



# Green University of Bangladesh

**Department of Computer Science and Engineering (CSE)**

Faculty of Sciences and Engineering

Fall 2022, B.Sc. in CSE (DAY)

## LAB REPORT NO # 06

**Course Title: Object Oriented Programming (JAVA)**

**Course Code: CSE 202**

**Section: CSE 213 - DA (PC)**

**Lab Experiment Name(s):**

Polymorphism

### Student Details

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**Lab Date:** 28 November, 2022

**Submission Date:** 04 December, 2022

**Course Teacher's Name:** Dr. Muhammad Aminur Rahaman, Associate Professor

**[For Teacher's use only: Don't write anything inside this box]**

### Lab Report Status

<b>Marks:</b>	<b>Signature:</b>
<b>Comments:</b>	<b>Date:</b>

# **1. TITLE OF THE LAB EXPERIMENT**

Polymorphism

## **2. OBJECTIVES**

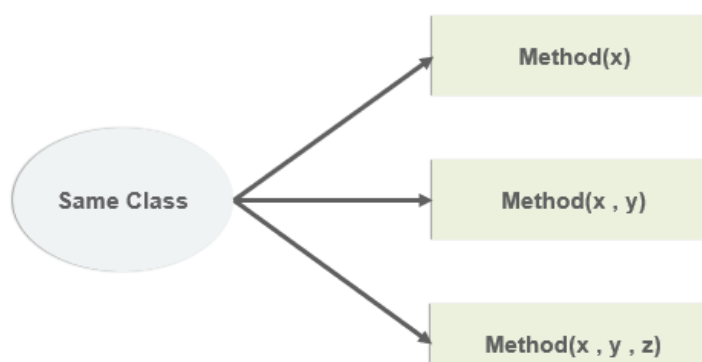
- Understanding Polymorphism in Abstract classes
- Method overloading, Method overriding

## **3. DEFINITION & DESCRIPTION**

### **What is Method Overloading in Java?**

Method overloading allows the method to have the same name which differs on the basis of arguments or the argument types. It can be related to compile-time polymorphism. Following are a few pointers that we have to keep in mind while overloading methods in Java.

- We cannot overload a return type.
- Although we can overload static methods, the arguments or input parameters have to be different.
- We cannot overload two methods if they only differ by a static keyword.
- Like other static methods, the main() method can also be overloaded.



### **3. DEFINITION & DESCRIPTION**

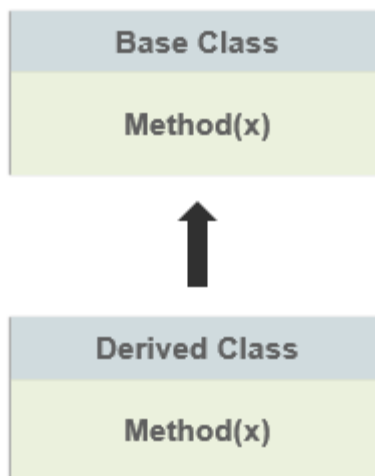
#### **What Is Method Overriding in Java?**

Inheritance in java involves a relationship between parent and child classes. Whenever both the classes contain methods with the same name and arguments or parameters it is certain that one of the methods will override the other method during execution. The method that will be executed depends on the object.

If the child class object calls the method, the child class method will override the parent class method. Otherwise, if the parent class object calls the method, the parent class method will be executed.

#### ***Rules For Method Overriding***

- ☐ The access modifier can only allow more access for the overridden method.
- ☐ A final method does not support method overriding.
- ☐ A static method cannot be overridden.
- ☐ Private methods cannot be overridden.
- ☐ The return type of the overriding method must be the same.
- ☐ We can call the parent class method in the overriding method using the super keyword.
- ☐ A constructor cannot be overridden because a child class and a parent class cannot have the constructor with the same name.







## 4. IMPLEMENTATION & TEST RESULT

### Example of Method Overloading

Main.java	Output
<pre>1 import java.io.*; 2 3 class MethodOverloadingEx { 4 5     static int add(int a, int b) 6     { 7         return a + b; 8     } 9 10    static int add(int a, int b, int c) 11    { 12        return a + b + c; 13    } 14 15    public static void main(String args[]) 16    { 17        System.out.println("add() with 2 18        parameters"); 19        System.out.println(add(4, 6)); 20 21        System.out.println("add() with 3 22        parameters"); 23        System.out.println(add(4, 6, 7)); 24    } 25 }</pre>	<pre>java -cp /tmp/jvTeOTjx65 MethodOverloadingEx add() with 2 parameters 10 add() with 3 parameters 17</pre>

## 4. IMPLEMENTATION & TEST RESULT

### Example of Method Overriding

Main.java	  	Output	
<pre>1 import java.io.*; 2 class Animal { 3     void eat() 4     { 5         System.out.println("eat() method of base           class"); 6         System.out.println("eating."); 7     } 8 } 9 class Dog extends Animal { 10    void eat() 11    { 12        System.out.println("eat() method of derived           class"); 13        System.out.println("Dog is eating."); 14    } 15 } 16 class MethodOverridingEx { 17     public static void main(String args[]) 18     { 19         Dog d1 = new Dog(); 20         Animal a1 = new Animal(); 21 22         d1.eat(); 23         a1.eat(); 24 25         Animal animal = new Dog(); 26 27         animal.eat(); 28     } 29 } 30</pre>		<pre>java -cp /tmp/jvTe0Tjx65 MethodOverridingEx eat() method of derived class Dog is eating. eat() method of base class eating. eat() method of derived class Dog is eating.</pre>	

## **5. ANALYSIS AND DISCUSSION**

- 1) Here, we can see that a method `eat()` has overridden in the derived class name **Dog** that is already provided by the base class name **Animal**. When we create the instance of class **Dog** and call the `eat()` method, we see that only derived class `eat()` method run instead of base class method `eat()`, and When we create the instance of class **Animal** and call the `eat()` method, we see that only base class `eat()` method run instead of derived class method `eat()`.

## **6. SUMMARY**

Overriding occurs when the method signature is the same in the superclass and the child class. Overloading occurs when two or more methods in the same class have the same name but different parameters..