Data Types in Java

- This tutorial will deal with different data types that we use in Java programming language.
- So What are data types? Let's start at the beginning, in computer every single thing is interpreted in the form of binary digits right? And they are just electrical signals and combining the binaries we get all types of data and perform the calculations too. So now we have this basic knowledge of binaries, we can understand what a byte is. It simply means a group of binary digits or in short bits, and the size of the group is 8. So 8 bits form a byte and all the data in the computer are termed in terms of bytes.
- So, we know what a byte is. Now we can come to data types.
- This definition is straight from **Wikipedia** and explains in a single line what a **data type** is clearly. We know that we require a compiler to compile the java code to byte codes and then interpret the bytecodes to machine language form. Now through data types, we tell the compiler or interpreter what kind of data are we using so that during any calculation, the correct form of the data is used, after all we are programming because we are trying to solve some problems and possibly through calculations.
- Now in java two major data type or type of data are available, one is the primitive data type and the other one is the user defined one, we will focus on the primitive one for right now.
- There are mainly 8 primitive data types in java and I am going to describe them along with the size and also the initial value and an example.

Data Type	Example	Size(bytes)	Default Value	Short Description

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int	12, -9, 0	4	0	stores whole numbers from **-2^{32}** to **2^{32} -1**
Double	12.5	8	0.0d	stores fractional numbers(bigger digits)
float	4.5	4	0.0f	stores fractional numbers
short	2	2	0	stores whole numbers
long	33232	8	0L	stores whole numbers from **2^{64}** to **2^{64} -1**
char	'a'	2	'\u0000'	store a single character
boolean	true, false	1	false	**True** or **false** values
byte	23	1	0	stores whole numbers from **2^{7}** to **2^{7}-1**

- Java is a statically typed language, that means that programmers themselves must write the type of the data that we are trying to use so that our compiler can easily determine them.
- so we have seen earlier what a variable is and what is the general structure to declare a variable,
  - **Type Name ;** or **Type Name = initial value ;**

Int

```
int age = 22;
System.out.println("My age is: " + age);
```

Double

```
double rateOfInterest = 0.15d;
System.out.println("The interest rate is " + rateOfInterest);
```

float

```
float radius = 4.3f;
System.out.println("Radius is " + rateOfInterest);
```

- When to use float or double for the case of fractional numbers? Depends on the precision of the fraction we are trying to show.
- Scientific notations are also **floats** or **double**

- ```
  double speedOfLight = 3E8f;
  float randomNumber = 2.5e4d;
  System.out.println("Speed of light is " + speedOfLight + "not some
  random number like: "+ randomNumber);
  ```

Byte

- ```
  byte ourByte = 400;
  System.out.println("Byte is " + ourByte);
  ```

boolean

- ```
  boolean isProgrammingHard;
  boolean isProgrammingFun = true;
  boolean isJavaTough = false;

  System.out.println(isProgrammingHard);
  System.out.println(isProgrammingFun);
  System.out.println(isJavaTought);
  ```

Character

- Talk about ascii values a bit. The first character set an encoding standard used in digital materials. Just know that every character has an unique number associated with it and the characters can be accessed with these **ASCII** values.
- ```
  char myGradeInJava = 'A';
  char myAge = '2';
  char anASCII = 65;
  System.out.println("My Grade is " + myGradeInJava);
  System.out.println("My age is " + myAge);
  ```

Short

- ```
  short aSmallNumber = 23;
  System.out.println(aSmallNumber);
  ```
-

Long

- ```
  long veryLongNumber = 123456789L;
  System.out.println("A very long number:  " + age);
  ```