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Week 5 Research Assignment

## 1. What are the four pillars of Object-Oriented Programming? Explain each pillar.

**Encapsulation** is the concept of bundling data and the functions that operate on that data within a single unit, an object. This provides a way to hide internal details of an object and expose only the necessary functionalities through well-defined interfaces. Encapsulation enhances code security and reduces the complexity of a system by limiting access to its internal workings.

**Inheritance** is a mechanism that allows for the creation of hierarchical relationships between classes, enabling a subclass to inherit properties and behaviors from a parent class. This facilitates code reuse and promotes modular design, allowing for the creation of specialized classes that inherit from more general classes and add their own specific properties and behaviors.

**Polymorphism** refers to the ability of objects to take on many forms. Method overriding and method overloading are two ways that polymorphism is achieved in OOP. Method overriding allows a subclass to provide its own implementation of a method that is already provided by its parent class, while method overloading enables multiple methods with the same name but different parameters to coexist in a class. Polymorphism enhances code flexibility and extensibility, allowing for the creation of code that can adapt to different situations and requirements.

**Abstraction** is the process of simplifying complex systems by breaking them down into smaller, more manageable components. In OOP, abstraction is achieved through abstract classes and interfaces. Abstract classes provide a basic structure and set of functionalities that can be customized by subclasses, while interfaces define a contract for classes that implement them. Abstraction enhances code modularity and maintainability by separating the implementation details from the interface.

## 2. What is an exception and what are best practices for handling them?

Handling exceptions is an essential part of writing reliable JavaScript code. Exceptions are unexpected or erroneous events that occur during program execution. To handle them, developers should use try-catch blocks, handle exceptions at the appropriate level, provide informative error messages, log errors, use a finally block, and utilize built-in error types. By following these best practices, developers can write more resilient code that is easier to debug and maintain.

# References

Oracle. "The Four Object-Oriented Programming Concepts." Oracle. https://www.oracle.com/java/technologies/javase/oop-concepts.html

GeeksforGeeks. "Pillars of Object Oriented Programming." GeeksforGeeks. https://www.geeksforgeeks.org/pillars-of-object-oriented-programming/