Difference Between Overloading and Overriding in Java

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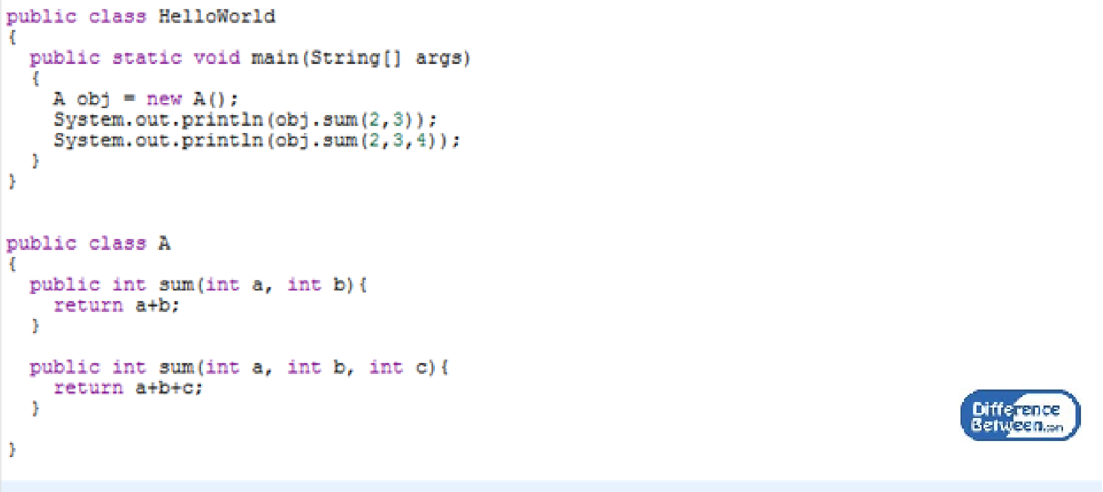
Key Difference - Overloading vs Overriding in Java

Object-Oriented Programming (OOP) is a major paradigm in software development. It is a methodology to design a program using classes and objects. A class is a blueprint. It describes what should contain in the object. It defines the properties or attributes and the methods that the object should consist of. Therefore, an object is an instance of a class. These objects communicate with other objects. One major concept of OOP is Polymorphism. It is the ability for an object to behave in multiple ways. Polymorphism is categorized into two sections which are overloading and overriding. This article discusses the difference between these two in Java. The **key difference** between overloading and overriding in Java is, **Overloading is the ability to create multiple methods of the same name with different implementations and Overriding is to provide an implementation for a subclass method that already exists in the superclass**.

What is Overloading in Java?

Overloading is the ability to create multiple methods of the same name with different implementations. Refer the below Java code.



```
public class HelloWorld
{
  public static void main(String[] args)
  {
    A obj = new A();
    System.out.println(obj.sum(2,3));
    System.out.println(obj.sum(2,3,4));
  }
}


public class A
{
  public int sum(int a, int b){
    return a+b;
  }

  public int sum(int a, int b, int c){
    return a+b+c;
  }

}
```

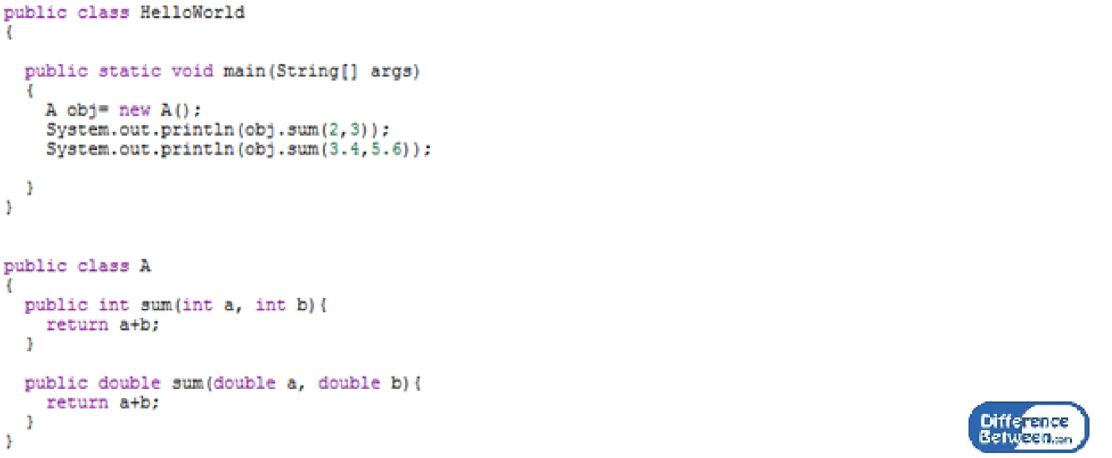
Figure 01: Java program that explains Overloading with different number of arguments

According to the above program, class A contains two methods with the same name. The first sum method has two parameters. The second sum method has three parameters.

When creating an object of type A and calling sum(2,3) , it will call sum method with two parameters that are sum(int a, int b) and returns 5. When creating an object of type A and calling sum(2,3,4), it will call the other sum method with three parameters which is the sum(int a, int b, int c) and returns 9.

The method name is the same but number of parameters are different. It can be observed that the same object is behaving differently. This concept is known as overloading. It is also referred as static binding or compiles time polymorphism.

There can also be overloaded with different data types. Refer the below Java code.



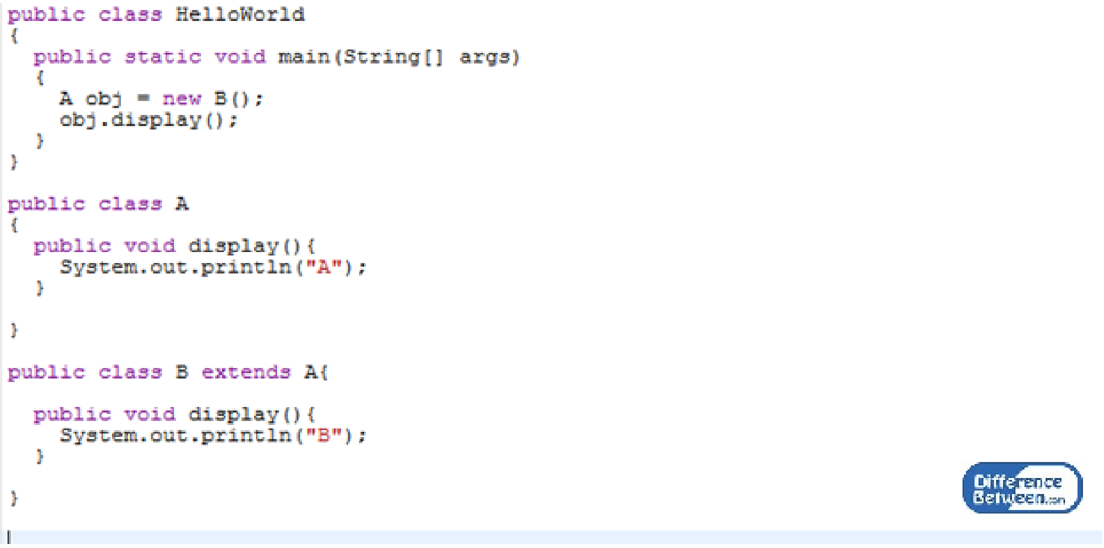
```
public class HelloWorld
{

  public static void main(String[] args)
  {
    A obj= new A();
    System.out.println(obj.sum(2,3));
    System.out.println(obj.sum(3.4,5.6));

  }
}


public class A
{
  public int sum(int a, int b){
    return a+b;
  }

  public double sum(double a, double b){
    return a+b;
  }
}
```

Figure 02: Java program which explains Overloading with different number of arguments

According to the above program, class A consist of two methods with the same name. The sum(int a, int b) method receives two integer values. The sum(double a double b) receives two double values. When creating the object of type A and calling sum(2,3), it will call sum(int a, int b) and return the value 5. When calling sum(3.4, 5.6), it will call sum(double a double b) and return the value 9.0. In this example, the methods have the same name, but a different type of variables. This is also overloading.

What is Overriding in Java?

In Java, it is possible to build subclasses with already existing classes. Rather than creating the new class from the beginning, it is possible to use the properties and methods of the already existing class. The existing class is the superclass, and the derived class is the subclass. When the subclass provides an implementation for a method, which is already in the superclass, it is known as overriding. Refer the below Java program.



```
public class HelloWorld
{
  public static void main(String[] args)
  {
    A obj = new B();
    obj.display();
  }
}

public class A
{
  public void display(){
    System.out.println("A");
  }

}

public class B extends A{

  public void display(){
    System.out.println("B");
  }

}
```

Figure 03: Java program for overriding

According to the above program, Class A is having a method display(). Class B is extending from class A, so the properties and methods of class A are accessible by class B. Class B has method display() with a specific implementation. When creating an object of type, A and calling the display method, it will give the output B. Even though; class A has a display method, it is overridden be class B display method. Subclass is implementing a method already exist in the superclass.

This concept is a type of polymorphism and known as overriding. It is also called as Late binding, Dynamic Binding, Runtime Polymorphism.

What are the Similarities Between Overloading and Overriding in Java?

- Both are types of Polymorphism.
- In overloading and overriding, methods have the same name.

What is the Difference Between Overloading and Overriding in Java?

Overloading vs Overriding in Java	
Overloading in Java is the ability to create multiple methods of the same name with different implementations.	Overriding in Java is providing a specific implementation in subclass method for a method already exist in the superclass.
Parameters	
In overloading, the methods have the same name but a different number of parameters	In overriding, the methods have the same name and parameters must be the same.

or a different type of parameters.	
Themes	
Overloading occurs within the class.	Overriding occurs within the two classes that have an inheritance relationship.
Synonyms	
Overloading is called compiled time polymorphism.	Overriding is called run time polymorphism.

Summary - Overloading vs Overriding in Java

Polymorphism is a major concept in Object Oriented Programming. It provides the ability for an object to behave in multiple ways. This can be of either overloading or overriding. Overloading is the compile-time polymorphism, and overriding is the runtime polymorphism. They are useful in software application development. The difference between overriding and overloading is that Overloading is the ability to create multiple methods of the same name with different implementations and Overriding is providing a specific implementation in subclass method for a method already exist in the superclass. It is possible to implement both overloading and overriding in Java.

Reference:

1.tutorialspoint.com. “Java Overriding.” The Point. Available here
2.“Method Overloading in Java - Javatpoint.” Available here
3.“Method Overriding in Java - javatpoint.” Available here

How to Cite this Article?

APA: Difference Between Overloading and Overriding in Java.(2018 January 16). Retrieved (date), from http://differencebetween.com/difference-between-overloading-and-vs-overriding-in-java/

MLA: "Difference Between Overloading and Overriding in Java" Difference Between.Com. 16 January 2018. Web.

Chicago: “Difference Between Overloading and Overriding in Java.” Difference Between.Com. http://differencebetween.com difference-between-overloading-and-vs-overriding-in-java/ accessed (accessed [date])