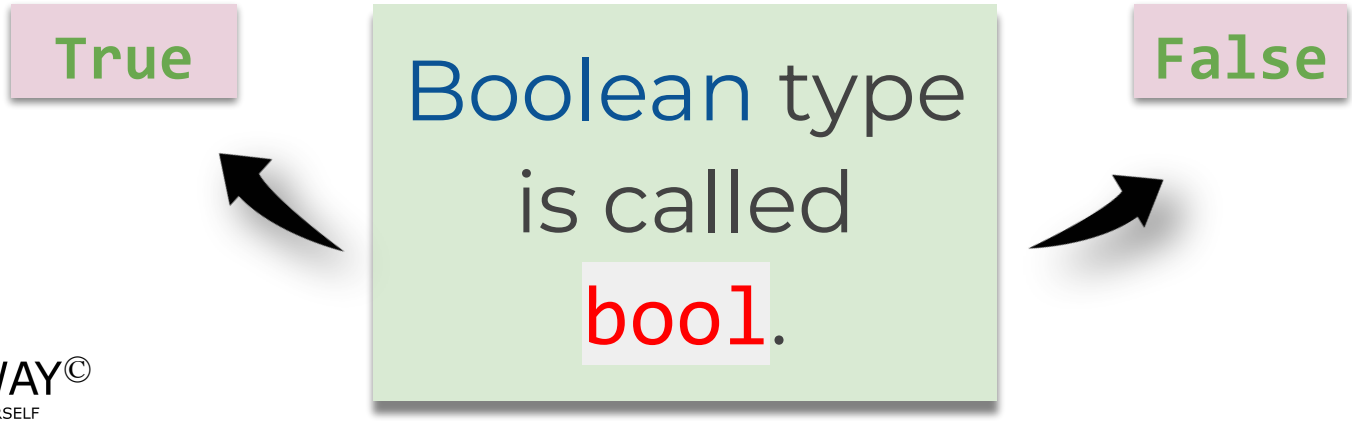
```
40.0
-18.66
```

Floating point type is called `float`.

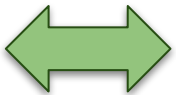
5 Boolean

Boolean

- Boolean types' values are the two constant objects **False** and **True**.
- In numeric contexts (for example, when used as the argument to an arithmetic operator), they behave like the integers 0 and 1, respectively.



6 Type Conversion

`int`  `str`

Type Conversion

We can print the types of data using `type()` function

```
my_data = 'I am string'
print(type(my_data))
```

Type Conversion

We can print the types of data using `type()` function

```
my_data = 'I am string'
print(type(my_data))
```

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

Type Conversion

Type conversion functions.

We can convert the types of data to each other if the type allows to be converted.
There are some functions to convert the types:

- `str()` converts to **string** type
- `int()` converts to **signed integer** type
- `float()` converts to **floating point** type

The value of any type in Python can be converted to a `str`.

True

False

Students choose an option

Type Conversion

Converting `float` to `str`

```
pi = 3.14

converted_pi = str(pi)
print(converted_pi)
print(type(converted_pi))
```

Type Conversion

Converting `float` to `str`

```
pi = 3.14

converted_pi = str(pi)
print(converted_pi)
print(type(converted_pi))
```

```
3.14
<class 'str'>
```

Type Conversion

Converting `float` to `int`

```
pi = 3.14

converted_pi = int(pi)
print(converted_pi)
print(type(converted_pi))
```

What is the output?

Students, write your response!

Type Conversion

Converting `float` to `int`

```
pi = 3.14

converted_pi = int(pi)
print(converted_pi)
print(type(converted_pi))
```

```
3
<class 'int'>
```

Type Conversion

Converting `int` to `float`

```
no = 3

converted_no = float(no)
print(converted_no)
print(type(converted_no))
```

Type Conversion

Converting `int` to `float`

```
no = 3

converted_no = float(no)
print(converted_no)
print(type(converted_no))
```

```
3.0
<class 'float'>
```

Type Conversion

input :

```
x = 39
v = "11"
y = "2.5"
z = "I am at_"

print(x-int(v))
print(x-float(y))
print(z+str(x))
```

output :

```
28
36.5
I am at_39
```

Type Conversion

input :

```
1  x = 39
2  v = "11"
3  y = "2.5"
4  z = "I am at_"
5
6  print(x-int(v))
7  print(x-float(y))
8  print(z+str(x))
9
```

x-int("11") = 39-11 = **28**

output :

```
1  28
2  36.5
3  I am at_39
4
5
```

Type Conversion

input :

```
1  x = 39
2  v = "11"
3  y = "2.5"
4  z = "I am at_"
5
6  print(x-int(v))
7  print(x-float(y))
8  print(z+str(x))
9
```

x-int("11") = 39-11 = **28**

x-float("2.5") = 39-2.5 = **36.5**

output :

```
1  28
2  36.5
3  I am at_39
4
5
```

Type Conversion

input :

```
1  x = 39
2  v = "11"
3  y = "2.5"
4  z = "I am at_"
5
6  print(x-int(v))
7  print(x-float(y))
8  print(z+str(x))
9
```

x-int("11") = 39-11 = **28**

x-float("2.5") = 39-2.5 = **36.5**

z+str(39) = "I am at_" + "39" = **I am at_39**

output :

```
1  28
2  36.5
3  I am at_39
4
5
```

Type Conversion

- **Task**
  - First, Login to your LMS,
  - Then, click **here** to complete and submit the task.

Type Conversion

💡 Without using any Interpreter/IDLE, just try to guess the output.

```
number_int = 123
number_flt = 1.23

number_new = number_int + number_flt

print("datatype of number_int:", type(number_int))
print("datatype of number_flt:", type(number_flt))

print("Value of number_new:", number_new)
print("datatype of number_new:", type(number_new))
```

What is the output?

Students, write your response!

Type Conversion

The output

```
datatype of number_int: <class 'int'>
datatype of number_flo: <class 'float'>
Value of number_new: 124.23
datatype of number_new: <class 'float'>
```

Type Conversion

💡 Without using any Interpreter/IDLE, just try to guess the output.

```
number_int = 123
number_str = "456"

print("Data type of number_int:", type(number_int))
print("Data type of number_str:", type(number_str))

print(number_int + number_str)
```

What is the output?

Type Conversion

💡 The output

```
Data type of number_int: <class 'int'>
Data type of number_str: <class 'str'>

Traceback (most recent call last):
  File "python", line 7, in <module>
TypeError: unsupported operand type(s) for +: 'int' and 'str'
```

Type Conversion

💡 Without using any Interpreter/IDLE, just try to guess the output.

```
number_int = 123
number_str = "456"

print("Data type of number_int:", type(number_int))
print("Data type of number_str before Type Casting:", type(number_str))

number_str = int(number_str)
print("Data type of number_str after Type Casting:", type(number_str))

number_sum = number_int + number_str

print("Sum of number_int and number_str:", number_sum)
print("Data type of the sum:", type(number_sum))
```

What is the output?

Students, write your response!

Type Conversion

The output

```
Data type of number_int: <class 'int'>
Data type of number_str before Type Casting: <class 'str'>

Data type of number_str after Type Casting: <class 'int'>

Sum of number_int and number_str: 579
Data type of the sum: <class 'int'>
```

Draw or type 2 things you already know about today's topic:

1

2

Students, draw anywhere on this slide!

THANKS!

End of the Lesson

(Basic Data Types)

next Lesson

Simple Operations

click above