Polymorphism

CSPROG2
Computer Programming 2 for CS

Specific Objective

- Learn about the definition of polymorphism
- Learn about the implementation of polymorphism
- Explore how to use the method of polymorphism
- Differentiate the function of overloading with the overriding effect of polymorphism

Polymorphism

- Polymorphism is the ability of objects belonging to different types to respond to methods of the same name, each one according to the right type-specific behavior.
- It is the ability to redefine methods for derived classes.

Polymorphism

- **Implementing Polymorphism**

1. **Method Overloading**
   - **Using one method identifier to refer to multiple functions in the same class, In the Java programming language, methods can be overloaded but not variables or operators.**

Polymorphism

- **Method Overloading**

➢ **Constructor Overloading**

– **-** creating more than one constructor in a class

➢ **Method Overloading**

– **-** creating multiple methods having same name in one class.

Polymorphism

- **Example : Constructor Overloading**

```
public Student(){
        …
}

public Student(String name, int studNo){
                this.name = "Anonymous";
}
    //more constructor here…
```

Polymorphism

- **Example : Method Overloading**

```
public void eat(){
            …
   }

   public void eat(String food){
  cout << "The animal is eating ," +food);
}
        //more methods here…
```

Polymorphism

- **Implementing Polymorphism**

2. Method Overriding

- **Providing a different implementation of a method in a subclass of the class that originally defined a method.**

Polymorphism

- **Example : Method Overriding**

```
public class ElectronicDevice{
    …
    public void on(){
          cout << "The device is turned on!";
    }
}

public class Computer extends ElectronicDevice{
    public void on(){
          cout  << The computer boots…";
          cout  << "The computer loads drivers…";
          }
}
```

Polymorphism

Overloading VS. Overriding

Overloading

- Overloaded functions supplement each other.
- Overloaded functions can exist, in any number, in the same class.
- Overloaded functions must have different argument lists.
- The return type of an overloaded function may be chosen freely.

Polymorphism

Overriding

- Overriding function replaces the function it overrides.
- Each function in a base class can be overridden at most once in any one derived class.
- Overriding functions must have argument lists of identical type and order.
- The return type of an overriding method must be identical to the function it overrides.