

**Questions:**

**1. How does polymorphism improve flexibility in object-oriented design?**

Flexibility is increased by polymorphism, which permits objects of various types to be treated uniformly, provided they inherit from the same base class or follow a common interface. Because of this, developers are able to create more reusable, universal code that can manage numerous objects without requiring changes to the logic that is already in place. Two types of polymorphism are present: Method overloading is a type of compile-time (static) polymorphism, while runtime (dynamic) polymorphism, which includes overriding methods. The use of polymorphism systems can be made extendable by developers so that new features can be added without changing the current codebase to make it more modular and maintainable.

**2. What is the advantage of using inheritance to extend functionality?**

Code structure is made easier by inheritance, which permits subclasses to inherit properties and actions from a parent teacher. As a result, there is less redundancy and more code reuse. maintaining uniformity among related classes. Additionally, it makes extensibility easier because subclasses are able to improve or alter inherited behavior without altering the source code. Additionally, because inheritance allows for backward compatibility, new subclasses can be created without interfering with already-existing functionality. It is therefore a crucial instrument for preserving applications that are scalable and organized.

**Observation**

From knowledge of object-oriented programming and Java, polymorphism, and inheritance establish a solid basis for software design. Dynamic behavior is made possible by polymorphism, enabling code to changelessly to accommodate various object types, while inheritance guarantees structures that are both reusable and maintainable. These ideas, when coupled with interfaces, further separate dependencies to create software architectures that are flexible, scalable, and modular develop well over time.