Java Keyword - super

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Super Keyword

- What is super?
- Uses of super keyword
- Super used To call methods of the superclass that is overridden in the subclass.
- Access Attributes of the Superclass
- Use of super() to access superclass constructor
- Use of super()
- Call Parameterized Constructor Using super()

★ What is Super?

- ★ The super keyword refers to the objects of immediate parent class. OR
- ★ The super keyword in Java is a reference variable which is used to refer immediate parent class object.
- ★ Whenever you create the instance of subclass, an instance of parent class is created implicitly which is referred by super reference variable.
- ★ The super keyword in Java is used in subclasses to access superclass members (attributes, constructors and methods).

★ Uses of super keyword

1. To call methods of the superclass that is overridden in the subclass.
2. To access instance variable (fields) of the superclass if both superclass and subclass have attributes with the same name.
3. To explicitly call superclass no-arg (default) or parameterized constructor from the subclass constructor.

★ Super used To call methods of the superclass that is overridden in the subclass.

If methods with the same name are defined in both superclass and subclass, the method in the subclass overrides the method in the superclass. This is called method overriding.

Output : I am a dog

-> In this example, by making an object dog1 of Dog class, we can call its method printMessage() which then executes the display() statement.

-> Since display() is defined in both the classes, the method of subclass Dog overrides the method of superclass Animal. Hence, the display() of the subclass is called.

```
class Animal {

  // overridden method
  public void display(){
    System.out.println("I am an animal");
  }
}

class Dog extends Animal {

  // overriding method
  @Override
  public void display(){
    System.out.println("I am a dog");
  }

  public void printMessage(){
    display();
  }
}

class Main {
  public static void main(String[] args) {
    Dog dog1 = new Dog();
    dog1.printMessage();
  }
}
```

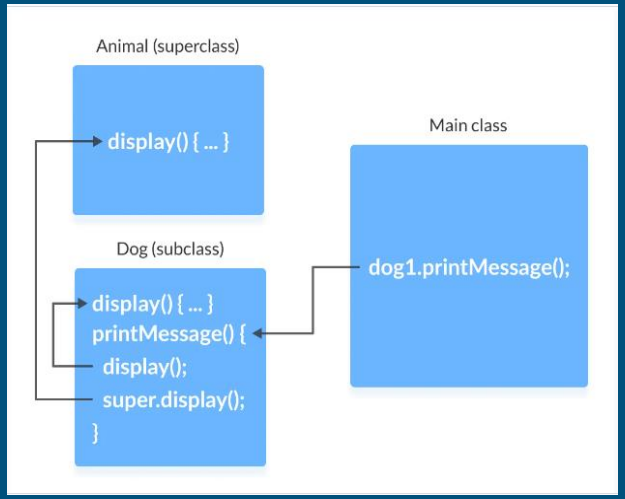
What if the overridden method of the superclass has to be called?

We use super.display() if the overridden method display() of superclass Animal needs to be called.

Output : I am a dog

I am an animal

Here, how the above program works.




```java
class Animal {

  // overridden method
  public void display(){
    System.out.println("I am an animal");
  }
}

class Dog extends Animal {

  // overriding method
  @Override
  public void display(){
    System.out.println("I am a dog");
  }

  public void printMessage(){

    // this calls overriding method
    display();

    // this calls overridden method
    super.display();
  }
}

class Main {
  public static void main(String[] args) {
    Dog dog1 = new Dog();
    dog1.printMessage();
```

★ Access Attributes of the Superclass

The superclass and subclass can have attributes with the same name. We use the super keyword to access the attribute of the superclass.

Output : I am a mammal

I am an animal

Inside the printType() function :-

-> type refers to the attribute of the subclass Dog.

-> super.type refers to the attribute of the superclass Animal.

```
class Animal {
  protected String type="animal";
}

class Dog extends Animal {
  public String type="mammal";

  public void printType() {
    System.out.println("I am a " + type);
    System.out.println("I am an " + super.type);
  }
}

class Main {
  public static void main(String[] args) {
    Dog dog1 = new Dog();
    dog1.printType();
  }
}
```

★ Use of super() to access superclass constructor

As we know, when an object of a class is created, its default constructor is automatically called.

- ★ To explicitly call the superclass constructor from the subclass constructor, we use super(). It's a special form of the super keyword.
- ★ super() can be used only inside the subclass constructor and must be the first statement.
- ★ However, using super() is not compulsory. Even if super() is not used in the subclass constructor, the compiler implicitly calls the default constructor of the superclass.

So, why use redundant code if the compiler automatically invokes super()?

- ★ It is required if the parameterized constructor (a constructor that takes arguments) of the superclass has to be called from the subclass constructor.
- ★ The parameterized super() must always be the first statement in the body of the constructor of the subclass, otherwise, we get a compilation error.

★ Use of Super()

Output : I am an animal

I am a dog

-> Here, when an object dog1 of Dog class is created, it automatically calls the default or no-arg constructor of that class.

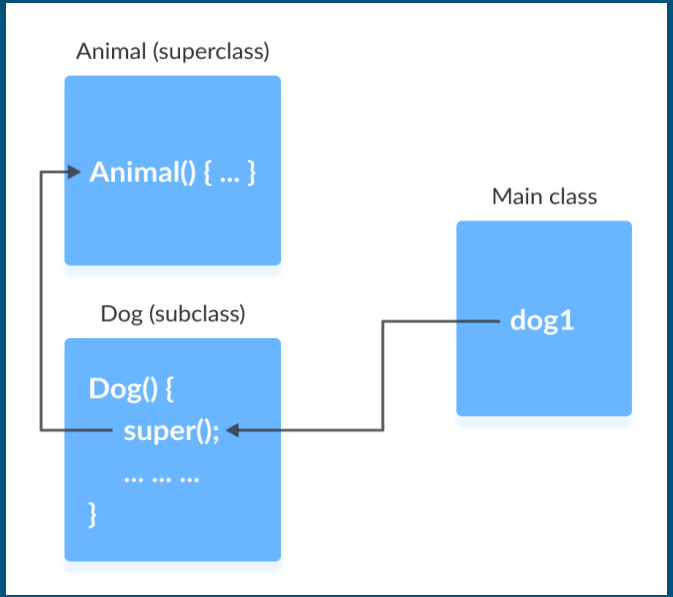
-> Inside the subclass constructor, the super() statement calls the constructor of the superclass and executes the statements inside it. Hence, we get the output I am an animal.

```
class Animal {

  // default or no-arg constructor of class Animal
  Animal() {
    System.out.println("I am an animal");
  }
}

class Dog extends Animal {

  // default or no-arg constructor of class Dog
  Dog() {

    // calling default constructor of the superclass
    super();

    System.out.println("I am a dog");
  }
}

class Main {
  public static void main(String[] args) {
    Dog dog1 = new Dog();
  }
}
```

The flow of the program then returns back to the subclass constructor and executes the remaining statements. Thus, I am a dog will be printed.

-> The compiler can automatically call the no-arg constructor. However, it cannot call parameterized constructors.

-> If a parameterized constructor has to be called, we need to explicitly define it in the subclass constructor.



★ Call Parameterized Constructor Using super()

Output: Type: Animal

I am a dog

```java
class Animal {

  // default or no-arg constructor
  Animal() {
    System.out.println("I am an animal");
  }

  // parameterized constructor
  Animal(String type) {
    System.out.println("Type: "+type);
  }
}

class Dog extends Animal {

  // default constructor
  Dog() {

    // calling parameterized constructor of the superclass
    super("Animal");

    System.out.println("I am a dog");
  }
}

class Main {
  public static void main(String[] args) {
    Dog dog1 = new Dog();
  }
}
```

Thank you