

# Java Wrapper Classes Part -2

22\_11\_2022\_wrapper\_class\_notes - Notepad++

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Number => Byte, Short, Integer, Long, Float, Double  
2, 2, 2, 2, 2, 3, 2

Object => Boolean, Character  
2, 1(char type)

String => case insensitive of true is true remaining all false  
boolean

Object  
toString() => return the hashCode of the Object  
equals() => compares the reference

Wrapper classes and String class are immutable  
toString() => print the content of the Object  
equals() => compares the data

Can we create our own immutable object?  
Answer : yes I

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```

public static java.lang.String toBinaryString(int);
static int formatUnsignedInt(int, int, char[], int, int);
public static java.lang.String toString(int);
public static java.lang.String toUnsignedString(int);
static void getChars(int, int, char[]);
static int stringSize(int);
public static int parseInt(java.lang.String, int) throws java.lang.NumberFormatException;
public static int parseInt(java.lang.String) throws java.lang.NumberFormatException;
public static int parseUnsignedInt(java.lang.String, int) throws java.lang.NumberFormatException;
public static int parseUnsignedInt(java.lang.String) throws java.lang.NumberFormatException;
public static java.lang.Integer valueOf(java.lang.String, int) throws java.lang.NumberFormatException;
public static java.lang.Integer valueOf(int);
public java.lang.Integer(int);
public java.lang.Integer(java.lang.String) throws java.lang.NumberFormatException;
public byte byteValue();
public short shortValue();
public int intValue();
public long longValue();
public float floatValue();
public double doubleValue();
public java.lang.String toString();
public int hashCode();
public boolean equals(java.lang.Object);
public static java.lang.Integer.getInteger(java.lang.String);
public static java.lang.Integer.getInteger(java.lang.String, int);
public static java.lang.Integer.getInteger(java.lang.String, java.lang.Integer);
public static java.lang.Integer.decode(java.lang.String) throws java.lang.NumberFormatException;
public int compareTo(java.lang.Integer);
public static int compare(int, int);
public static int compareUnsigned(int, int);
public static long toUnsignedLong(int);
public static int divideUnsigned(int, int);
public static int remainderUnsigned(int, int);

```





### Wrapper class utility methods

1. valueOf() method.
2. XXXValue() method.
3. parseXXX() method.
4. toString() method.

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### Wrapper class utility methods

1. valueOf() method.
2. XXXValue() method.
3. parseXXX() method.
4. toString() method.

```
public static Integer valueOf(String, int) throws java.lang.NumberFormatException;  
public static Integer valueOf(String) throws java.lang.NumberFormatException;  
public static Integer valueOf(int data);
```

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Editor - [D:\Wrapper class\Test.java]

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Directory Content Functions

D:\ New Volume

Wrapper class

Test.java

```
1 class Test
2 {
3     public static void main(String[] args)
4     {
5         Integer i1 = Integer.valueOf(10);
6         System.out.println(i1);
7
8         Integer i2 = Integer.valueOf("10");
9         System.out.println(i2);
10
11        Boolean b1 = Boolean.valueOf("sachin");
12        System.out.println(b1);
13
14        Integer i3 = Integer.valueOf("ten");
15        System.out.println(i3); //NumberFormatException
16
17    }
18 }
19
```

15

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Neeraj Singh



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Directory Object Functions

D:\New Volume

Whisper class

Test.java

1 class Test

2 {

3     public static void main(String[] args)

4     {

5         // Number System

6         // base-2(binary), base-8(octal), base-10(decimal), base-16(hexadecimal), base-36

7

8         Integer i1 = Integer.valueOf("100", 2);

9         System.out.println(i1); //4

10

11         System.out.println("MAX\_RADIX => "+Character.MAX\_RADIX);

12         System.out.println("MIN\_RADIX => "+Character.MIN\_RADIX);

13     }

14 }

15 }

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String Primitive

Wrapper Object

valueOf()

String Primitive

Wrapper Object

primitive type

xxxValue()

Integer

Byte

Short

Long

Float

Double

=>6 xxxValue()

Not applicable for character and boolean types

public static Character valueOf(char);

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400 x 77px

3400 x 3830px

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```
Character c=Character.valueOf('a');  
Boolean b=Boolean.valueOf(true);  
Primitive/String =>valueOf() => WrapperObject
```

## 2. xxxValue()

We can use xxxValue() to get primitive type for the given Wrapper Object.

These methods are a part of every Number type Object.  
(Byte,Short,Integer,Long,Float,Double) all these classes have these 6 methods which is written as shown below.

### Methods

=====

```
public byte byteValue();  
public short shortValue();  
public int intValue();  
public long longValue();  
public float floatValue();  
public double doubleValue();
```

eg#1.

```
Integer i=new Integer(130);  
System.out.println(i.byteValue());//-126
```





### 3. charValue()

Character class contains charValue() to get Char primitive for the given Character Object.

public char charValue()

eg#1.

```
Character c=new Character('c');
```

```
char ch= c.charValue();
```

```
System.out.println(ch);
```

b

### 4. booleanValue()

Boolean class contains booleanValue() to get boolean primitive for the given boolean Object.

public boolean booleanValue()

eg#1.

```
Boolean b=new Boolean("nith");
```

```
boolean b1=b.booleanValue();
```

```
System.out.println(b1);//false
```

In total xxxValue() are 36 in number.

=> xxxValue() => convert the Wrapper Object => primitive.

10



```
Boolean b=Boolean.valueOf(true);
```

```
Primitive/String =>valueOf() => WrapperObject
```

## 2. xxxValue()

We can use xxxValue() to get primitive type for the given Wrapper Object.

These methods are a part of every Number type Object.

(Byte,Short,Integer,Long,Float,Double) all these classes have these 6 methods which is written as shown below.

### Methods

=====

```
public byte byteValue();
```

```
public short shortValue();
```

```
public int intValue();
```

```
public long longValue();
```

```
public float floatValue();
```

```
public double doubleValue();
```

eg#1.

```
Integer i=new Integer(130);
```

```
System.out.println(i.byteValue());//-126
```

```
System.out.println(i.shortValue());//130
```

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Editor - (D:\Wrapper class\Test.java)

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Directory Content Functions

D:\New Volume

Wrapper class

1 class Test

2 {

3     public static void main(String[] args)

4     {

5         //valueOf()         => Converts String/Primitive to Wrapper type

6         //xxValue()       => Converts Wrapper type to Primitive type

7         //parseXXX()      => Converts String to primitive type

8

9         int i = Integer.parseInt("10");

10         System.out.println(i);

11

12         boolean b1 = Boolean.parseBoolean("sachin");

13         System.out.println(b1);

14

15         double d1 = Double.parseDouble("10.0");

16         System.out.println(d1);

17

18     }

19 }

20 }

21 }

Test.java

Java (.java)

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Nitin Rajgurunath





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Directory Object Functions

D:\New Volume

Wrapper.class

1 //MAP to take inputs from the command line and perform arithmetic operations  
2 class Test  
3 {  
4     public static void main(String[] args)  
5     {  
6         //valueOf()     => Converts String/Primitive to Wrapper type  
7         //xxValue()   => Converts Wrapper type to Primitive type  
8         //parseXXX()   => Converts String to primitive type  
9  
10        //commandline arguments => String inputs = args[0],args[1]  
11  
12        int i1 = Integer.parseInt(args[0]);  
13        int i2 = Integer.parseInt(args[1]);  
14  
15        System.out.println(i1+i2);  
16        System.out.println(i1\*i2);  
17        System.out.println(i1/i2);  
18  
19     }  
20  
21 }  
22

Test.java

Java (\*.java)

Test.java

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toString()

=====

To convert the Wrapper Object or primitive to String.

Every Wrapper class contain toString()

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public String toString()

1. Every wrapper class (including Character class) contains the above toString() method to convert wrapper object to String.
2. It is the overriding version of Object class toString() method.
3. Whenever we are trying to print wrapper object reference internally this toString() method only executed

eg: Integer i=Integer.valueOf("10");

System.out.println(i);//internally it calls toString() and prints the Data.

41





System.out.println(i); //internally it calls toString() and prints the Data.

form 2

====

public static String toString(primitive type)

1. Every wrapper class contains a static toString() method to convert primitive to String.

String s=Integer.toString(10);

|=> primitive type int.

eg:

String s=Integer.toString(10);

String s=Boolean.toString(true);

String s=Character.toString('a');

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Directory Explorer Functions

D:\New Volume

Wrapper classes

Test.java

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13

class Test

{

public static void main(String[] args)

{

String s1 = Integer.toString(7,2);

String s2 = Integer.toString(17,2);

System.out.println(s1);

System.out.println(s2);

}

}

Test.java

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Mr. Manjuna



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Command Prompt

D:\Wrapper\classes>javac Test.java

D:\Wrapper\classes>java Test


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D:\Wrapper\classes>

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Nitin Ranjan



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```
public static String toString(primitive p, int radix)  
    | => 2 to 36
```

```
eg: String s=Integer.toString(15,2)  
System.out.println(s); // 1111
```

form 4  
====

Integer and Long classes contains the following toXxxString() methods.

```
public static String toBinaryString(primitive p);  
public static String toOctalString(primitive p);  
public static String toHexString(primitive p);
```

Example:

```
class WrapperClassDemo {  
    public static void main(String[] args) {  
        String s1=Integer.toBinaryString(7);
```

6





Editor - [D:\Wrapper\classes\Test.java]

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D:\ New Volume

Wrapper\classes

Test.java

```
1 public static void main(String[] args)
2 {
3     String result1 = Integer.toString(7,2); // 111
4     String result2 = Integer.toString(10,8); // 111
5     String result3 = Integer.toString(10,16); // 111
6
7     System.out.println(result1);
8     System.out.println(result2);
9     System.out.println(result3);
10
11     System.out.println();
12
13     String s1=Integer.toBinaryString(7); //0,1
14     String s2=Integer.toOctalString(10); //0-7
15     String s3=Integer.toHexString(10); //0-9,a-f
16
17     System.out.println(s1);
18     System.out.println(s2);
19     System.out.println(s3);
20
21 }
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```

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Command Prompt

D:\Wrapper\classes>javac Test.java

D:\Wrapper\classes>java Test

111

12

a

111

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a

D:\Wrapper\classes>

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Q Search

Windows icons

Taskbar icons

System tray

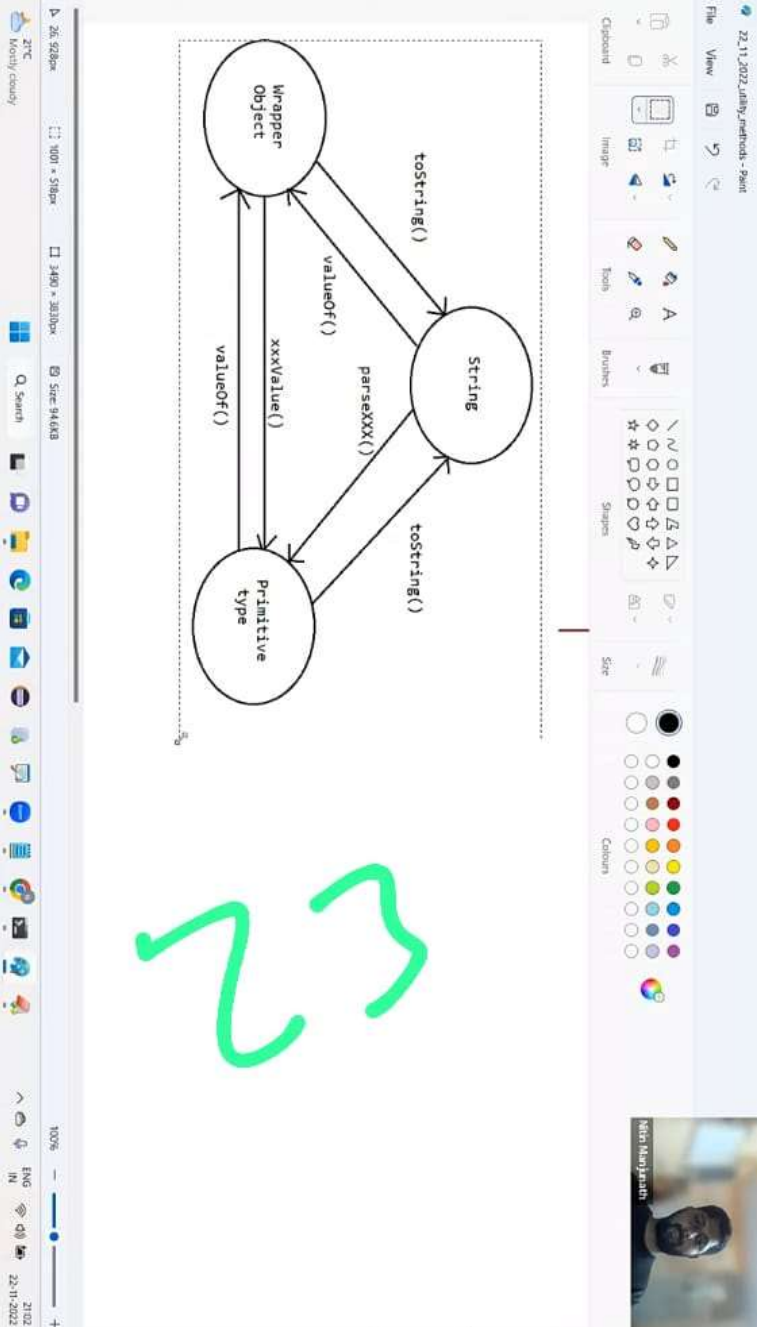
A small video call participant thumbnail showing a man with a beard and glasses, wearing a dark shirt, looking towards the camera. The name 'Nitin Dhanraj' is visible above the video.



The screenshot shows an IDE window titled "Test.java". The code defines a class named "Test" with a public static void main method. Inside the main method, three strings are created: "result1", "result2", and "result3". Each string is converted to its corresponding wrapper class (Integer, Integer, and Integer) using the toString() method. Then, each wrapper object is converted back to a string using various methods: valueOf(), intValue(), parseInt(), parseXXX(), toString(), toHexString(), toBinaryString(), and toOctalString(). Finally, each result is printed to the console using System.out.println().

```
1 // String/primitive to wrapper => valueOf()  
2  
3 // Wrapper type to primitive => intValue()  
4 // String type to primitive => parseInt()  
5 // Primitive type to String => toString(), toHexString(), toBinaryString(), toOctalStri  
6  
7  
8  
9 class Test  
10 {  
11     public static void main(String[] args)  
12     {  
13         String result1 = Integer.toString(7,2); // 111  
14         String result2 = Integer.toString(10,8); // 111  
15         String result3 = Integer.toString(10,16); // 111  
16  
17         System.out.println(result1);  
18         System.out.println(result2);  
19         System.out.println(result3);  
20  
21  
22     }  
}
```







}

Note:

String class

```
public static String valueOf(boolean);  
public static String valueOf(char);  
public static String valueOf(int);  
public static String valueOf(long);  
public static String valueOf(float);  
public static String valueOf(double);
```

String data = String.valueOf('a');//static factory methods

String data = "sachin".toUpperCase();//instance factory methods

28









## AutoBoxing and AutoUnBoxing

=====

untill 1.4Version, we can't provide wrapper class objects in place of primitive and primitive in place of wrapper object all the required conversions should be done by the programmer.

But from jdk1.5 Version onwards, we can provide primitive in place of wrapper and in place of wrapper we can keep primitive also. All the required conversion will be done by the compiler automatically, this mechanism is called as "AutoBoxing" and "AutoUnBoxing".

eg#1.

```
Boolean b1 = Boolean.valueOf(true);
```

```
if (b1)
```

```
System.out.println("hello");
```

eg#2.

```
ArrayList al = new ArrayList();
```

```
al.add(10);
```

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The screenshot shows a Windows desktop environment. In the background, a Java IDE is open, displaying a code editor with the following Java code:

```

4
5 class Test
6 {
7     public static void main(String[] args)
8     {
9
10         Integer i1 = 10; // Integer i1 = Integer.valueOf(10);
11
12     }
13 }
14

```

A large, hand-drawn green number "5" is overlaid on the right side of the code editor. The desktop taskbar at the bottom shows the Start button, a search bar, and several application icons. The system tray in the bottom right corner displays the date and time as "23-11-2022 21:37".



```
File Edit View  
System.out.println("hello");
```

eg#2.

```
ArrayList al = new ArrayList();  
al.add(10);
```

Autoboxing

=====

Automatic conversion of primitive type to wrapper object by the compiler is called "Autoboxing".

Integer i1 = 10;

| After compilation the code would be

|  
Integer i1 = Integer.valueOf(10);

Note: Autoboxing is done by the compiler using a method called "valueOf".

AutoUnBoxing

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Editor - (D:\Wrapper\classes\Test.java)

File Edit View Search Document Project Tools Browser Emmet Window Help

Directory Content Functions

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Wrapper\classes

Test.java

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```
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14
15
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17

class Test
{
    public static void main(String[] args)
    {
        Integer i1 = new Integer(10);
        int i2 = i1.intValue();
        System.out.println(i2);
    }
}
```

Non Manojkumar

Java (Test.java)

Test.java

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29







Clipboard Image Tools Brushes Shapes Size Colors

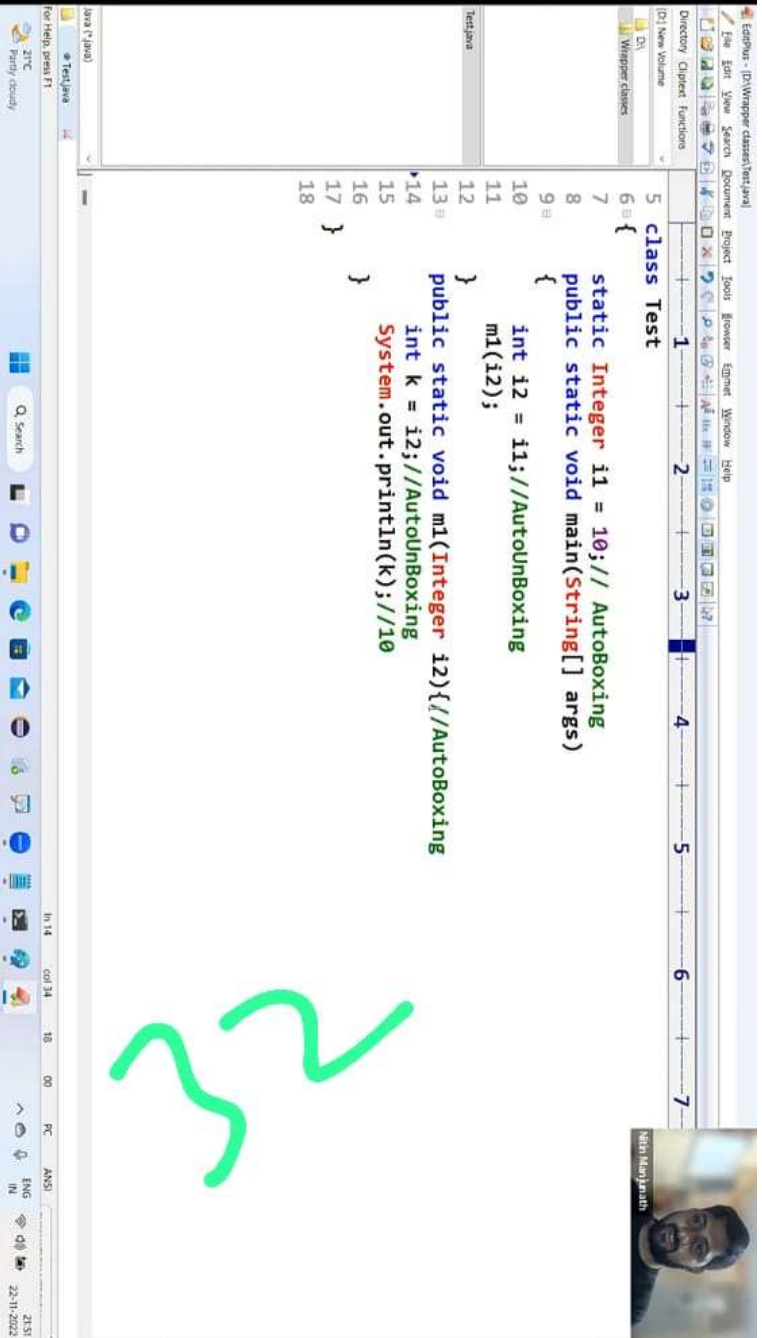


Compiler will do the conversions automatically from JDK1.5 version



15









```
====  
class Test  
{  
    static Integer i1 = 10; // AutoBoxing  
    public static void main(String[] args)  
    {  
        int i2 = i1; // AutoUnBoxing  
        m1(i2);  
    }  
    public static void m1(Integer i2) // AutoBoxing  
    {  
        int k = i2; // AutoUnBoxing  
        System.out.println(k); // 10  
    }  
}
```



Compiler is responsible for conversion of primitive to wrapper and wrapper to primitive using the concept of "AutoBoxing and AutoUnBoxing".



File Edit View Search Document Project Tools Browser Emmet Window Help

Directory Object Functions

D:\New Volume

01

Wrapper class

Test.java

5 class Test

6 {

7     static Integer i1;//i1 = null

8     public static void main(String[] args)

9     {

10         int i2 = i1;// int i2 = i1.intValue() :: NullPointerException

11         System.out.println(i2);

12     }

13 }

14 }

Test.java

Java 11 (JDK)

Test.java

for help, press F1

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Neeraj Kulkarni



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FileView

Clipboard

Image

Tools

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Shapes

Size

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Wrapper Object

valueOf()

xxxValue()

valueOf()

Primitive type

AutoBoxing(value)

Primitive type

AutoUnBoxing(x)

Integer(Immutable)

Integer i1 = 10;

Integer i2 = 11;

i1++;

System.out.println(i1); //11

System.out.println(i2); //10

System.out.println(i1==i2); //false

10

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Editor - (D:\Wrapper\classes\Test.java)

File Edit View Search Document Project Tools Browser Emmet Window Help

D:\New Volume

Directory Object Functions

D:\

Wrapper\classes

1 2 3 4 5 6 7

Test.java

5 class Test

6 {

7     public static void main(String[] args)

8     {

9         Integer x = new Integer(10);

10        Integer y = new Integer(10);

11        System.out.println(x == y); // false

12     }

13 }

14 }

15 }

Test.java

Test.java

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Nitin Mangrulkar

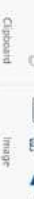












```
Integer x = 18;
```

```
Integer y = 18;
```

```
System.out.println(x == y);//true
```

```
Integer a = 100;
```

```
Integer b = 100;
```

```
System.out.println(a == b);//true
```

```
Integer i = 1000;
```

```
Integer j = 1000;
```

```
System.out.println(i == j);//false
```

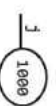
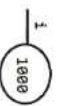
Compiler uses "valueOf()" for Autoboxing.



Implemented in intelligent way in Wrapper classes

Buffer of Objects

At the time of loading the .class file JVM use buffer with already the objects which are in



25



22\_11\_2022\_wrapper\_class\_notes - Notepad  
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```
Integer x = new Integer(10);  
Integer y = new Integer(10);  
System.out.println(x == y);//false
```

Case5:

```
Integer x = new Integer(10);//memory from heap area  
Integer y = 10;//AutoBoxing ==> Integer y = Integer.valueOf(10);  
System.out.println(x == y);//false
```

Case6:

```
Integer x = new Integer(10);  
Integer y = x; ==> reference is reused so pointing to same object  
System.out.println(x == y);//true
```

Case7:

```
Integer x = 10;  
Integer y = 10;  
System.out.println(x == y);
```

```
Integer a = 100;
```

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**Note:**

1. To implement autoboxing concept in wrapper class a buffer of object will be created at the time of class loading.
2. During Autoboxing, if an object has to be created first jvm will check whether the object is already available inside buffer or not.
3. If it is available, then JVM will reuse the buffered object instead of creating a new Object.
4. If the Object is not available inside buffer, then jvm will create a new object in the heap area, this approach improves the performance and memory utilization

But this buffer concept is applicable only for few cases

1. Byte => -128 to +127
2. Short => -128 to +127
3. Integer=> -128 to +127
4. Long => -128 to +127
5. Character => 0 to 127
6. Boolean => true, false

In the remaining cases new object will be created.

—  
△



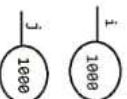




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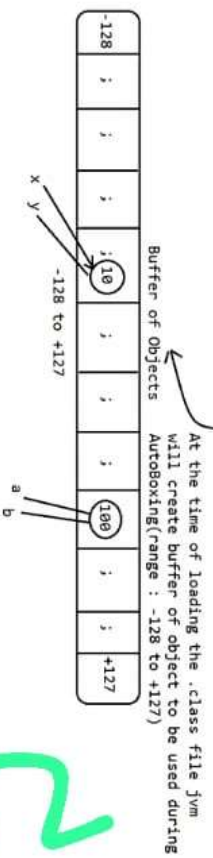
    tln(x == y) // true
    ;
    ;
    tln(a == b) // true
    ;
    ;
    tln(i == j) // false
    ;
    ;

```



Compiler uses "valueOf()" for Autoboxing.

Implemented in intelligent way in Wrapper classes



42



Editor - (D:\Wrapper class\Test.java)

File Edit View Search Document Project Tools Browser Emmet Window Help

Directory Object Functions

D:\New Volume

Wrapper class

Test.java

8 =

9 {

10 Integer x = 128;

11 Integer y = 128;

12 System.out.println(x == y); //false

13

14 Integer a = 127;

15 Integer b = 127;

16 System.out.println(a == b); //true

17

18 Boolean b1 = true;

19 Boolean b2 = true;

20 System.out.println(b1==b2); //true

21

22 Double d1 = 10.0;

23 Double d2 = 10.0;

24 System.out.println(d1==d2); //false

25

26 }

27 }

28 }

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43

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