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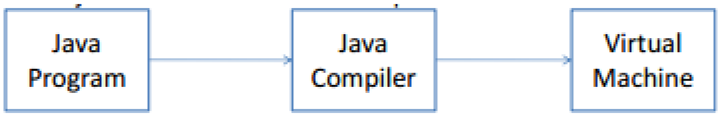
Lesson - 01

INTRODUCTION TO JAVA LANGUAGE ENVIRONMENT

INTRODUCTION TO JAVA FEATURES

JAVA VIRTUAL MACHINE

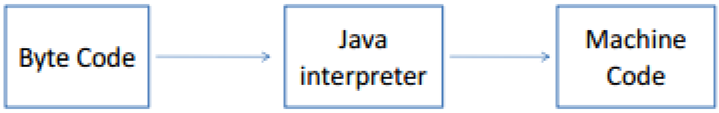
- All language compilers translate source code into machine code for specific computer.
- Java compiler produces an intermediate code known as bytecode for a machine that does not exist.
- This machine is called the **java virtual machine** and exits only inside the computer memory.
- It is a simulated computer within the computer and does all major functions of a real computer.



INTRODUCTION TO JAVA FEATURES

JAVA VIRTUAL MACHINE

- The virtual machine code is not machine specific.
- The machine specific code is generated by the java interpreter by acting as intermediary between the virtual and real machine.



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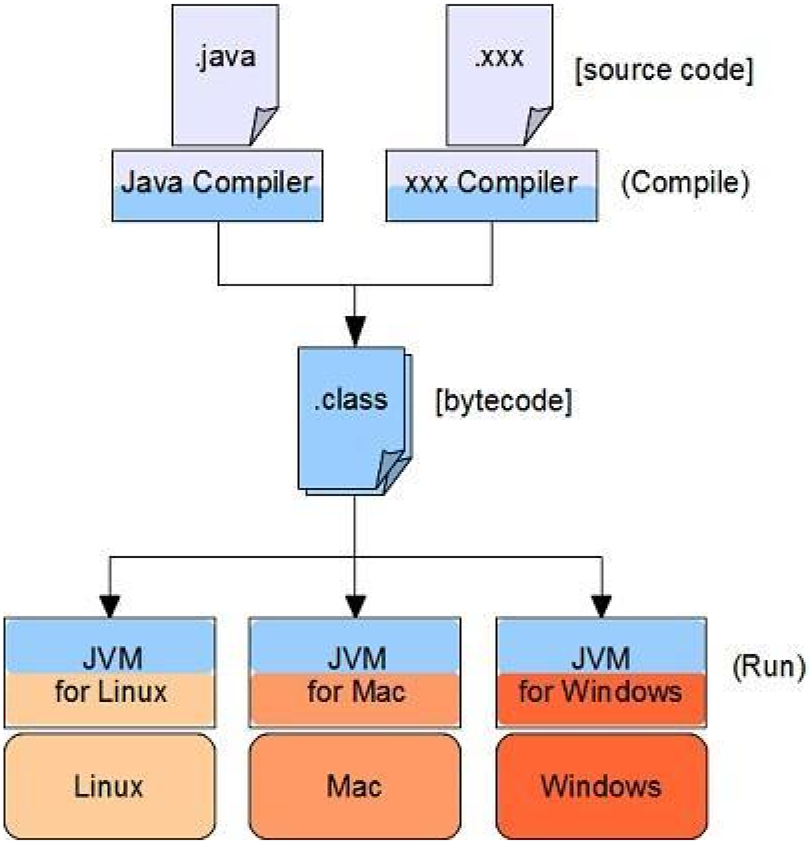

JAVA PROGRAM STRUCTURE

```
class SampleOne
{
public static void main(String args[])
{
System.out.println(“Java is better than C++”);
}
}
```

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Class Declaration
Everything must be placed inside a class
E.g.: class SampleOne
Main Line
Every java program must include the main method. Starting point for the interpreter to begin the execution of the program. Java application can have any number of classes but only one of them must include main method to initiate the execution.

Public :
main method as un protected and therefore making it accessible to all other classes.
Static :
Declare this method as one that belongs to the entire class and not a part of any objects of the class.

void :
main method does not return any value.
Output Line:
Every method must be part of an object. println method is a member of the out object,which is a static data member of System class.

JAVA PROGRAM STRUCTURE

•Documentation
•Package Statement
•Import statement
•Interface statement
•Class definition
•Main method class

Documentation
• comprises a set of comment lines giving the name of the program, author and other details.
Package statement
• declares a package name and informs the compiler that the classes defined here belong to this package.
• E.g: package student

Import statements
• Instruct interpreter to load the test class contained in the

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package student.
E.g.: import student.Test;

Interface statements

- New concept in java
- Like a class but includes a group of method declarations.

Class definitions

- A java may contain multiple class definitions.

Main Method Class

- Every java stand –along program requires a main method as its starting point, this class is essential part of a java program.

Java Syntax

```
public class Main {

  public static void main(String[] args) {

    System.out.println("Hello World");

  }

}
```

The main Method

```
public static void main(String[] args)
```

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System.out.println()

```
public static void main(String[] args) {

  System.out.println("Hello World");

}
```

Java Comments

Single-line Comments

```
// This is a comment

System.out.println("Hello World");

System.out.println("Hello World"); // This is a comment
```

Java Multi-line Comments

```
/* The code below will print the words Hello World

to the screen, and it is amazing */

System.out.println("Hello World");
```

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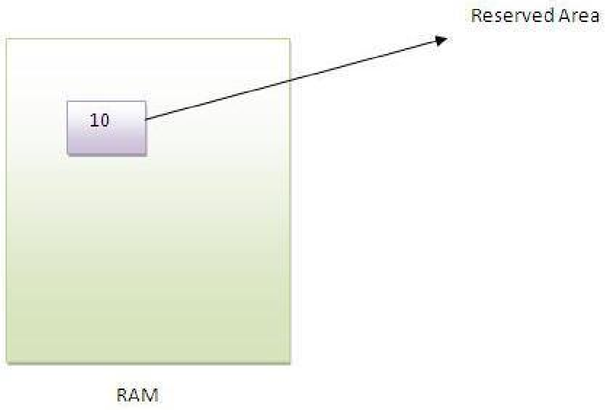
Data Types, Variables in Java

Variable

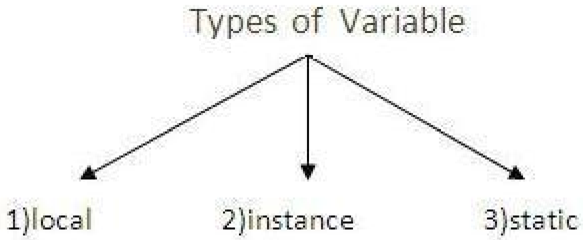
Variable is name of reserved area allocated in memory.



Types of Variable

There are three types of variables in java

- local variable
- instance variable
- static variable



Local Variable

A variable that is declared inside the method is called local variable.

Instance Variable

A variable that is declared inside the class but outside the method is called instance variable . It is not declared as static.

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Static variable

A variable that is declared as static is called static variable. It cannot be local.

Declaring (Creating) Variables

```
String name = "Devz";

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

Final Variables

However, you can add the `final` keyword if you don't want others (or yourself) to overwrite existing values (this will declare the variable as "final" or "constant", which means unchangeable and read-only):

```
final int myNum = 15;

myNum = 20;  // will generate an error: cannot assign a value to a final variable

int myNum = 15;

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

In java, there are two types of data types

- primitive data types
- non-primitive data types

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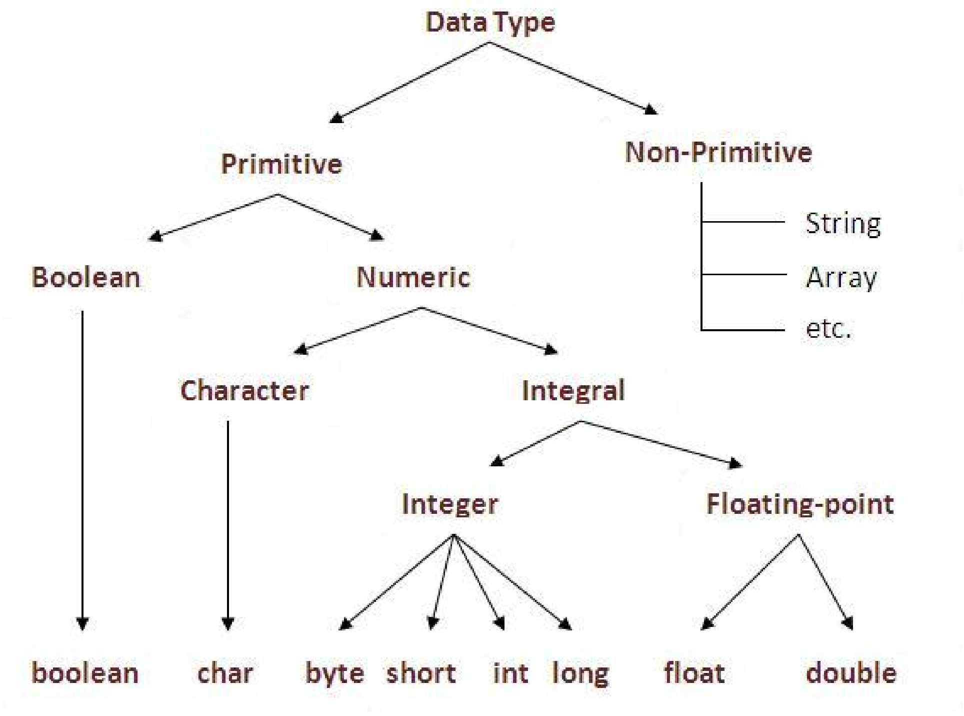


Primitive Data Types

There are eight primitive datatypes supported by Java. Primitive datatypes are predefined by the language and named by a keyword. Let us now look into the eight primitive data types in detail.

byte

- Byte data type is an 8-bit signed two's complement integer
- Minimum value is -128 (-2^7)
- Maximum value is 127 (inclusive)(2^7 -1)
- Default value is 0
- Byte data type is used to save space in large arrays, mainly in place of integers, since a byte is four times smaller than an integer.
- Example: byte a = 100, byte b = -50

short

- Short data type is a 16-bit signed two's complement integer
- Minimum value is -32,768 (-2^15)

- Maximum value is 32,767 (inclusive) (2^15 -1)
- Short data type can also be used to save memory as byte data type. A short is 2 times smaller than an integer
- Default value is 0.
- Example: short s = 10000, short r = -20000

int

- Int data type is a 32-bit signed two's complement integer.
- Minimum value is - 2,147,483,648 (-2^31)
- Maximum value is 2,147,483,647(inclusive) (2^31 -1)
- Integer is generally used as the default data type for integral values unless there is a concern about memory.
- The default value is 0
- Example: int a = 100000, int b = -200000

long

- Long data type is a 64-bit signed two's complement integer
- Minimum value is -9,223,372,036,854,775,808(-2^63)
- Maximum value is 9,223,372,036,854,775,807 (inclusive)(2^63 -1)
- This type is used when a wider range than int is needed
- Default value is 0L
- Example: long a = 100000L, long b = -200000L

float

- Float data type is a single-precision 32-bit IEEE 754 floating point
- Float is mainly used to save memory in large arrays of floating point numbers
- Default value is 0.0f
- Float data type is never used for precise values such as currency
- Example: float f1 = 234.5f

double

- double data type is a double-precision 64-bit IEEE 754 floating point

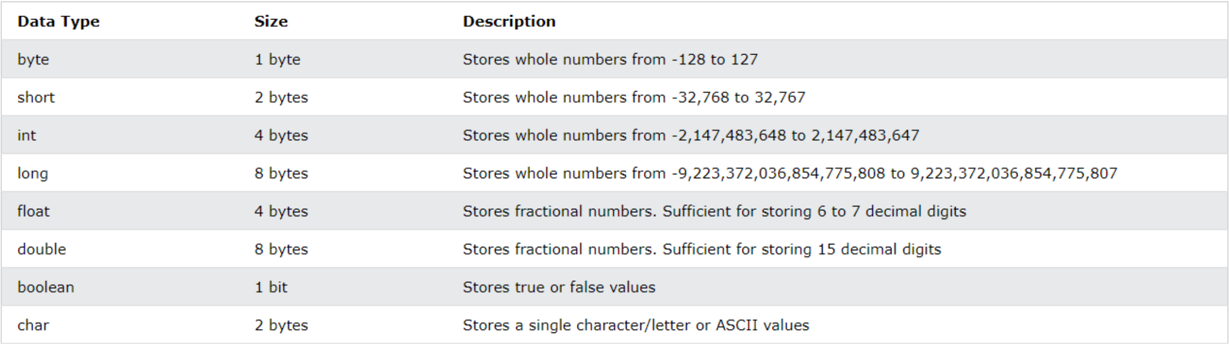
- This data type is generally used as the default data type for decimal values, generally the default choice
- Double data type should never be used for precise values such as currency
- Default value is 0.0d
- Example: double d1 = 123.4

boolean

- boolean data type represents one bit of information
- There are only two possible values: true and false
- This data type is used for simple flags that track true/false conditions
- Default value is false
- Example: boolean one = true

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)
- Char data type is used to store any character
- Example: char letterA = 'A'



Data Type	Size	Description
byte	1 byte	Stores whole numbers from -128 to 127
short	2 bytes	Stores whole numbers from -32,768 to 32,767
int	4 bytes	Stores whole numbers from -2,147,483,648 to 2,147,483,647
long	8 bytes	Stores whole numbers from -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807
float	4 bytes	Stores fractional numbers. Sufficient for storing 6 to 7 decimal digits
double	8 bytes	Stores fractional numbers. Sufficient for storing 15 decimal digits
boolean	1 bit	Stores true or false values
char	2 bytes	Stores a single character/letter or ASCII values