Data Structure and Algorithm

Laboratory Activity No. 1

Object-oriented Programming

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| *Submitted by:* | *Instructor:* |
| Elpedes, Glen JorgeA. | Engr. Maria Rizette H. Sayo |

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# Objectives

This laboratory activity aims to implement the principles and techniques in object-oriented programming specifically through:

* Identifying object-orientation design goals
* Identifying the relevance of design pattern to software development

# Methods

* Software Development
  + The design steps in object-oriented programming
  + Coding style and implementation using Python
  + Testing and Debugging
  + Reinforcement of below exercises
  1. Suppose you are on the design team for a new e-book reader. What are the primary classes and methods that the Python software for your reader will need? You should include an inheritance diagram for this code, but you do not need to write any actual code. Your software architecture should at least include ways for customers to buy new books, view their list of purchased books, and read their purchased books.
  2. Write a Python class, Polygons that has three instance variables of type str, int, and float, that respectively represent the name of the polygon, its number of sides, and its area. Your class must include a constructor method that initializes each variable to an appropriate value, and your class should include methods for setting the value of each type and retrieving the value of each type.

# Results A diagram of a computer flowchart AI-generated content may be incorrect. Figure 1. Inheritance Diagram The diagram explains how a digital book system functions by showing the roles of different parts.

# A user has basic information like a name and email, and they can buy books, view the books they’ve purchased, and read them.

# The book store contains a catalog of books available for purchase. It allows new books to be added, displays all available books, and lets users buy any book they want.

# Books include details such as the title, author, and price, and users can check this information through a method called get\_details(). There are also special types of books.

# An audio book is a version that can be listened to, and it includes the length of the audio in hours.

# An e-book is a digital form of a book and includes the file format, such as PDF or EPUB.

# E-book readers, like Kindle or Kobo, are devices that allow users to read e-books or listen to audio books.

# These devices have attributes like the device name, screen size, and battery life, and they can open books for reading or listening .

# Each part of the system—whether it's a user, book, store, or device—has attributes, which are its characteristics, and methods, which are the actions it can perform

# A screen shot of a computer program AI-generated content may be incorrect. The Python code defines a class called Polygons, which is used to represent geometric shapes such as triangles, squares, and other polygons.

# The class includes three instance variables: name (a string for the polygon's name), sides (an integer for the number of sides), and area (a float for the area of the shape).

# These variables are initialized using the constructor method \_\_init\_\_, which assigns the values passed when creating an object.

# The class also includes setter methods (set\_name, set\_sides, and set\_area) that allow users to update the name, number of sides, and area after the object is created.

# In addition, getter methods (get\_name, get\_sides, and get\_area) are provided to retrieve the current values of those attributes. In the sample code, a Polygons object named triangle is created with the name "Triangle", 3 sides, and an area of 15.5. The program then prints these values using the getter methods. Later, the area is updated to 18.0 using the set\_area method, and the updated value is printed. Overall, this class provides a simple and organized way to create, access, and modify data about polygons.

Image

Figure 1 Screenshot of program

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# Conclusion

The diagram provides a clear overview of how a digital book system operates by showing the relationships between users, books, bookstores, and reading devices. It highlights how users can interact with the system by purchasing and reading different types of books—regular, audio, or digital. Each component in the system has specific attributes and actions, making the structure organized and easy to understand. Overall, this system offers a convenient and flexible way to access and enjoy books through both online platforms and electronic devices.

**References**

[**Inheritance in Python - GeeksforGeeks**](https://www.geeksforgeeks.org/python/inheritance-in-python/)