Java

19/10/2018

**Any queries/questions from the previous session ?**

>> Goal of today’s session – Introduce you to the basics of Java programming

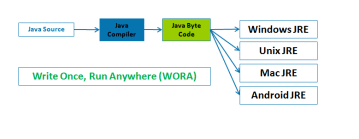
**>> Q? Have all of you installed JDK 8 on your respective machines ? We will install the JDK on those machines that don’t have it. JAVA\_HOME, Path needs to be set**

**On Mac – what are the steps to be followed ?**

>> What is the JDK ?

>> Compile and run your Java programs

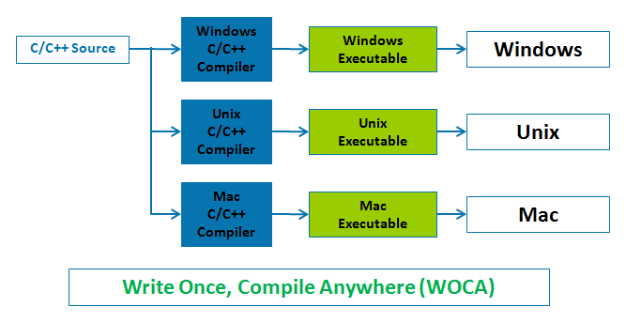
>> Write once run anywhere



**java bytecode** is the machine **code** in the form of a .class file. The JVM executes this bytecode.

**>> Q ? The same java file is compiled on Mac and Windows . Will the .class file be the same ?**

**Let us create a simple program to demonstrate the above concepts**



Source of the two images - <https://core2advance.wordpress.com/2016/03/14/creation-of-java-for-platform-independence-wora/>

*FYI – Java was created for platform independence and not web development, data sciences, etc.*

**Q? Is Java a popular language ?**

Yes.

For the students, as part of your assignment, please find out how Java is being used ? . It is widely used across the industry and for developing different kinds of business applications and IT products.

**Q? Do I have to code everything from scratch or are there libraries that I can use in my programs ?**

No. Java comes with a rich standard library that is being continuously enhanced that developers can refer to.

For the students, as part of your assignment, each of you find out about 1 library/module ? .

>> We can create Java code using a number of different editors

1. Notepad
2. Notepad++
3. Eclipse IDE [Will be covered later on in the course]
4. NetBeans IDE
5. IntelliJ

We will start with Notepad(++) as it is easier for beginners. Later on, we will move to Eclipse. 2-3 sessions will be conducted using Notepad.

Using IDEs for applications improves developer productivity and make it easy to compile, test and run programs.

>> Creating applications in Java

>> Applications are simply a collection of programs

>> We’ll start with really simple applications which consist of a program. Later on, the apps will have more than 1 program

**Q? In general, what do you think a program consist of ?**

>> Data and actions performed upon that data

>> Students to provide some examples

## Given two numbers, add, multiple, subtract these two numbers

## If calling prefix = “+91”, then calling country is India

## For a student, if % > 60, then grade = “Ist Class”, else “2nd Class”

## Given a set of numbers, find the highest, 2nd highest number

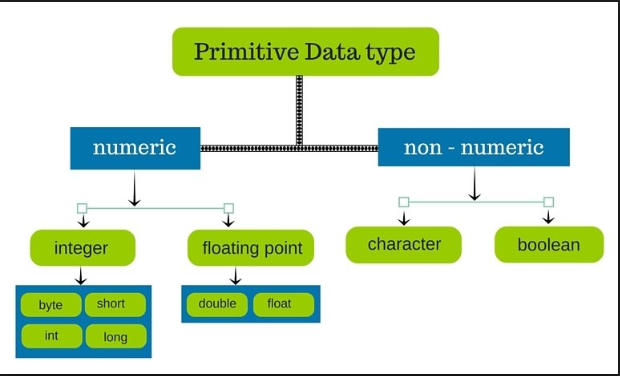
## Given a set of numbers, list the numbers in ascending or descending order

|  |
| --- |
| 1. **Public class** ReallySimple{ 2. **public** **static** **void** **main**(String args[]){ 3. System.out.println("Really simple java program"); 4. } 5. } |

>> To handle data, Java provides two data types

>> Primitive Data types

>> Reference Data types



**Exercise – Please find out more about integer data types and floating points. Why do we have so many different primitive data types**

NOTE : Java is an object oriented language. For reasons of performance, it has primitive data types. These are the simplest data types that one can create/use in Java. ***They do not form part of the Class hierarchy in Java [will be explained later in the OOP sessions]***

These primitive data types have no special capabilities and serve just one purpose. Store data for quick retrieval.

We will for the time being use two reference data types – “String” and “Arrays”. These are actually objects that we will use in our programs.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| -1 | -2 | 100 | 0 | 5 | 7 | 7890 | 34 | 23 | -22 |

---------------------------------------------- 19th end --------------------------------------------------------------------------------

JAVA PROGRAMS

1. Write a program which calculates the average of three numbers

>> Is the average an Integer ? NO

>> Can we store the average as an Integer ? YES – Will be covered later

>> Assuming simple logic, would this work for say 10 numbers, 5 numbers - Array with Loops -

1. Given Principal, Rate of Interest and Time. Find the simple interest

>> At run time, can we change the values – YES

>> STRING to INT conversion – TBD

>> Storing the simple interest in an Integer data type (Automatic conversion or “Implicit Conversion” )

1. Any suggestions from the team (let’s try to ensure that all primitive data types are used along with Strings and Arrays]

>> Saving these files on GITHUB

>> IF ELSE

>> WHILE

>> DO WHILE

>> FOR

>> SWITCH STATEMENTS

>> Operators

* Arithmetic Operators
  + Module , ++, --
* Relational Operators
  + ==
* Bitwise Operators (will not be covered)
* Assignment Operators
  + a += b is equivalent to a = a + b.
  + a -= b is equivalent to a = a – b
  + a \*= b is equivalent to a = a \* b
  + a /= b is equivalent to a = a / b
  + a %= b is equivalent to a = a % b
* Logical Operators
  + &&, || and !

SOME JAVA PROGRAMS

|  |
| --- |
| Int x, y = 1 ;  X = ++y ; // x = y++ |

>> More on Arrays and Strings

>> Strings

**Strings**, which are widely used in **Java** programming, are a sequence of characters. In **Java** programming language, **strings** are treated as objects. The **Java** platform provides the **String** class to create and manipulate **strings**.

As String is a class, it comes with a rich set of functions

<https://docs.oracle.com/javase/8/docs/api/java/lang/String.html>

This is the official specification of the String class. We’ll just walk through the amazing set of functions that it provides to manipulate strings.

String s = “Training” ;

String s = new String (“test”);

JAVA PROGRAMS RELATED TO STRINGS

>> Write a program which compares two strings

>> Write a program to retrieve a portion of a string

>> Converts a string to upper case

>> Arrays

<https://docs.oracle.com/javase/8/docs/api/java/util/Arrays.html>

**Q.? After creating an array, can the size be increased ?**

First row – index, 2nd row – value for that index

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| A | B | C | D | E | F | G |

How would you defined this array ?

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| “test” | “ab” | “cd” | “beta” | “java” | “x” | “12” | “23” | “os” | “unix” |

**ASSIGNMENTS**

1. For a student, store the marks for say 5/6/… subjects. Use Looping to print the subject name and the marks
2. **conditional Operator**: We normally use the if-then-else statements fr evaluating conditions. Java include a special operator ‘?’ which can replace if-then-else statements for evaluating conditions. The general form of ‘?’ operator is:

*expression1 ? expression2 : expression3*

*Write a simple Java program that uses this operator*

1. 1 = Monday, 2 = Tuesday, ….

Write a program which accepts the day of the week and prints the day as a string