

# **Course Name - Object Oriented Programming using Java**

## **Lecture 13 – call by value & call by reference**

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# Topic of Interest

- ▶ **Call by Value in Java**
- ▶ **Example of call by value in java**
- ▶ **Call by Reference in Java**
- ▶ **Example of Call by Reference in Java**
- ▶ **Difference between call by value and call by reference**

# Call by Value in Java:

- In call by value method, the value of the actual parameters is copied into the formal parameters. In other words, we can say that the value of the variable is used in the method call in the call by value method.
- In call by value method, we can not modify the value of the actual parameter by the formal parameter.
- In call by value, different memory is allocated for actual and formal parameters since the value of the actual parameter is copied into the formal parameter.
- The actual parameter is the argument which is used in the method call whereas formal parameter is the argument which is used in the method definition.

# Example of call by value in java

```
class Operation{  
    int data=50;  
  
    void change(int data){  
        data=data+100;//changes will be in the local variable only  
    }  
  
    public static void main(String args[]){  
        Operation op=new Operation();  
  
        System.out.println("before change "+op.data);  
        op.change(500);  
        System.out.println("after change "+op.data);  
  
    }  
}
```

Output

before change 50  
after change 50

# Call by Reference in Java

- In call by reference, the address of the variable is passed into the method call as the actual parameter.
- The value of the actual parameters can be modified by changing the formal parameters since the address of the actual parameters is passed.
- In call by reference, the memory allocation is similar for both formal parameters and actual parameters. All the operations in the function are performed on the value stored at the address of the actual parameters, and the modified value gets stored at the same address.

# Example of Call by Reference in Java

```
class Operation2{  
    int data=50;  
  
    void change(Operation2 op){  
        op.data=op.data+100;//changes will be in the instance variable  
    }  
  
    public static void main(String args[]){  
        Operation2 op=new Operation2();  
  
        System.out.println("before change "+op.data);  
        op.change(op);//passing object  
        System.out.println("after change "+op.data);  
    }  
}
```

Output

before change 50  
after change 150

# Difference between call by value and call by reference

Call by value	Call by reference
This method copies the value of an argument into the formal parameter of the subroutine.	In this method, reference to an argument is passed to the parameter.
Does not access the actual argument.	This reference is used to access the actual argument.
Thus, changes made to parameter of the subroutine have no effect on the argument.	Thus, changes made to parameter will have an effect on the argument.

*Thank  
You*