JAVA BASICS

By Tripurari kumar

Java is a general purpose, object oriented programming language developed by Sun MicroSystems in 1991. Originally called OAK by James gosling , one of the inventors of the language. But was renamed as java in 1995.

1. Features of Java:

- Simple: Java was designed to be easy for professional programmers to learn, if he already knows C &C++. Java includes syntaxes from C and object oriented concepts from C++. The confusing concepts in both C & C++ are leftover here. So java is easy to learn and it is simple language.
- II. <u>Secure</u>: Security becomes an important issue for a language that is used for programming on internet. Threat of viruses and abuse of resources are everywhere. Java systems not only verify all memory access but also ensure that no viruses are communicated with an applet. The absence of pointers in java ensures that programs can't gain access to memory locations without proper authorization.
- III. <u>Portable</u>: The most significant contribution of java over other languages is its portability. Java programs can be easily moved from on computer to another, anywhere and anytime. Changes and upgrades in operating systems, processors and system resources will not force any changes in java programs. This is the reason why java has become popular language for programming on internet which interconnects different kinds of systems worldwide.
- IV. <u>Object-oriented</u>: java is a true object oriented language. Almost everything in java is an object. All program code and data reside with in objects & classes. Java comes with an extensive set of classes, arranged in packages, that we can use in our programs by inheritance. The object Model in java is simple and easy to extend.
- V. <u>**Robust**</u>: Java is a robust language. It provides many safeguards to ensure reliable code. It has strict compile time and runtime checking for data types. It is designed as a garbage collected language relieving the programmers virtually all memory management problems. Java also incorporates the concept of exception handling which captures serious errors and eliminates any risk of crash the system.
- VI. <u>Multithreaded</u>: It means handling multiple tasks simultaneously. Java supports multithreaded programs. This means that we need not wait for the application to finish one task before another. For eg, we can listen to an audio clip while scrolling a page and at the same time download an applet from a distant computer. This feature greatly improves the interactive performance of graphical applications.
- VII. <u>Architectural Neutral</u>: One of the problems facing by programmers was program written today will not be run tomorrow even in the same machine or if the OS or if the processor upgrades. So java designers made it architectural neutral by implementing JVM (Java Virtual Machine)through java runtime environment. The main role of java designers to make it architecture neutral write once, run anywhere, anytime forever.
- VIII. <u>Compiled & Interpreted</u>: Usually a computer language is either compiled or interpreted. Java combines both these approaches thus making java a two stage system. First java compiler translates source code into what is known as byte code. Byte codes are not machine instructions and therefore, in second stage java interpreter generates

machine code that can be directly executed by the machine that is running the java program. So we can say that java is both compiled and interpreted language.

- IX. <u>High Performance</u>: Java performance is impressive for an interpreted language, mainly due to the use of intermediate byte code. Java architecture is also designed to reduce overheads during runtime. Further, the incorporation of multithreading enhances the over all execution speed of java programs.
- X. **<u>Dynamic</u>**: java programs carry with them substantial amount of runtime information that is used to access the objects at runtime. This makes java Dynamic.
- XI. <u>Distributed</u>: java is designed for the distributed environment of the internet because it handle TCP/IP protocols. Java supports two computers to support remotely through a package called Remote Method Invocation (RMI)

2. What are the data types in java?

Data types:

Every variable in java has a data type. Data types specify the size and type of values that can be stored. Java language is rich in its data types.

Integer types:

Java supports 4 types of integers, they are byte short, int and long. Java does not support the concept of unsigned types and therefore all java values are signed, meaning they can be +ve or - ve

Туре	Size	Range
byte	1 byte	-128 to 127
short	2 bytes	-2^{15} to 2^{15} -1
int	4 bytes	-2^{31} to $2^{31}-1$
long	8 bytes	-2^{63} to 2^{63} -1

byte: The smallest integer type is byte. This is a signed 8-bit type that has a range from -128 to 127. Variables of type 'byte' are especially useful when you're working with a stream of data from a n/w or file. byte variables are declared by use of 'byte' keyword. eg: byte b, c;

short: short is signed 16 b it type. It has range from -2^{15} to 2^{15} -1. The short variables are declared by use of short keyword.

eg: short s;

int: The most commonly used integer type is int. It is a signed 32 bit type that a range from -2^{31} to 2^{31} -1. In addition to other uses, variables of type int are commonly employed to control loop and to index arrays. 'int' type is most versatile & efficient type. int variables are declared by use of 'int' keyword.

eg: int a;

long: long is a signed 64 bit type and is useful for those occasions where an int type is not large enough to hold the desired values. The range of long is quite large. It has range from -2^{63} to 2^{63} -

1. long variables are declared by use of 'long' keyword eg: long a;

Floating point types:

Floating point numbers are used when evaluating expressions that require fractional precision. There are two kinds of floating point types, float and double. Which represent single and double precision numbers respectively.

Туре	Size	Range
float	4 bytes	1.4e-045 to 3.4e+038
short	8 bytes	4.9e-324 to 1.8e+308

float: the type float specifies a single precision value that uses 32 bits of storage. Single precision is faster on same processors and takes half as much space as double precision. float variables are declared by use of 'float' keyword.

eg: float a=1.234;

double: double precision, as denoted by the double keyword, uses 64 bits to store a value. All transcendental math functions such as sin(), cos() and sqrt() return double values. double variables are declared by use of 'double' keyword.

eg: double d;

char: In java, the datatype used to store characters is char. Java uses Unicode to represent characters. Unicode defines a fully international character set that can represent all of the characters found in all human languages. Thus in java char is a 16bit type. The range of char is 0 to 65536. There are no negative chars. char variables are declared by use of char keyword. eg: char c;

boolean: Java has a simple type called boolean, for logical values. It can have only one of two possible values, true or false. This is the type returned by all relational operators such as a<b. Boolean is also the type required by conditional expressions that govern the control statements such as 'if' and 'for'. boolean variables are declared by use of 'boolean' keyword.

eg: boolean b; b=false;