JAVA TYPE CASTING, UPCASTING,DOWNCASTING, TYPE CASTING WITH DIFFERENT TYPES OF DATA TYPES

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Type Casting

- Typecasting in Java is the process of converting one data type to another data type using the casting operator.
- When you assign a value from one primitive data type to another type, this is known as type casting.
- To enable the use of a variable in a specific manner, this method requires explicitly instructing the Java compiler to treat a variable of one data type as a variable of another data type.

Types of Type Casting

There are two types of Type Casting in java:

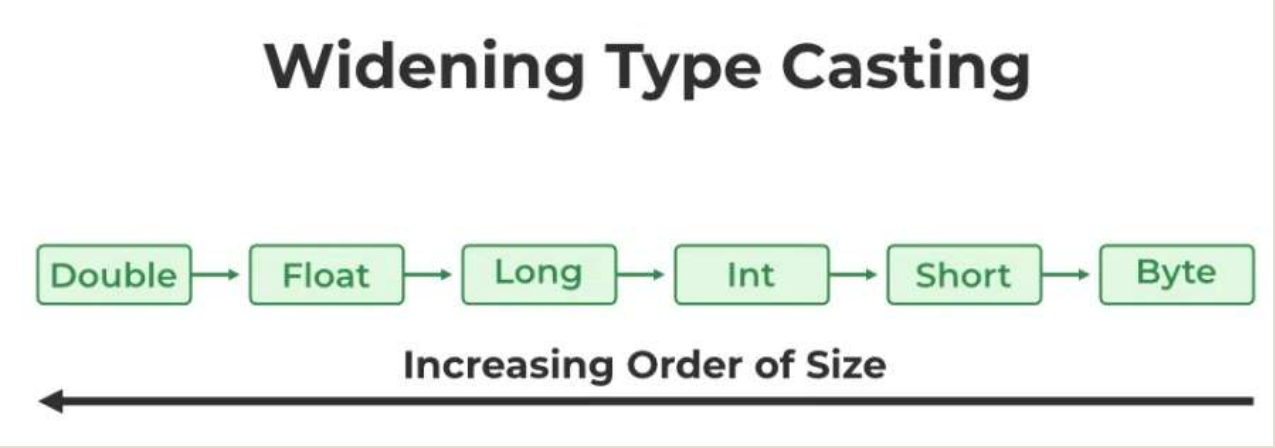
- Widening Type Casting(Implicit type casting)
- Narrow Type Casting(Explicit type casting)

Widening Type Casting

A lower data type is transformed into a higher one by a process known as widening type casting. Implicit type casting and casting down are some names for it. It occurs naturally. Since there is no chance of data loss, it is secure. Widening Type casting occurs when:

- The target type must be larger than the source type.
- Both data types must be compatible with each other.
- **Syntax:**

```
larger_data_type variable_name = smaller_data_type_variable;
```



Example Program

```
// Java program to demonstrate Widening TypeCasting
import java.io.*;

class WTCast {
	public static void main(String[] args)
	{
		int i = 10;

		// Wideing TypeCasting (Automatic Casting)
		// from int to long
		long l = i;

		// Wideing TypeCasting (Automatic Casting)
		// from int to double
		double d = i;

		System.out.println("Integer: " + i);
		System.out.println("Long: " + l);
		System.out.println("Double: " + d);
	}
}
```

Output:

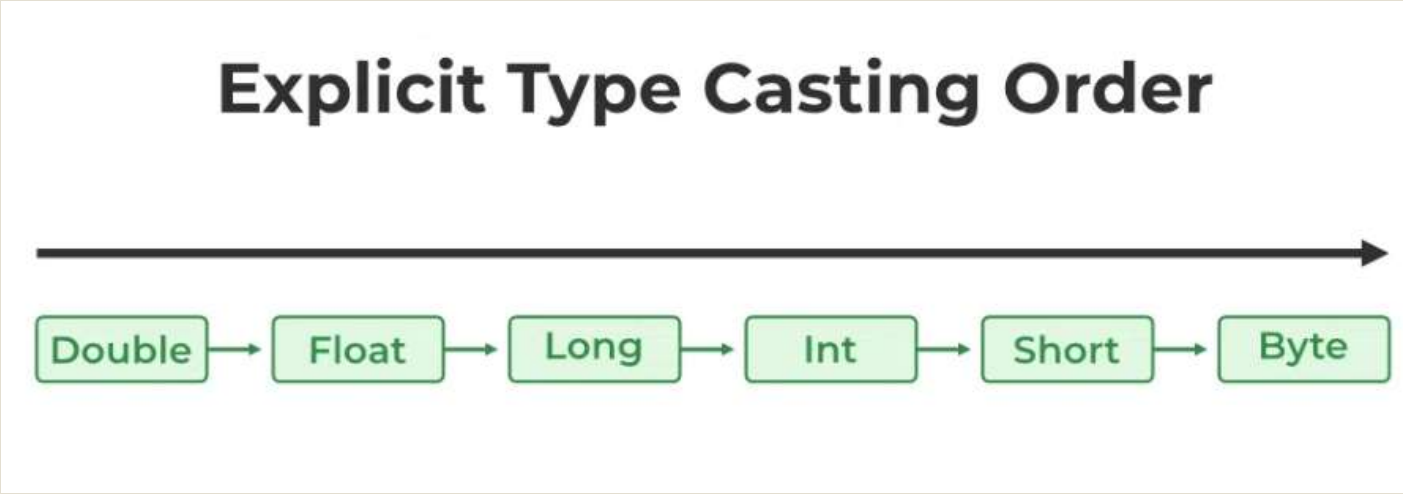
```
Integer: 10
Long: 10
Double: 10.0
```

Narrow Type Casting

The process of downsizing a bigger data type into a smaller one is known as narrowing type casting. Casting up or explicit type casting are other names for it. It doesn't just happen by itself. If we don't explicitly do that, a compile-time error will occur. Narrowing type casting is unsafe because data loss might happen due to the lower data type's smaller range of permitted values.

Syntax:

```
smaller_data_type variable_name = (smaller_data_type) larger_data_type_variable;
```



Example Program

```
// Java Program to demonstrate Narrow type casting
import java.io.*;

class NTCast {
        public static void main(String[] args)
        {
                double i = 100.245;

                // Narrowing Type Casting
                short j = (short)i;
                int k = (int)i;

                System.out.println("Original Value before Casting"+ i);
                System.out.println("After Type Casting to short “+ j);
                System.out.println("After Type Casting to int "+ k);
        }
}
```

Output:

Original Value before Casting100.245
After Type Casting to short 100
After Type Casting to int 100

◦ Types of Explicit Casting

◦ Mainly there are two types of Explicit Casting:

- **Explicit Upcasting:**Upcasting is the process of casting a subtype to a supertype in the inheritance tree's upward direction. When a sub-class object is referenced by a superclass reference variable, an automatic process is triggered without any further effort.
- **Explicit Downcasting:**When a subclass type refers to an object of the parent class, the process is referred to as downcasting. If it is done manually, the compiler issues a runtime ClassCastException error. It can only be done by using the instanceof operator. Only the downcast of an object that has already been upcast is possible.

Example Program for Explicit Upcasting

```
// Java Program to demonstrate Explicit Upcasting
import java.io.*;

class Animal {
        public void makeSound()
        {
                System.out.println("The animal makes a sound");
        }
}

class Dog extends Animal {
        public void makeSound()
        {
                System.out.println("The dog barks");
        }

        public void fetch()
        {
                System.out.println("The dog fetches a ball");
        }
}
class EUCast {
        public static void main(String[] args)
        {       // Upcasting
                Animal animal = new Dog();
                // Calls the overridden method in Dog class
                animal.makeSound();
                // This would give a compile error as fetch() is not
                // a method in Animal class
                // animal.fetch();
        }
}
```

Output:
The dog barks

Example Program for Explicit Downcasting

```
// Java Program to demonstrate Explicit downcasting
import java.io.*;
class Animal {
        public void eat()
        {
                System.out.println("The animal is eating.");
        }
}

class Cat extends Animal {
        public void meow()
        {
                System.out.println("The cat is meowing.");
        }
}

class EDCast {
        public static void main(String[] args)
        {
                Animal animal = new Cat();
                animal.eat();

                // Explicit downcasting
                Cat cat = (Cat)animal;
                cat.meow();
        }
}
```

Output:

The animal is eating.
The cat is meowing.