**OOP Report**

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**Object-Oriented Programming** is a programing model that helps developers organize their work around objects rather than functions and logics. This paradigm can make it more efficient and easier to scale up when it comes to big and complex coding projects.

Throughout the COS20007 course, I’ve learned about the four core concepts of OOP are: **Encapsulation**, **Abstraction**, **Inheritance** and **Polymorphism**.

# I. Encapsulation

**Definition:** Encapsulation is the concept of wrapping data (known as “fields”) and the method into a “class”. This restrics direct access from outside the class, giving controlled access to important data.

**The main goal:** The main goal of encapsulation is to control the access from the outside to the class’s internal to make sure: Data integrity (prevent invalid inputs), Modularity (independent and scalable), Security (exposing only what’s necessary).

**Key component:**

1. Access Modifiers: control field’s visibility: private (-) and public (+) / also there are: protected and internal.
2. Getters and Setters: changing or view the value of a field indirectly.
3. Hide Implementation Details: change the internal implementation of a class without affecting other classes.

**How I implemented this concept in my code:**

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AI-generated content may be incorrect.

# II. Abstraction

**Definition:** Abstraction focuses on hiding the implementation details and only show out the features (or more likely “what it does”) of an object.

**Main goal:** To define a general picture of the behavior of that object and letting specific classes provide the actual implementation behind.

**Purpose:**

* Simplify interaction.
* Separate interface.
* Increase code readability, reusability, and maintainability.
* Enable extensibility via polymorphism.

**How it is used:** Through abstract classes, Interfaces.

**How I implemented this concept in my code:**

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# III. Inheritance

**Definition:** Inheritance allows one class to inherit the members (fields, methods, properties) of another class (parent). It courages code reuse and supports polymorphism.

**Main goal:** Inheritance enables new classes to be built on top of existing ones, avoiding code duplication and making the system easier to extend.

**How I implemented this concept in my code:**

Parent’s method: 

Child class overrided it: A close up of a screen

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# IV. Polymorphism

**Definition:** Polymorphism is the ability of different objects to respond in their own way to the same method call.

**Main goal:** You can call the same method on different objects and get different results.

**Benefits:**

* Code Reusability
* Flexibility
* Maintainability
* Extensibility

**How I implemented this concept in my code:**

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* When the method Draw() is called, but depend on different classes, it will draw a Line or a Rectangle.