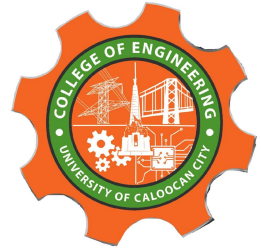**UNIVERSITY OF CALOOCAN CITY**
COMPUTER ENGINEERING DEPARTMENT

Data Structure and Algorithm

Laboratory Activity No. 1

Object-oriented Programming

Submitted by:
Directo, Hannah Thea B.

Instructor:
Engr. Maria Rizette H. Sayo

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I.   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

II.   Methods

- Software Development
  o The design steps in object-oriented programming
  o Coding style and implementation using Python
  o Testing and Debugging
  o Reinforcement of below exercises

A.   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.

B.   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.
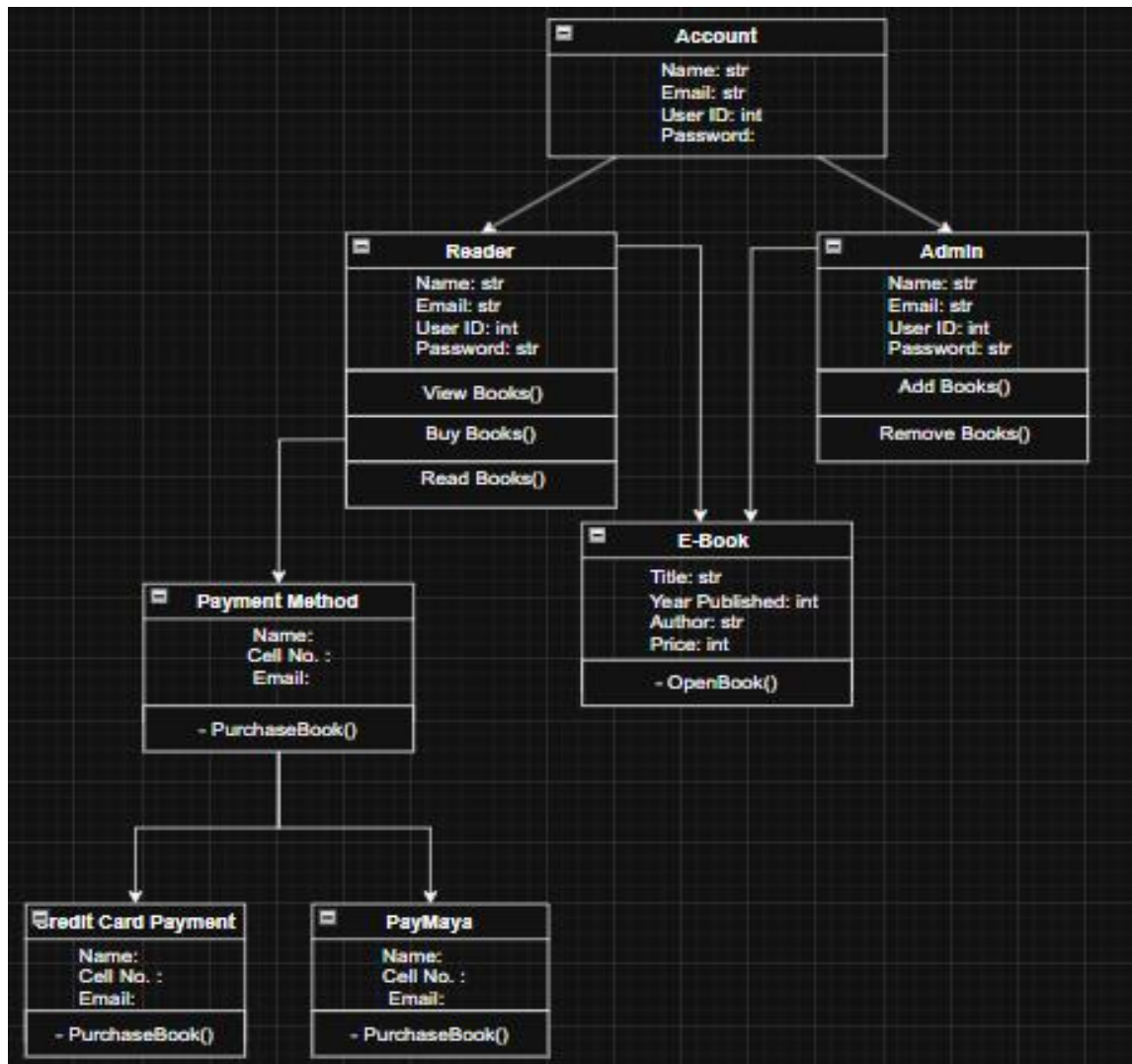
III. Results

Figure 1: Task A

The Account class stores basic user info and inherited by Reader and Admin. Readers can view, buy, and read books, while Admins can add or remove books. The E-Book class contains book details and a method to open the book. For purchasing, the Payment Method class handles basic payment details and is extended by Credit Card Payment and PayMaya, both offering purchase functionality.

Task B: Refer to this Colab link.

https://colab.research.google.com/drive/1fGCUUJGAE7jnWqhC_CJN0WG2h3pHQOuV#scrollTo=aa2xkF-og3s5

IV. Conclusion

In this activity, I designed a simple system for an e-book reader for Task A, I created a class diagram that shows how different parts of the system connect. The diagram includes classes like Account, Reader, Admin, E-Book, and Payment Method, showing how users can log in, buy books, and read them using different payment options. This design helps organize the system clearly. In Task B, I created a Polygons class in Python that uses object-oriented principles like attributes, a constructor, and getter/setter methods to manage data. This task helped me better understand how object-oriented programming can be used to organize and manage data clearly. The activity showed that with a good system design and clean, organized code, it's easier to build software that works well and is easy to understand.

References

[1] Co Arthur O.. "University of Caloocan City Computer Engineering Department Honor Code," UCC-CpE Departmental Policies, 2020.