

JAVA PROGRAMMING BASICS

Module 2: Java Object-oriented Programming

Training program

1. Classes and Instances
2. The Methods
3. **The Constructors**
4. Static Elements
5. Initialization sections
6. Package
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8. Abstract classes and Interfaces
9. String processing
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12. Nested classes
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Module contents

- The Constructors
 - Constructors declaration
 - Default Constructors
 - Constructors overloading
 - Calling one constructor from another

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Constructor declaration 1/4

```
1. public class Car {  
2.     private int maxSpeed;  
3.     //...  
4.     public Car(int maxSpeed) {  
5.         this.maxSpeed = maxSpeed;  
6.     }  
7.     //...  
8.     public int getMaxSpeed() {  
9.         return maxSpeed;  
10.    }  
11. }
```



Constructor
declaration

Constructor declaration 2/4

- Constructors are special methods defined in a class that used while class instances are created for the instances initialization.

Access modifier Constructor parameters may contain Exceptions list

```
1. public Car(int maxSpeed) {  
2.     this.maxSpeed = maxSpeed;  
3. }
```

Constructor body

The diagram illustrates the components of a Java constructor declaration. It shows a code snippet with three lines: 1. `public Car(int maxSpeed) {`, 2. `this.maxSpeed = maxSpeed;`, and 3. `}`. Annotations include: 'Access modifier' pointing to `public`, 'Constructor parameters' pointing to `(int maxSpeed)`, and 'may contain Exceptions list' pointing to the space between the parameters and the opening brace. A large blue bracket on the right side groups the three lines under the label 'Constructor body'.

Constructor declaration 3/4

Get a block of unused memory in the heap, large enough to hold an object of the specified type



Call the default constructor of the superclass if no constructor is defined



Initialize member variables to the specified values (or default initial value is used)



Executes the body of the constructor

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Default Constructors 1/4

- When we don't define any constructor, the compiler creates the default constructor

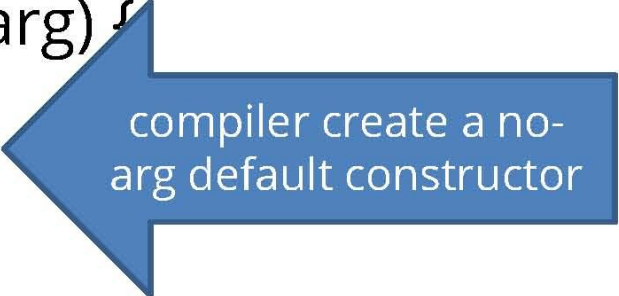
```
1. public class Car {  
2.     private int maxSpeed;  
3.     //...  
4.     public int getMaxSpeed() {  
5.         return maxSpeed;  
6.     }  
7.     //...  
8. }
```

- equivalent to the declaration:* **public** Car() { }

The same access modifier as the class

Default Constructors 2/4

```
1. public class Main {  
2.     public static void main(String[] arg) {  
3.         Car myCar1 = new Car();  
4.         Car myCar2 = new Car();  
5.         Car myCar3 = new Car();  
6.         System.out.println(myCar1.getMaxSpeed());  
7.         System.out.println(myCar2.getMaxSpeed());  
8.         System.out.println(myCar3.getMaxSpeed());  
9.     }  
10. }
```



compiler create a no-
arg default constructor

Default Constructors 3/4

- When we define any constructor, the compiler don't creates the default constructor

```
1. public class Car {  
2.     private int maxSpeed;  
3.     //...  
4.     public Car(int maxSpeed) {  
5.         this.maxSpeed = maxSpeed;  
6.     }  
7.     //...  
8.     public int getMaxSpeed() {  
9.         return maxSpeed;  
10.    }  
11. }
```

Default Constructors 4/4

```
1. public class Main {  
2.     public static void main(String[] arg)  
3.         Car myCar1 = new Car();  
4.         Car myCar2 = new Car(100);  
5.         Car myCar3 = new Car(120);  
6.         System.out.println(myCar1.getMaxSpeed());  
7.         System.out.println(myCar2.getMaxSpeed());  
8.         System.out.println(myCar3.getMaxSpeed());  
9.     }  
10. }
```



compiler doesn't create
a no-arg constructor

See objcreation

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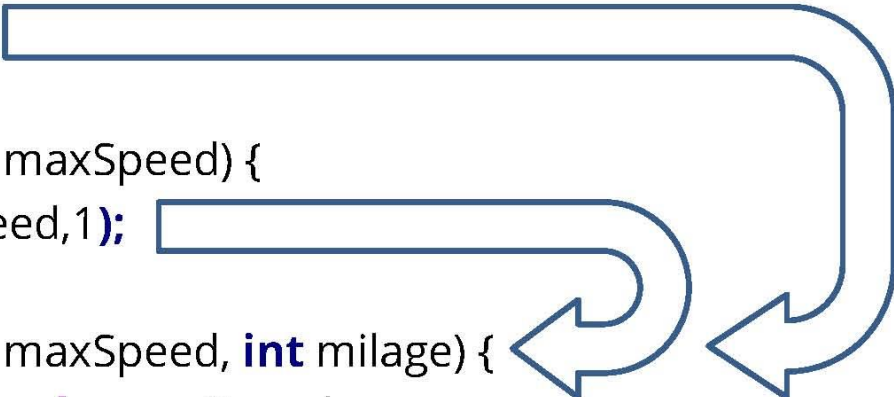
See `constructoroverloadpkg`

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Calling one constructor from another 1/3

```
1. public class Car {  
2.     private int maxSpeed, milage;  
3.     public Car() {  
4.         this(100,1);  
5.     }  
6.     public Car(int maxSpeed) {  
7.         this(maxSpeed,1);  
8.     }  
9.     public Car(int maxSpeed, int milage) {  
10.        this.maxSpeed = maxSpeed;  
11.        this.milage = milage;  
12.    }  
13.}
```

The diagram consists of two blue arrows. The first arrow starts at the line `this(100,1);` in the first constructor and points to the third constructor `public Car(int maxSpeed, int milage) {`. The second arrow starts at the line `this(maxSpeed,1);` in the second constructor and also points to the same third constructor. This illustrates how both the no-argument and the single-argument constructors explicitly call the three-argument constructor.

**explicit
constructor
invocation**

See constructoroverloadpkg

This() call must be first!!!