

Wrapper Classes

Recap: Primitives vs. References

Primitive	Reference
Most basic data type in Java. Built-in.	Insatiable classes made by programmers that often use primitive types.
Store values.	Store the address of the value.
Do not have associated methods.	Have associated methods.

Wrapper Classes

We can convert primitive types to object types using wrapper classes.

For every primitive type in Java there is a built-in object type called Wrapper Class which contains or "wraps" primitive data types as an object.

Wrapper Classes

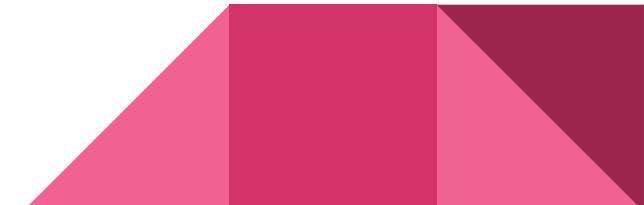
Primitive Type	Corresponding Wrapper Class
boolean	Boolean
char	Character
int	Integer
double	Double

How do Wrapper Classes Help?

Wrapper classes provide a way to **wrap primitive values in an object**, so that primitives can do activities reserved for objects.

Each wrapper class contains **special values** (like the minimum and maximum values for the type) **and methods** that are **useful for converting between types**.

Wrapper classes provide an assortment of built in utility methods for primitives like **converting primitive types to and from string objects** or comparing various objects.



Instantiating an Object of a Wrapper Class

```
Integer y = Integer.valueOf(3)
```

```
Double z= Double.valueOf(3.14)
```

Wrapper Classes start with Uppercase, while primitive types use lowercase.

The data type input as an actual parameter must match the Wrapper Class.

Integer and Double Methods

Integer Methods	Use
Integer.MIN_VALUE	Returns the minimum possible int or Integer value
Integer.MAX_VALUE	Returns the maximum possible int or Integer value
IntegerObject.intValue()	Convert Integer value into an int value

Double Methods	Use
DoubleObject.doubleValue()	Convert Double value into an double value

Integer Class Methods

Integer.MIN_VALUE: The minimum value represented by an int or Integer
(-2147483648)

Integer.MAX_VALUE: The maximum value represented by an int or Integer
(2147483647)

Integer valueOf() and intValue()

```
Integer y = Integer.valueOf(3)
```

```
int i = y.intValue();
```

Is there an easier way?

Is there an easier way?

The conversion can be done automatically at runtime by the compiler using features called autoboxing and unboxing.

Autoboxing: Includes converting a **primitive value** into an **object** of the corresponding wrapper class. It is done automatically by the compiler.

Autoboxing Example

Instead of having to write:

```
Integer y = Integer.valueOf(3);
```

```
Double x = Double.valueOf(4.5);
```

We can write:

```
Integer myInt = 3;
```

```
Double myDouble = 4.5
```

Java automatically converts primitive values to Integer and Double objects if values are declared as Wrapper class objects.

Autoboxing

The Java compiler will also apply autoboxing when a primitive value is passed as parameter to a method that expects an object of the corresponding wrapper class.

```
ArrayList<Integer> myList = new ArrayList<Integer>();
```

```
int primitive = 5;
```

```
myList.add(primitive)
```

Java autoboxes the variable primitive and converts it to an Integer object

Unboxing

Converting an object of a wrapper type to its corresponding primitive value is called unboxing.

```
Integer myInt = 5;
```

```
int myInt2 = myInt;
```

Autoboxing

The Java compiler will also apply unboxing when a Wrapper value is passed as a parameter to a method that expects a primitive value.

```
Integer wrapperClass = Integer.valueOf(5);
```

```
Rectangle rect = new Rectangle(wrapperClass, 8);
```

```
System.out.println(rect);    =>    w: 5 - h: 8
```

Advantages of Autoboxing / Unboxing

Autoboxing and unboxing allow programmers write cleaner code, making it easier to read.

It allow us to use primitive types and wrapper class objects interchangeably without having to perform any casting explicitly.

Wrapper classes - Most popular methods

Integer.parseInt(String s): Converts a string representation of an integer to an int value.

Integer.valueOf(String s) : Converts a string representation of an integer to an Integer object.

Integer.valueOf(int i): Converts an int value to an Integer object.

Integer.toString(int i): Converts an int value to a string representation.

** Similar methods Double class