Java Document

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Introduction of Java:

Java is a Class-based, Object Oriented, General Purpose Computer programming language.

Created By: James Gosling and the team at Sun Microsystems.
First Released: May 23, 1995.
Current Owner: Oracle Corporation (acquired Sun Microsystems in 2010).

Features of Java:

1. Simple
2. Object-oriented
3. Distributed
4. Robust
5. Secure
6. Dynamic
7. Platform Independent
8. Portable
9. Interpreted
10. High Performance
11. Architecture Neutral
12. Multithreaded

Basic Syntax of Java:

```
public class HelloWorld
{
   public static void main(String[] args)
{
      System.out.println("Hello, World!");
   }
}
```

Components of the Java Platform:

- **Java Development Kit (JDK) :** It is for development purpose
- **Java Runtime Environment (JRE)** : It is for running the java programs
- **Java Virtual Machine (JVM):** JDK & JRE BOTH contains JVM so that we can run our java program

Java Program Compilation and Execution:

- **Compilation**: Java source code files (.java) are compiled by the Java compiler (javac) into bytecode files (.class)
    - javac HelloWorld.java
- **Execution**: The Java Virtual Machine (JVM) executes the bytecode using the Java interpreter (java)
    - java HelloWorld

Java Comments:

Comments are used to explain code and make it more readable. They are ignored by the compiler.

1. **Single-Line Comments:**

```
// This is a single-line comment
```

2. **Multi-Line Comments:**

```
/* This is a
   multi-line comment */
```

3. **Documentation Comments:**

```
/**
   This is a documentation comment
   used for generating Javadoc
 */
```

Literals, Keywords and Variables:

- **Literals:** Nothing but identifierS
  There are 3 types:
    1. Numeric Literals
    2. Character Literals
    3. Boolean Literals
- **Keywords:** These are special/reserved words

  There are 50 reserved words in java

- **Variables:** It is an identifier, behave like container.

  These are used to store input/output of our java program

Variable consists of declaration and initialization parts,

Declaration: To allocate sufficient memory to the variable

Ex: int age;

initialization: To store some value in that particular memory

Ex: int age;

age = 25;

Data Types:

Refer to the different sizes and values that can be stored in a variable

There are three types of datatypes,

1. **Primitive data types:** Can store only one value in a variable
2. **Derived data types:** Can store more than one value of similar type
3. **User defined data types:** Can store more than one value of similar/dissimilar type

Java Expressions:

An expression is a combination of variables, operators, and values that evaluates to a single value.

Example:
int sum = 5 + 3; // Expression evaluating to 8

Expression Evaluation:

Expressions is a combination of operands and operators is mainly depends on priority and associativity.

Example:
int result = 5 + 3 * 2;

Priority and Associativity:

- **Priority:** This represents the evaluation of expression starts from " what " operator
- **Associativity:** It represents which operator should be evaluated first if an expression is containing more than one operator with same priority

Types of Operators and Examples

It is a special symbol or character that tells the compiler to perform specific mathematical or logical Operation.

Operators help you manipulate data and control the logic of your program

These operators are the following types,

1. **Arithmetic operators:** used to perform common mathematical operations
2. **Assignment operators:** used to assign values to variables
3. **Comparision operators:** used to compare two values
4. **Logical operators**: used to determine the logic between values
5. **Bitwise operators:** that performs a specified operation on standalone bits