JAVA - Data Types & Variables

Table of Contents

Chapter 1: Data types

In java there are 8 primitive data types .We can categorize these 8 primitive data types into 4 sub categories. Those are

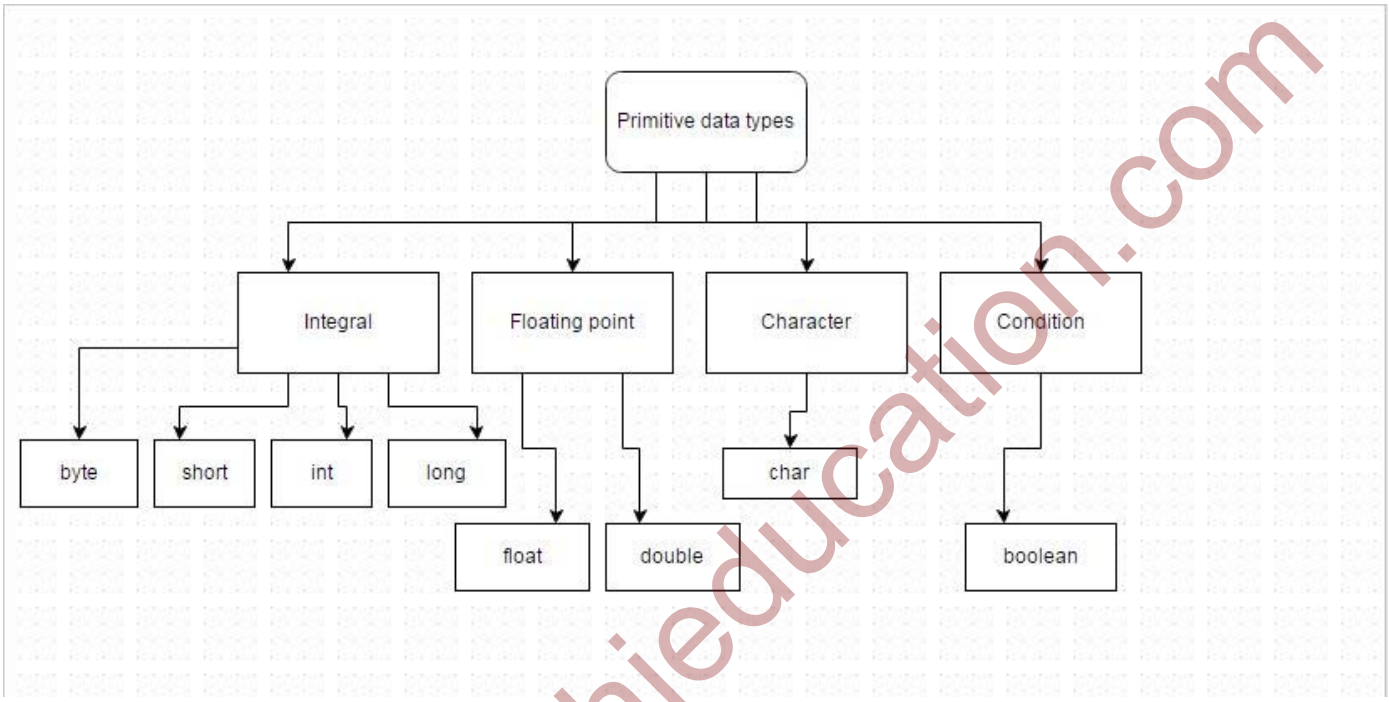

Figure: java primitive data types hierarchy

1.1 Integer

1.1.1 byte

- byte data type is an 8-bit two's complement integer
- byte minimum value is -128(-2^7)
- byte maximum value is 127(2^7-1)(inclusive)
- default value is 0
- byte can be useful for saving memory in large arrays
- Ex: byte x=10, byte y=20

1.1.2 short

- Short data type is a 16-bit signed two's complement integer
- Short has a minimum value of -32,768
- Short has a maximum value of 32,767(inclusive)
- Default value is 0.

- **Declaration:**short x=1200

1.1.3 int

- int is the most used data type in java
- int data type is a 32-bit signed two's complement integer
- int has a minimum value of - 2,147,483,648.(-2^31)
- int has a maximum value of 2,147,483,647(inclusive).(2^31 -1)
- default value id 0
- **Declaration:**int x=100, int y=200

1.1.4 long

- long data type is a 64-bit two's complement integer.
- long minimum value is -9,223,372,036,854,775,808.(-2^63)
- long maximum value is 9,223,372,036,854,775,807 (inclusive). (2^63 -1)
- default value is 0
- **Declaration:**long x=10000

1.2 floating point

1.2.1 float

- Float is a 32 bit data type.
- Default value is 0.0f.
- Numbers and Strings covers Big Decimal and other useful classes provided by the Java platform.
- use a float (instead of double) if you need to save memory in large arrays of floating point numbers.
- For that, you will need to use the java.math.BigDecimal class
- **Declaration:** float d=10.3f

1.2.2 double

- Double is a 64 bit data type
- Default value is 0

- For decimal values, this data type is generally the default choice. As mentioned above, this data type should never be used for precise values, such as currency
- **Declaration:**double d=10.56

1.3 character

1.3.1 char

- char data type is a single 16-bit Unicode character
- Minimum value is '\u0000' (or 0).
- Maximum value is '\uffff' (or 65,535 inclusive)
- **Declaration:** char c= 'a'.

1.4 Condition

1.4.1 Boolean

- Boolean data type has only two possible values: true and false
- Boolean data type represents one bit of information
- This data type is used for simple flags that track true/false conditions.
- Default value for boolean is 'false'
- **Declaration**: Boolean b=true

Chapter 2 Variables in java

2.1 Instance variables

Instance variables are variables declared in a class but outside any method
Non Static Variables are called Instance Variables
They are having less scope
Example:

```
public class Animal {
String name;
int age;
String breed;
}
```

2.2 Static variables

- Static variables are also known as class variables
- Static variables will be created one copy, regardless of how many times the objects are created
- class variables have same default values as instance variables
- static variables can be accessed by using ClassName.VariableName

2.3 Local variables

- local variables are declared inside the methods, constructors
- Local variables are accessed inside the method only. We cannot access outside the method
- access modifiers cannot be used for local variables
- scope of local variables is less
- Local variables gets destroyed when method execution completed.

Example:

```
public count(int x, inty){
int sum;
sum = x + y;
return (sum)              }
```

Chapter 3: Operators in java

3.1 Arithmetic Operators

Java programming language has some basic arithmetic operations such as Addition, subtraction, multiplication, division etc...

Operator name	Description	Usage
+	This operator adds the two values	Ex: a + b
-	Subtraction operator	Ex: a – b
*	This operator multiples the two values	Ex: a * b
/	Division operator	Ex: a / b
%	Remainder Operator	Ex: a % b

Program:

```
public class SakshiEducation {

	public static void main(String[] args) {

		// TODO Auto-generated method stub

		int a=10; int b=5;

		System.out.println("Addition is:"+(a+b)); // + operator adds the both "a" and "b" values

		System.out.println("Subtraction is:"+(a-b)); // - operator subtracts the both "a" and "b" values

		System.out.println("Multiplication is:"+(a*b)); // * operator multiplies the both "a" and "b" values

		System.out.println("division value is:"+(a/b)); // / operator divides the both "a" and "b" values

		System.out.println("Modular value is:"+(a%b)); // % operator divides the both "a" and "b" values and returns the remainder

	}

}
```

3.2 Relational Operators:

Operator Name	Description	Usage
>	Checks the left operand value is greater than right operand value	a>b
<	Checks the left operand value is less than tight operand value	a<b
>=	Checks the left operand value is greater than or Equal to right operand value	x>=y
=<	Checks the left operand value is less than or equal to right operand value	x=<y
==	Checks the two operand values are equal or not	x==y
!=	Checks the values of two operands are equal or not	x!= y

Program:

```
publicclassSakshiEducation {

	/**
	 * @paramargs
	 */
	publicstaticvoid main(String[] args) {
		// TODO Auto-generated method stub
		int a=10; int b=5;
		System.out.println("a is greater than b:"+(a>b));
		System.out.println("a is less than b:"+(a<b));
		System.out.println("a is greater than equal to b:"+(a>=b));
		System.out.println("a is less than equal to b:"+(a<=b));
		System.out.println("a is equal to b:"+(a==b));
		System.out.println("a is not equal to b:"+(a!=b));
	}

}
```

3.3 Bitwise Operators

Operator Name	Description
~	Unary bitwise complement
<<	Signed left shift
>>	Signed right shift
>>>	Unsigned right shift
&	Bitwise AND Operator
^	Bitwise OR Operator
|	Bitwise inclusive OR

Program:

```
package test;

public class SakshiEducation {

        public static void main(String args[]) {

        int x = 20;

        int y = 40;

        int z = 0;

           z = ~x;

        System.out.println("~x = " + z );

           z = x << y;

        System.out.println("x << 2 = " + z );

           z = x >> 2;

        System.out.println("x >> 2  = " + z );

           z = x >>> 2;

        System.out.println("x >>> 2 = " + z );

           z = x & y;

        System.out.println("x & y = " + z );

           z = x ^ y;

        System.out.println("x ^ y = " + z );

           z = x | y;

        System.out.println("x | y = " + z );

    }       }
```

Output:

~x = -21

x << 2 = 5120

x >>2 = 5

x >>> 2 = 5

x& y = 0

x ^ y = 60

x | y = 60

3.4 Logical Operators

Operator Name	Description	Usage
&&	If both operands are true	x && y
||	Either any operand is true	x || y
!	If operand is not true	!x

Program:

```
public class Sakshi {

public static void main(String args[]) {

    boolean x = false;

    boolean y = true;

    System.out.println("x && y = " + (x&&y));

System.out.println("x || y = " + (x||y) );

System.out.println("!(x && y) = " + !(x && y));

  }

}
```

Output:

```
x&& y = false
x || y = true
!(x && y) = true
```

3.5 Assignment Operators

The most commonly used assignment operator is

"=" Simple assignment operator

Program:

```
package test;

public class SakshiEducation {

        public static void main (String args[]) {

        int x = 20;       // 20 is assigned  to int x

        System.out.println ("value of x:"+x);

        }
}
```

3.6 Unary Operators

Operator Name	Description
++	Increment operator
--	Decrement operator
!	Logical complement operator

Program:

```
package test;
public class SakshiEducation
{
        public static void main(String args[])
        {
        int x = 20;
        System.out.println("value of x:"+(x++));
        System.out.println("value of x:"+(x--));
        }
 }
```

Chapter 4: Test

1. What is a Class variable

Ans: Class variable is a variable which will be declared with in a class, outside any method, with the static keyword.

2. Default value of byte in java?

Ans: Default value of byte is “0”

3. List any tow ide’s in java?

Ans: Eclipse, Net Beans

4. Smallest integer in java?
    a. Int
    b. Long
    c. Byte
    d. Short

Ans: byte

5. enum is a primitive data type ?
    a. Yes
    b. No

Ans: No

6. Byte data type range?
    a. -127 to 127
    b. -128 to 127
    c. -128 to 256
    d. -256 to 128

Ans: -128 to 127

7. What is the size of int java?
    a. 8bytes
    b. 4bytes

c. 2bytes
d. 3bytes

Ans:4bytes

8. Int default value in java

Ans: 0

9. Default value of double is?

Ans: 0

10. Default value of Boolean is?

Ans: False