CodeX Computing Co.
Turning Challenges Into Innovative Solutions

Issue Date: 24th March, 2025

Due Date: 2nd April, 2025 (Wednesday at 11:59)

Python Assignment 04 Tasks

1. Create a Bus child class that inherits from the Vehicle class. The default fare charge of any vehicle is seating capacity * 100. If Vehicle is Bus instance, we need to add an extra 10% on full fare as a maintenance charge. So total fare for bus instance will become the final amount = total fare + 10% of the total fare.

2. Create abstract base class "shape" that has abstract method "area". Inherit rectangle, triangle and square class from shape class and provide implementation of "area" method for each derived class. Finally print area of rectangle, triangle and square.

3. Write a program in which a class named Account has private member variables named account_no ,account_bal ,security_code. Use a public function to initialize the variables and print all data.

4. A university is deciding to upgrade its system. In order to upgrade, you need to implement the following scenario:

Note the following,

- The class student has a function that displays information about the student i.e. id and name.
- Class marks is derived from class student and has a function that displays all the marks obtained in the courses by the students. i.e. marks_algo, marks_dataScience, marks_calculus.
- Class result is derived from class marks. This class has a function that calculates the total marks and then calculates the average marks. It then displays both the total and the average marks.

In the main function you are required to do the following:

- Create an object of the result class.
- Then display the student details, the marks obtained in each courses and the total and the average marks.

5. You need to create a system where multiple shapes (like Circle, Rectangle, and Triangle) can be drawn using a common method, showcasing polymorphism.
   - Create a base class Shape with a method draw().
   - Create three subclasses: Circle, Rectangle, and Triangle. Each subclass should override the draw() method to display a unique message.
   - Write a function draw_shape(shape) that takes a Shape object and calls its draw() method.
   - Create instances of each shape and call draw_shape() on them.

6. Create a class called "Employee" with properties "name" and "salary". Add a method called "calculateBonus" that calculates a bonus amount based on the employee's salary. Managers get a bonus equal to 20% of their salary, while developers get a bonus equal to 10% of their salary. Then, create two subclasses called "Manager" and "Developer" that

inherit from the Employee class. The Manager class should have a method called "hire" that logs a message indicating that the manager is hiring someone, while the Developer class should have a method called "writeCode" that logs a message indicating that the developer is writing code. Finally, create a subclass called "SeniorManager" that inherits from the Manager class and that should have the "calculateBonus" method to give senior managers a bonus equal to 30% of their salary.

7. You have a block of text that contains several email addresses scattered throughout. Write a Python script that uses regular expressions to extract all valid email addresses from the text.

8. You have a text document that contains dates in various formats such as 12/09/2023, 2023-09-12, and Sep 12, 2023. Write a Python script that uses regular expressions to extract all dates in these formats from the text.

Resource

OOP in Python:

https://youtu.be/HeW-D6KpDwY?si=KqEIfcJqVYQFtHV4