Object-Oriented Programming

Laboratory Activity No. 1

Review of Technologies

Submitted by:
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4:30pm - 8:30pm / BSCPE 1-A

Submitted to
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I. Objectives

In this section, the goals in this laboratory are:

- To define the key terms in Object-oriented programming

- To be able to know the construction of OO concepts in relation to other types of programming such as procedural or functional programming

II. Methods

General Instruction:

A. Define and discuss the following Object-oriented programming concepts:

1. Classes

In Object Oriented Programming, classes are essential building blocks to create data projects. Also, It represent entities or concepts while objects are actual instances of those concepts. Object Oriented Programming is a mixture of the class mechanisms found in C++ and Modula -3 It defines the attributes and behaviors that the objects created from the class will have.

Example:

define a class

class Dog:

   sound = "bark" # class attribute

2. Objects

Objects have individuality, and multiple names (in multiple scopes) can be bound to the same object. This is known as aliasing in other languages. This is usually not appreciated on a first glance at Python, and can be safely ignored when dealing with immutable basic types (numbers, strings, tuples).

Example:

obj = MyClass()

print(obj.x)

3. Fields

The field function in Python's data class module is a powerful tool for customising the behaviour of class attributes. With the field function, developers can specify attributes such as default values, type hints, and more. This allows for more efficient and concise code, as well as improved data validation and error handling.

Examples

```python
class Person:
    name: str
    birth_year: int
    age: int = field(init=False)

    def __post_init__(self):
        # Assuming the current year is 2024 and their birthday already passed
        self.age = 2024 - self.birth_year
```

4. Methods

Methods are functions that are associated with an object and can manipulate its data or perform actions on it. They are called using dot notation, with the object name followed by a period and the method name. Methods are an important part of object-oriented programming in Python.

```python
Examples = [1, 2, 3]
# Create a copy of the list
b = a.copy()
print(b)
```
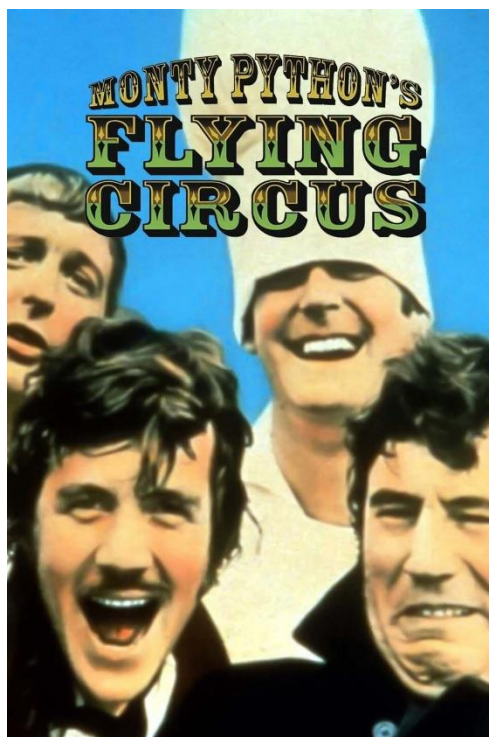
5. Properties

The @property decorator simplifies the management of attributes in your Python classes. It allows you to control attribute access, enabling features such as data

validation, lazy evaluation, and the creation of backward-compatible APIs without modifying the class's public interface.

Example:

```
6.  class Circle:
7.      def __init__(self, radius):
8.          self._radius = radius
9.
10.     @property
11.     def radius(self):
12.         return self._radius
13.
14.     @radius.setter
15.     def radius(self, value):
16.         self._radius = value
17.
18. # Usage
19. circle = Circle(10)
20. print(f"Initial radius: {circle.radius}")
21. circle.radius = 20
22. print(f"Updated radius: {circle.radius}")
```

III.   Results

Alright, let's play detective and go back to the late 1980s. Our main character? Guido van Rossum, the mastermind behind Python. Legend has it that Guido was a big fan of the British

comedy series Monty Python's Flying Circus 😄 . One day as he was brainstorming for a name,

he was struck by the show's surreal and quirky humor… and voilà! The name "Python" was born

The inspiration for the name came from the BBC's TV Show – ' **Monty Python's Flying**

Circus' , as he was a big fan of the TV show and also he wanted a short, unique and slightly

mysterious name for his invention and hence he named it Python! He was the "Benevolent

dictator for life" (BDFL) until he stepped down from the position as the leader on 12th July

2018. For quite some time he used to work for Google, but currently, he is working at Dropbox.

IV.   Conclusion

Object-Oriented Programming concepts such as classes the one that is like a blueprint that defines what is an object will look like, objects the outcome of what you want to build in your class, fields are the attributes or properties inside the class. It stores information about the object, methods are the functions that are defined inside a class. Lastly properties, a special attributes that allow you to control how values are accessed or modified.

The simplicity and readability of Python were key to its creation and continued growth. The creator of this lanuange Guido van Rossum was inspired from Monty Python's Flying Circus, reflects Python's emphasis on fun and approachability. Today, Python remains one of the most popular and versatile programming languages in the world, with an active community and widespread use across various fields.

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