Java Notes - TheTestingAcademy (Pramod Sir)

✅ Why Learn Java?

- Java is a general-purpose, object-oriented programming language that was designed by James Gosling at Sun Microsystems in 1995
- Compilation of the Java applications results in the bytecode that can be run on any platform using the Java Virtual Machine. Because of this, Java is also known as a WORA (Write Once, Run Anywhere)
- Java Version - https://en.wikipedia.org/wiki/Java_version_history
- High Level, Platform independent & Architecture Neutral
- Secure, Robus, Multi Thread, Distributed and OOPs language.

⚠️ Why Java is not 100% Object-Oriented?

- Primitive data types.
- Use of Static.
- Wrapper class

⚠️ How is Java Secure?

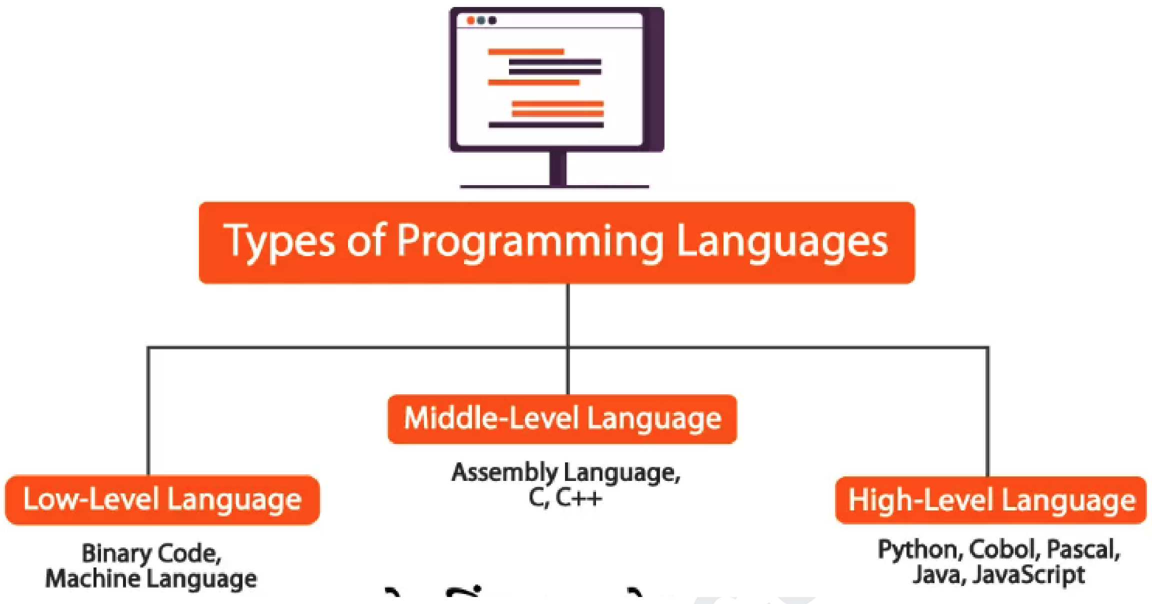
- JVM which protects from unauthorized or illegal access to system resources.
- Oops and inner classes

Ref - https://www.scaler.com/topics/why-java-is-not-100-object-oriented/

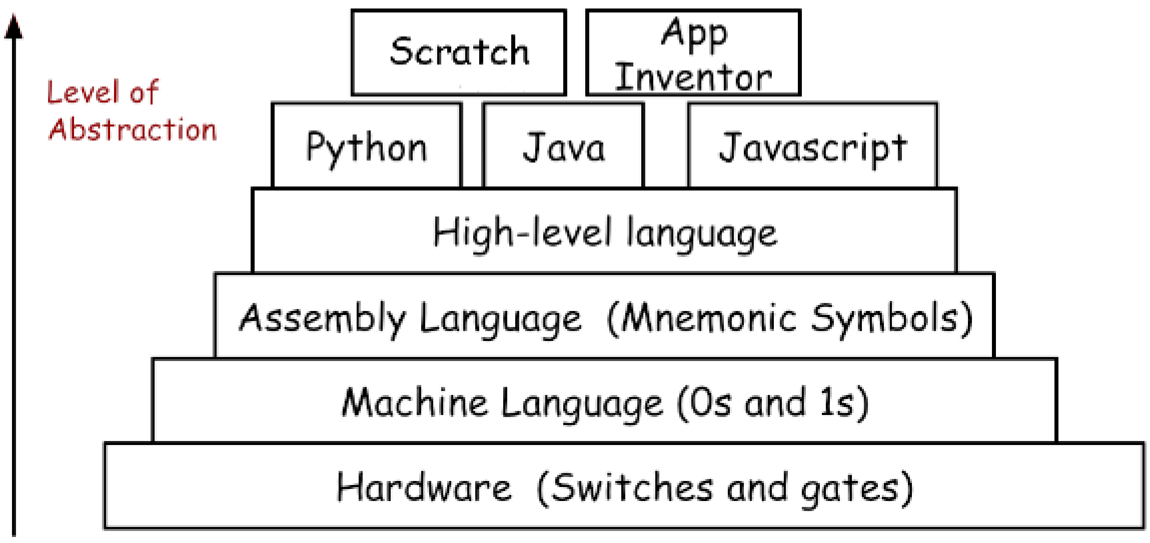
Important Points

- Since Java applications can run on any kind of CPU so it is architecture – neutral.
- Java program can be executed on any kind of machine containing any CPU or any
- operating system.

- Java is robust because of following: Strong memory management(Garbage Collector) No Pointers Exception handling Type checking mechanism Platform Independent.
- Using RMI and EJB we can create distributed applications in java


Types of Programming Languages
Middle-Level Language
Assembly Language, C, C++
Low-Level Language
Binary Code, Machine Language
High-Level Language
Python, Cobol, Pascal, Java, JavaScript

Check the Languages, with the Level of Abstraction


Level of Abstraction
Scratch
App Inventor
Python
Java
Javascript
High-level language
Assembly Language (Mnemonic Symbols)
Machine Language (0s and 1s)
Hardware (Switches and gates)

Major Features of Java Programming Language

- Simple.
- Object-Oriented.
- Platform Independent.
- Portable.
- Robust.
- Secure.
- Interpreted.
- Multi-Threaded

⚠ **What is Source Code?**

Human understandable code written using High Level Programming language is called as Source Code. (NameOfFile.java)

⚠ **What is Byte Code?**
JVM understandable code generated by Java Compiler is called as Byte Code. Byte code is also called as Magic Value.

⚠ **Why C and C++ are Platform Dependent?**
When you compile C or C++ program on one Operating System then compiler generates that Operating System understandable native code.Native code generated on one OS will not run on other OS directly. Window -> exe, Mac -> dmg, Linux, deb, pkg

⚠ **What is Java Compiler?**

Java Compiler is a program developed in C or C++ programming language with the name "javac". It will check syntactical or grammatical errors of the programs. It converts source code to byte code.

⚠ **What is Java Interpreter?**
Java Interpreter is a program developed in C or C++ programming language with the name "Java". It will convert byte code to native code line by line. It will execute that native code.

⚠ **What is JIT Compiler?**
JIT (Just-In-Time) compiler is a component of the Java Runtime Environment. JIT Compiler compiles or translates or converts the neccessary part of the bytecode into machine code instead of converting line by line. Because of this, performance of Java program has improved.

Run your First Java Program

1. Install Java and Set path to the Home in Windows / Mac
2. Install IDE (IntelliJ) and you can avoid the first step.
3. Create new command line project and Add the code and run the program.

How to Set JAVA_HOME path in MAC - Click here

1. Download the JDK latest -

```
echo export "JAVA_HOME=\$(/usr/libexec/java_home)" >> ~/.bash_profile
```

2. If you're using zsh (which probably means you're running macOS Catalina or newer), then it should instead be:

```
echo export "JAVA_HOME=\$(/usr/libexec/java_home)" >> ~/.zshrc
```

3. In either case, restart your shell.

How to Set JAVA_HOME path in Widnows

Set the JAVA_HOME Variable

To set the JRE_HOME or JAVA_HOME variable:

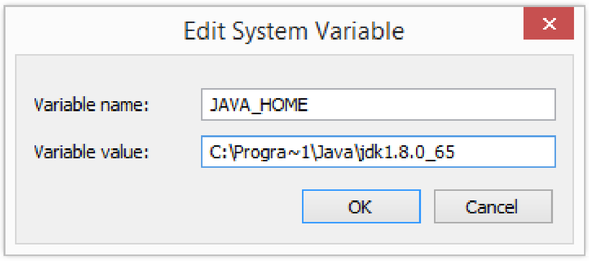
1. Locate your Java installation directory
   If you didn't change the path during installation, it'll be something like

```
C:\Program Files\Java\jdk1.8.0_65
```

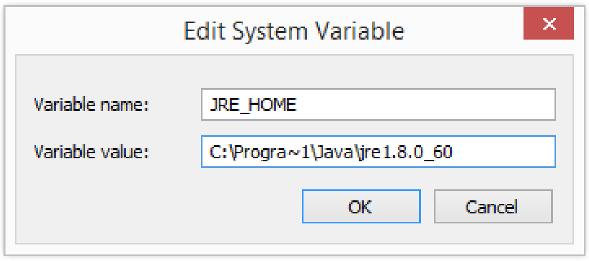
You can also type `where java` at the command prompt.

2. Do one of the following:
   Windows 7 – Right click **My Computer** and select **Properties** > **Advanced**
   Windows 8 – Go to **Control Panel** > **System** > **Advanced System Settings**
   Windows 10 – Search for **Environment Variables** then select **Edit the system environment variables**
3. Click the **Environment Variables** button.
4. Under **System Variables**, click **New**.
5. In the **Variable Name** field, enter either:
   - `JAVA_HOME` if you installed the JDK (Java Development Kit)
     or
   - `JRE_HOME` if you installed the JRE (Java Runtime Environment)

6. In the **Variable Value** field, enter your JDK or JRE installation path .
   If the path contains spaces, use the shortened path name. For example, `C:\Progra~1\Java\jdk1.8.0_65`



Variable name: JAVA_HOME
Variable value: C:\Progra~1\Java\jdk1.8.0_65



Variable name: JRE_HOME
Variable value: C:\Progra~1\Java\jre1.8.0_60

   Note for Windows users on 64-bit systems
   Progra~1 = 'Program Files'
   Progra~2 = 'Program Files(x86)'
7. Click **OK** and **Apply Changes** as prompted

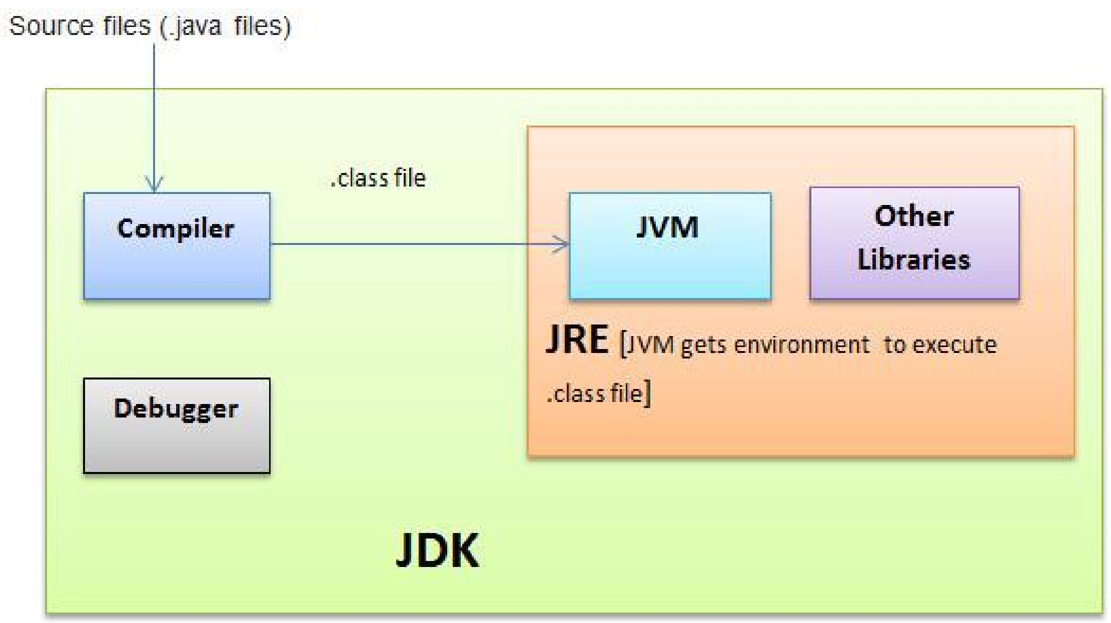
⚠️ What is JDK (Java Development Kit) / SDK (Software Development Kit)?

It is a set of various utility programs which are required for developing and executing the java programs.
It is Platform dependent. Various JDKs are provided for various Operating Systems.
Following are various utility programs provided under JDK:
1) Java Development Tools
   i. javac
   ii. java
   iii. javap
   iv. Jar
etc
2) Source Files
3) JRE
etc

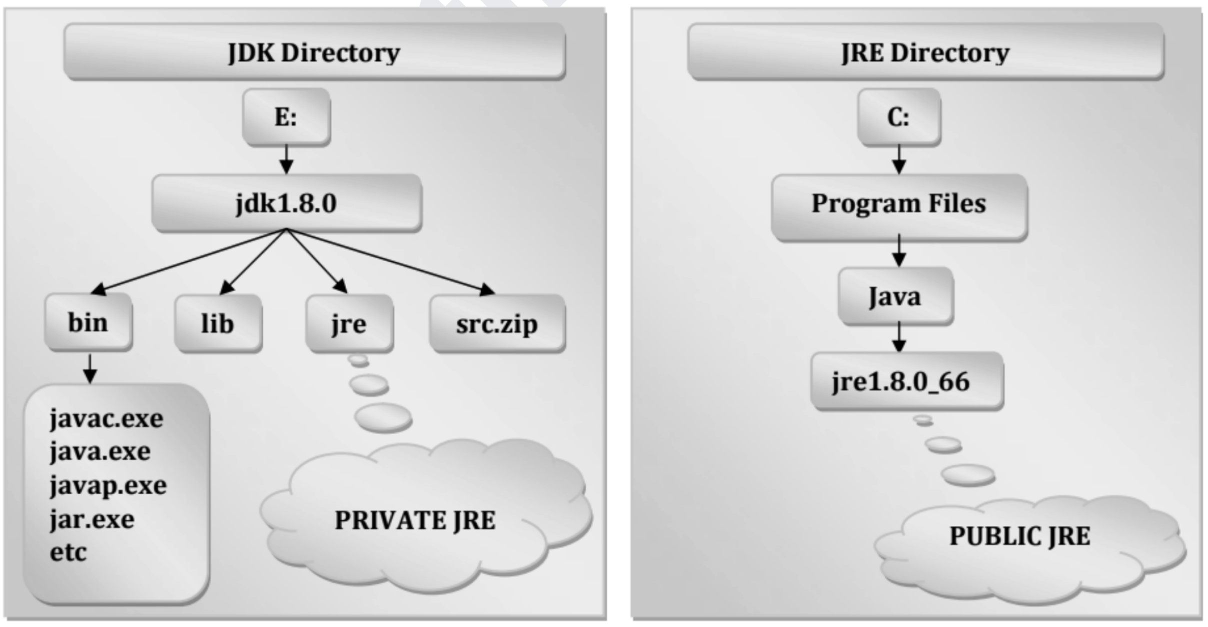
⚠️ What is JRE?
Ans: JRE stands for Java Runtime Environment. It is an implementation of JVM. It contains class
libraries, Interpreter, JIT Compiler etc. Only JRE is enough to run the Java program

⚠️ What is JVM?
Ans: JVM stands for Java Virtual Machine. It is a specification provided by SUN Microsystem whose
implementation provides an environment to run our Java applications. JVM becomes an instance of
JRE at run time.

Sun’s implementations of the Java Virtual Machine (JVM) is itself called as JRE. Sun’s JRE is availabe
as a part of JDK and also as a separate application.
Many vendors has implemented JVM. Some of them are SUN JRE, IBM JRE, Oracle JRE etc


Source files (.java files)
.class file
Compiler
JVM
Other Libraries
JRE [JVM gets environment to execute .class file]
Debugger
JDK

JDK Vs JRE



Java Editions

1. Enterprise Edition - Servlets, JSP, JDBC etc.
2. Micro Edition - micro devices like Mobiles,Setup Box etc
3. Standard Edition - Used to develop standalone applications using applet and swing.

Edition	Description
Java SE (Standard Edition)	The main edition of Java that is used for desktop and server applications. It includes the Java language, JVM, class libraries, and tools for developing, testing, and deploying Java applications.
Java EE (Enterprise Edition)	A set of specifications and APIs for developing enterprise applications, including web and mobile applications, distributed systems, and cloud computing. It includes components like servlets, JSPs, EJBs, JMS, JPA, and more.
Java ME (Micro Edition)	A platform for developing applications for mobile and embedded devices, like phones, PDAs, and set-top boxes. It includes a subset of the Java SE APIs and tools, as well as additional libraries for mobile-specific features like user interfaces and networking.
Java FX	A platform for developing rich client applications and user interfaces, with features like graphics and media support, animation, and web integration. It includes a set of APIs and tools for developing desktop, mobile, and web applications.

Note that Java EE has been rebranded as Jakarta EE, as Oracle transferred ownership of the Java EE specification to the Eclipse Foundation.

Java Versions

Java Version	Key Features
Java 1.0	Garbage collection, multi-threading, network programming
Java 1.1	Inner classes, JavaBeans, JDBC
Java 1.2 (Java 2)	Collections framework, reflection, Swing GUI toolkit, JNDI
Java 1.3 (Java 2)	HotSpot JVM, Java Sound API, Bluetooth support
Java 1.4 (Java 2)	Assertions, regular expressions, Java Web Start, JNI
Java 5 (Java 1.5)	Generics, annotations, enhanced for loop, concurrent API
Java 6 (Java 1.6)	JAXB API, Java Compiler API
Java 7 (Java 1.7)	Try-with-resources, multi-catch exceptions, Fork/Join Framework, NIO.2
Java 8 (1.8)	Lambda expressions, Stream API, java.time package, CompletableFuture
Java 9	Module system, private interface methods, JShell
Java 10	Local variable type inference, garbage collector improvements
Java 11	HttpClient API, var keyword for lambda parameters, Unicode 10.0 support

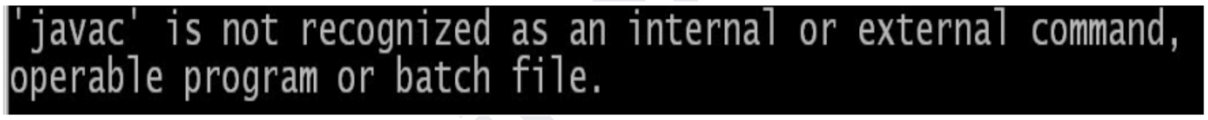
Java 12	Switch expressions, garbage collector improvements
Java 13	Text blocks, Z Garbage Collector improvements
Java 14	Record classes
Java 15	Sealed classes and interfaces, garbage collector improvements
Java 16	Pattern matching for instanceof, garbage collector and JFR improvements
Java 17	Sealed Types Preview, garbage collector improvements

Java Comments

Comment Type	Syntax	Description
Single-line comment	// comment	A comment that extends from the // marker to the end of the line. It is ignored by the compiler and used for adding notes and explanations to the code.
Multi-line comment	/* comment */	A comment that can span multiple lines, starting with the /* marker and ending with the */ marker. It is also ignored by the compiler and used for adding longer explanations or temporarily disabling code.

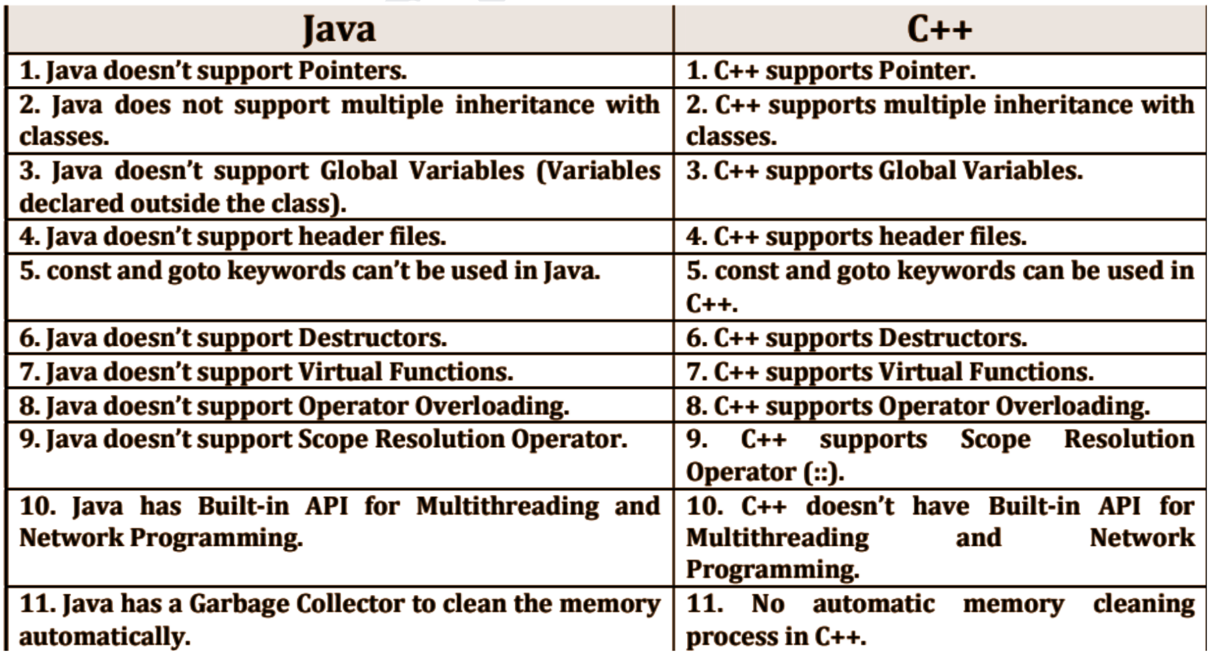
Documentation comment	/** comment */	A comment that begins with /** and ends with */. It is similar to a multi-line comment, but it is specifically used for generating API documentation with tools like Javadoc. It can include tags like @param, @return, @throws, etc.
Javadoc comment	/**	A special type of documentation comment that starts with /** and includes additional Javadoc tags for generating documentation. It can be used to describe classes, interfaces, methods, fields, etc. and their functionality. It is a best practice to include Javadoc comments in your code for documentation purposes.

⚠️ **Why this Kolavari DI? (Reason for this error)**
Install JDK properly



```
'javac' is not recognized as an internal or external command,
operable program or batch file.
```

⚠️ **Difference between Java and C++**



Java	C++
1. Java doesn't support Pointers.	1. C++ supports Pointer.
2. Java does not support multiple inheritance with classes.	2. C++ supports multiple inheritance with classes.
3. Java doesn't support Global Variables (Variables declared outside the class).	3. C++ supports Global Variables.
4. Java doesn't support header files.	4. C++ supports header files.
5. const and goto keywords can't be used in Java.	5. const and goto keywords can be used in C++.
6. Java doesn't support Destructors.	6. C++ supports Destructors.
7. Java doesn't support Virtual Functions.	7. C++ supports Virtual Functions.
8. Java doesn't support Operator Overloading.	8. C++ supports Operator Overloading.
9. Java doesn't support Scope Resolution Operator.	9. C++ supports Scope Resolution Operator (::).
10. Java has Built-in API for Multithreading and Network Programming.	10. C++ doesn't have Built-in API for Multithreading and Network Programming.
11. Java has a Garbage Collector to clean the memory automatically.	11. No automatic memory cleaning process in C++.

⚠️ **Differences between Oracle JDK and OpenJDK**

Both OpenJDK and Oracle JDK are created and maintained currently by Oracle only.

Most of the vendors of JDK are written on top of OpenJDK by doing a few tweaks to [mostly to replace licensed proprietary parts / replace with more high-performance items that only work on specific OS] components without breaking the TCK compatibility.

https://stackoverflow.com/questions/22358071/differences-between-oracle-jdk-and-openjdk

⚠️ **What is the use of setting the PATH?**
Setting the PATH is important for the operating system to know where to look for executable files when a command is executed. In the case of Java, setting the PATH is essential for the system to locate the Java compiler and runtime environment (JRE) executable files.

⚠️ **What is the reason for the following error?**

- Javac : file not found Hello.java
- Error Could not find or load main class Hello
- java.lang.NoClassDefFoundError : hello(Wrong name Hello)
- java.lang.ClassFormatERROR : Incompatible magic value (change in .class)
- java.lang.UnSupporttedClassVersion : Hello (Compiled with Old)

⚠️ **What are the ways available to set the PATH?**
There are several ways to set the PATH, including using the command line, editing system environment variables, and using third-party tools or scripts. The specific method used may vary depending on the operating system being used.

⚠️ **What is the difference between PRIVATE JRE and PUBLIC JRE?**
A PRIVATE JRE is a Java runtime environment that is installed and used by a specific application or user, and is not shared with other applications or users on the same system. A PUBLIC JRE is a Java runtime environment that is installed and made available to all applications and users on the system.

⚠️ **Which JRE will be used while compiling the Java Source File?**
The JRE is not used for compiling Java source files, but rather the Java Development Kit (JDK) is used, specifically the Java compiler (javac) which is included in the JDK.

⚠️ **What will happen when I am compiling Java program without PRIVATE JRE?**
Compiling a Java program does not require a PRIVATE JRE. However, if the program requires a specific version of the JRE to execute, and that version is not installed on the system, the program may not run properly.

⚠️ **Which JRE will be used while executing Java application?**

The JRE that is used to execute a Java application depends on several factors, including the system's PATH settings, the application's CLASSPATH settings, and any environment variables that may be set.

⚠️ **What will happen when I am executing Java program without PUBLIC JRE?**
If a PUBLIC JRE is not installed on the system, the Java application will not be able to run. The user will need to install a JRE before the application can be executed.

⚠️ **Can we execute java program without setting PATH?**
It is possible to execute a Java program without setting the PATH, but it requires specifying the full path to the Java executable file every time the command is executed.

⚠️ **What is the difference between JVM and JRE?**
JVM (Java Virtual Machine) is a virtual machine that runs Java bytecode, while JRE (Java Runtime Environment) is a software package that includes the JVM as well as other libraries and components required to run Java applications.

⚠️ **What is the difference between JIT Compiler and Java Interpreter?**
A JIT (Just-In-Time) compiler is a component of the JVM that dynamically compiles bytecode into machine code at runtime, while a Java Interpreter executes bytecode directly without compiling it.

⚠️ **What is the difference between Byte code and Native code?**
Bytecode is a machine-independent code that is generated by the Java compiler and is designed to be executed by the JVM. Native code, on the other hand, is machine-specific code that is directly executable by the CPU.

⚠️ **Is it possible to execute Java program without having JDK in machine?**
It is possible to execute a Java program without having the JDK (Java Development Kit) installed on the machine, but a JRE (Java Runtime Environment) must be installed.

⚠️ **Can I install multiple JDK versions in my machine?**
Yes, it is possible to install multiple JDK (Java Development Kit) versions on the same machine. It is important to manage the PATH and other environment variables correctly to ensure that the correct version is used when compiling or executing Java programs.

⚠️ **Can I install multiple JRE versions in my machine?**
Yes, it is possible to install multiple JRE (Java Runtime Environment) versions on the same machine. It is important to manage the PATH and other environment variables correctly to ensure that the correct version is used

---

Explain the main method in Java

- The main method in Java is the entry point for any Java program.

- It is a predefined method that is executed when a Java program is run, and is required in every Java program.
- The main method has a specific signature, which includes the keyword "public", the keyword "static", the return type "void", and a parameter of type "String" array named "args". Here is an example of the main method signature:
- public static void main(String[] args) {
-     // code to be executed
- }
- The main method takes an optional argument, "args", which is an array of strings that ca
- n be used to pass command-line arguments to the program.

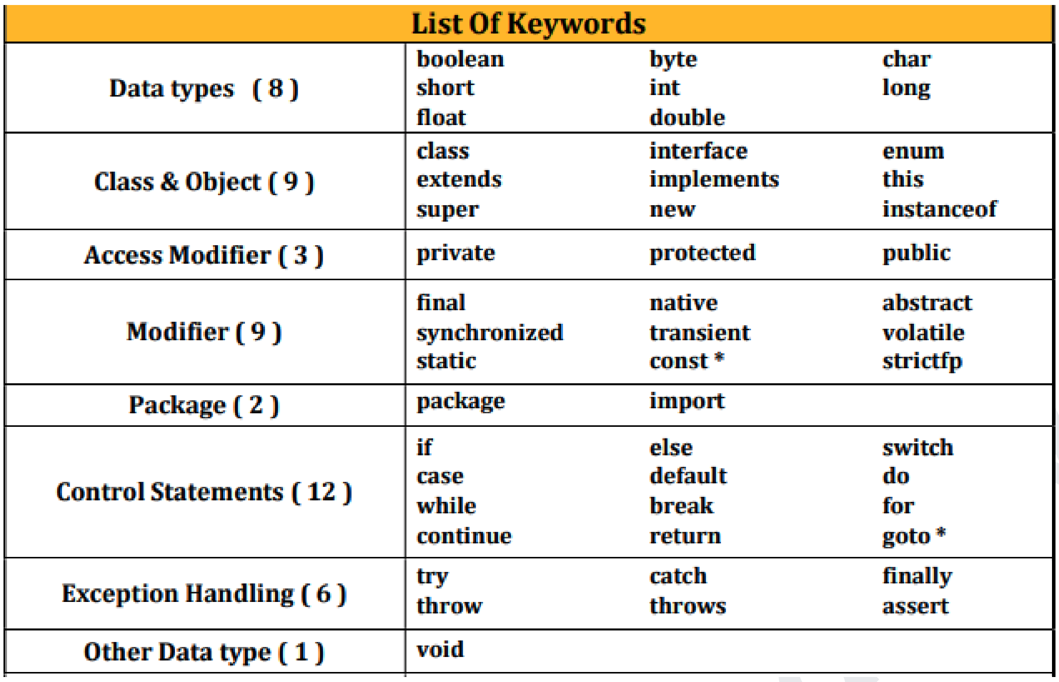
Steps that the JVM takes to call the main method:

- Loads the necessary classes for the program.
- Locates the entry point class specified on the command line.
- Locates the main method in the entry point class.
- Sets up the environment and executes the code inside the main method.
- When the main method completes, the JVM terminates the program.

JDK 11

✅ Keywords & Identifiers

- Simple English words which are having predefined meaning in Java Programming Language.
- Keywords are also called as Reserved Words.
- All the keywords are defined in Lower Case.
- We can't use keywords as names for variables, methods, classes, or as any other identifiers.

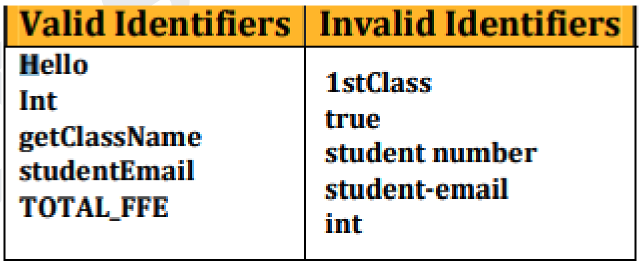


List Of Keywords			
Data types (8)	boolean	byte	char
	short	int	long
	float	double	
Class & Object (9)	class	interface	enum
	extends	implements	this
	super	new	instanceof
Access Modifier (3)	private	protected	public
Modifier (9)	final	native	abstract
	synchronized	transient	volatile
	static	const *	strictfp
Package (2)	package	import	
Control Statements (12)	if	else	switch
	case	default	do
	while	break	for
	continue	return	goto *
Exception Handling (6)	try	catch	finally
	throw	throws	assert
Other Data type (1)	void		

Identifiers - names those will be used to identify the programming elements like classes, methods, variables, etc uniquely

Rules to follow when you define an Identifier:

1. Identifier can contain Alphabets, Digits, and two special symbol i.e. Dollar ($),
2. Underscore (_).
3. First character of an identifier must be an Alphabet or Dollar ($) or Underscore (_).
4. Keywords or Reserved words can't be used as Identifier.



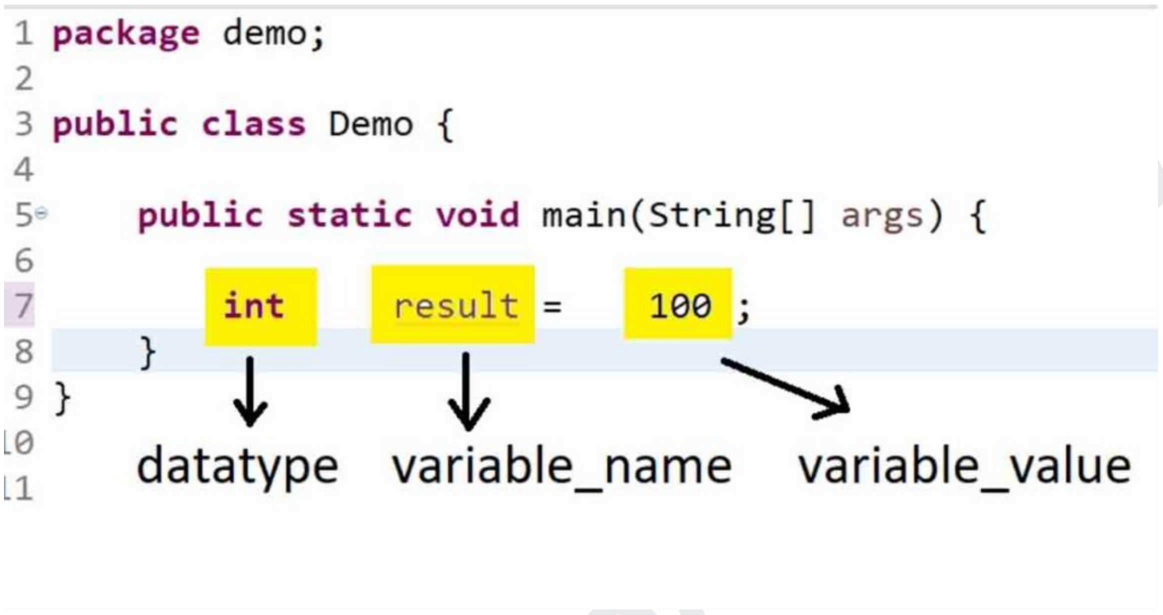
Valid Identifiers	Invalid Identifiers
Hello	1stClass
Int	true
getClassName	student number
studentEmail	student-email
TOTAL_FFE	int

✅ Variables and Data Types in Java

Variables

- A variable is a container (storage area) used to hold data.
- Each variable should be given a unique name (identifier).
- Memory will be allocated for the variable while executing the program
- Value of the variable can be changed any number of times during the program execution.

Types of Variables
There are two types of variables based on data type used to declare the variable.
1) Primitive Variables
2) Reference Variables

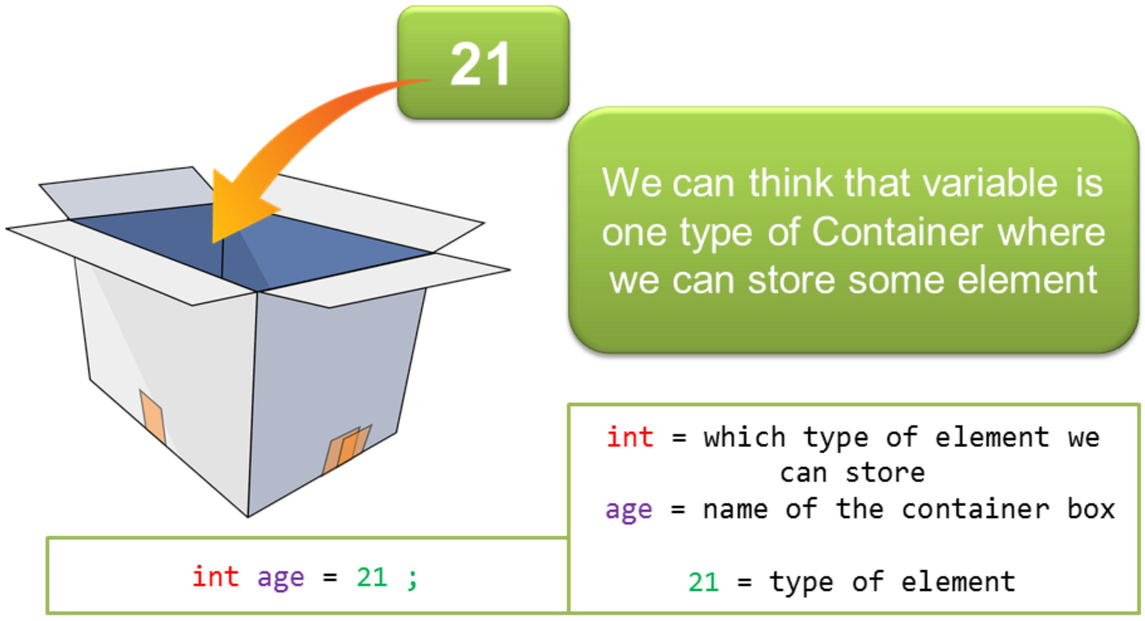


```java
package demo;

public class Demo {

    public static void main(String[] args) {

        int result = 100;
    }
}
```



21
We can think that variable is one type of Container where we can store some element

```java
int age = 21 ;
```

```
int = which type of element we
         can store
age = name of the container box

    21 = type of element
```

Some Points

- A variable is a storage location paired with an associated symbolic name (an identifier), which contains some known or unknown quantity of information referred to as a value.

- Variables in Java are strongly typed; thus they all must have a data type declared with their identifier

- There are three rules to create an identifier:
  - Characters from A to Z, as well as their lowercase counterparts, can be used.
  - Numbers from 0-9 can be used.
  - Special characters that can be used are $ (the dollar sign) and _ (underscore).

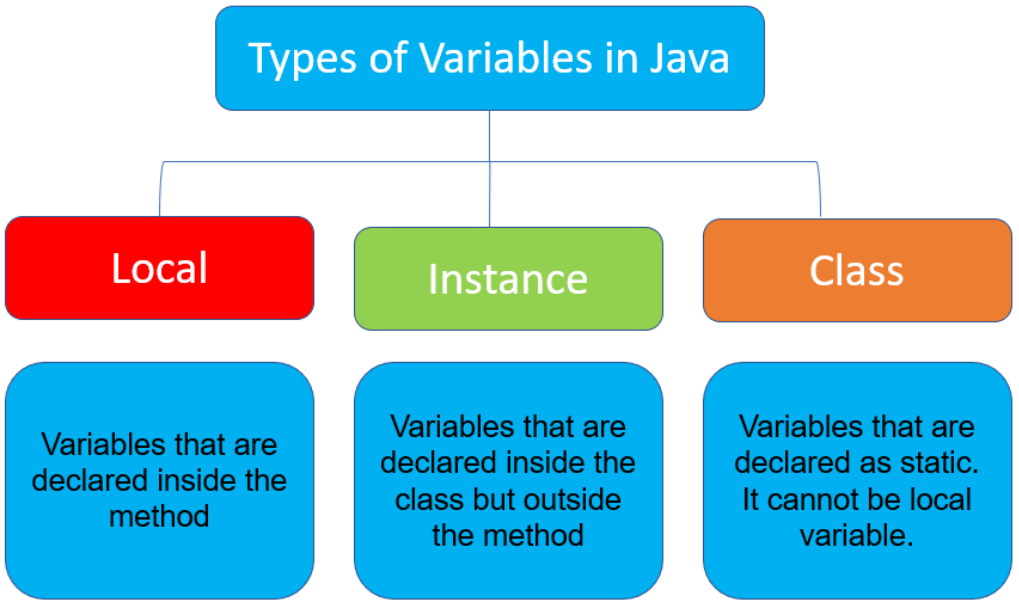
```
int $  = 34;    // 44 - Yes
//        int _pramod = 34; // Yes
//        int 123  = 34; // NO
//        int 123_name  = 34; // NO
//        int 1name  = 34; // no
        //int #1  = 34; // No
//       System.out.println($);
```

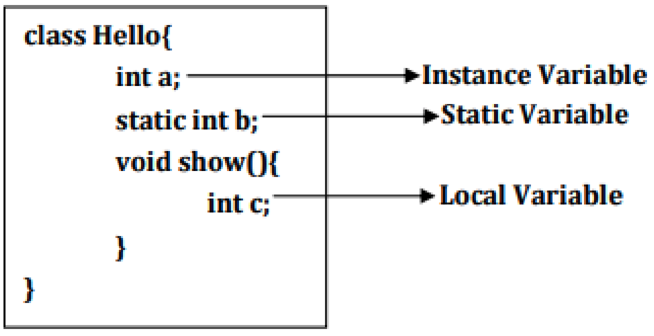
Primitive Variables
- Variables declared with primitive data types are called as primitive variables.
- int a; int b = 99; double d1; double d2=9.9;

Reference Variables - Variables declared with user defined data types are called as reference variables.
String str1;
String str2 = "TheTestingAcademy";

Based On SCOPE variables are 3 types

- **Instance Variables :** Variables declared in the class without using static keyword are called as Instance Variables.
- **Static Variables :** Variables declared in the class using static keyword are called as Static variables.
- **Local Variables -** Variables declared in the member of the class like method etc are called as Local variables.


Types of Variables in Java
Local
Instance
Class
Variables that are declared inside the method
Variables that are declared inside the class but outside the method
Variables that are declared as static. It cannot be local variable.


```
class Hello{
        int a;
        static int b;
        void show(){
                int c;
        }
}
```

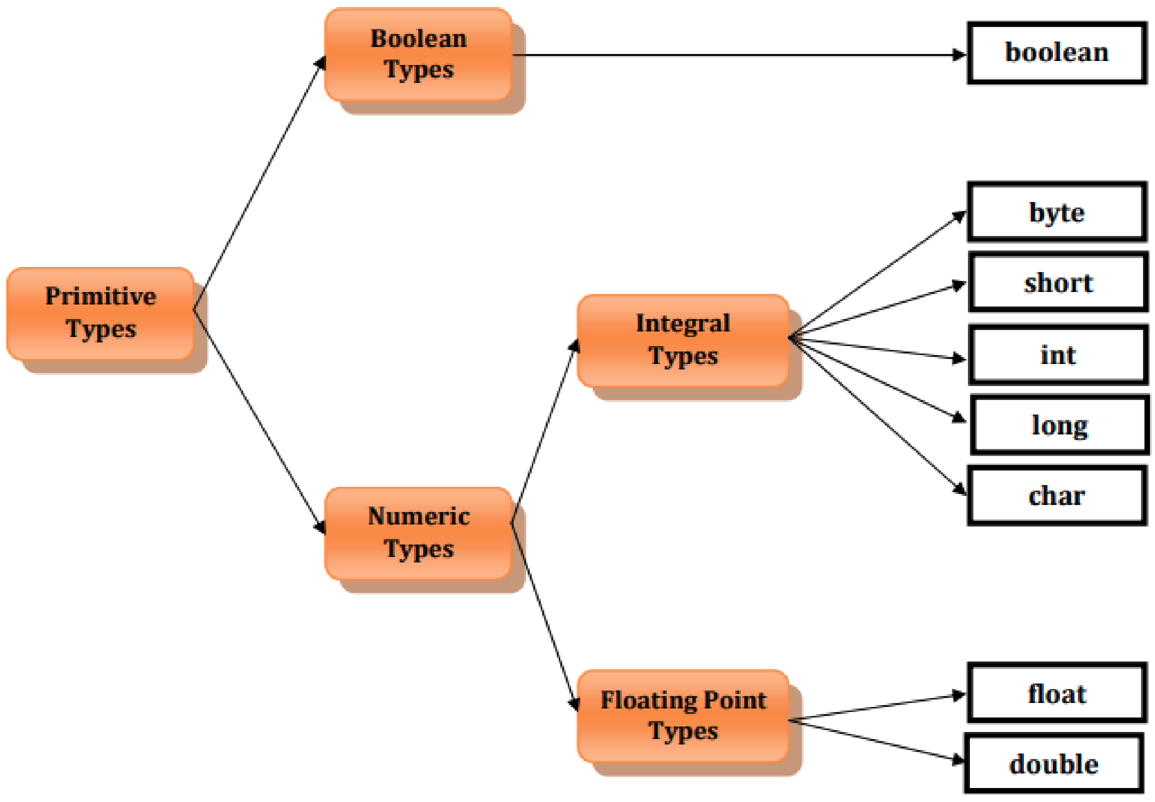
- Declare variables with default values
- Multiple variable declare.

Data Types

- Type of data you want to use
- Amount of memory allocation required for your data.
  - Size, Range

There are two types of data types
1) Primitive Data Types
2) User Defined Data Types

Primitive data types
They are the basic data types in Java and are used to store simple values.



There are eight primitive data types in Java, which are categorized into four groups: integer, floating-point, character, and boolean.

Data Type	Size (bits)	Default Value	Example
byte	8	0	byte b = 10;
short	16	0	short s = 100;

int	32	0	int i = 1000;
long	64	0L	long l = 100000L;
float	32	0.0f	float f = 1.23f;
double	64	0.0d	double d = 1.23;
char	16	'\u0000'	char c = 'A';
boolean	1	false	boolean b = true;

How byte b = 10 is stored in JVM?

When the statement byte b = 10 is executed in Java, the JVM creates a variable named b of type byte and assigns it the value 10.

Internally, the value 10 is represented in binary format as 00001010 (since byte data type is 8 bits in size), and it is stored in memory as a sequence of 8 bits. The JVM allocates a specific memory location for the variable b, and the binary representation of the value 10 is stored at that memory location.

To illustrate this, let's assume that the memory location allocated for the variable b is **0x1000**. The binary representation of the value 10 is 00001010, which can be stored in a single byte of memory. Therefore, the value 10 is stored at memory location 0x1000 as follows:

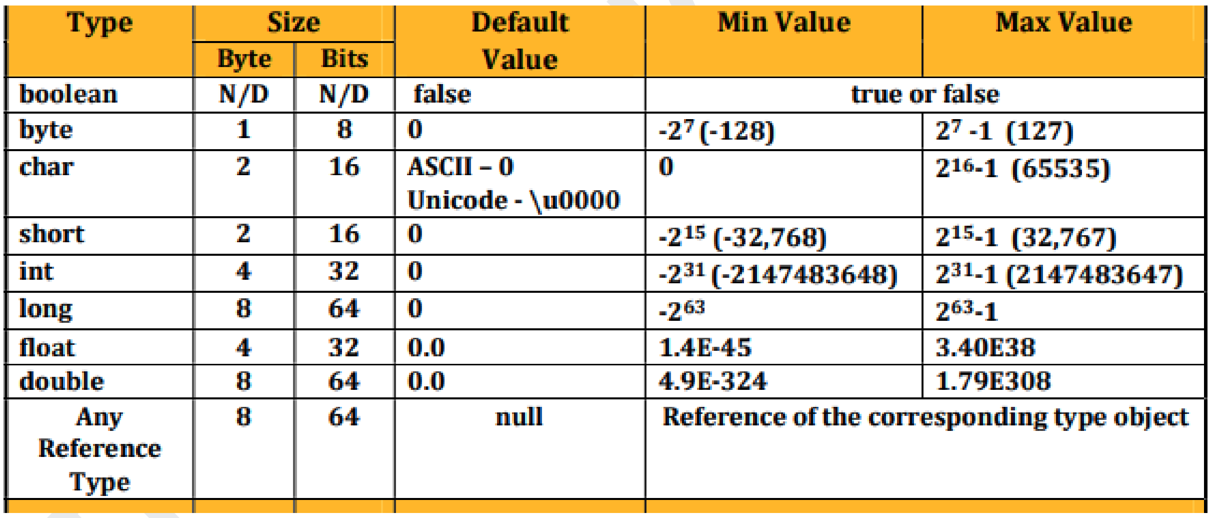
```
Address      | Data
------------------
0x1000       | 00001010
```

Reference data types are used to store complex objects, such as arrays and classes. These data types are created using predefined or custom classes.

<u>User Defined Data types</u>

Four types of User Defined Data types:

- Class type - String
- Interface type
- Enum type (From JAVA 5)
- Annotation type (From JAVA 5)



Type	Size		Default Value	Min Value	Max Value
	Byte	Bits			
boolean	N/D	N/D	false	true or false	
byte	1	8	0	-2^7 (-128)	$2^7 -1$ (127)
char	2	16	ASCII – 0 Unicode - \u0000	0	$2^{16}-1$ (65535)
short	2	16	0	-2^{15} (-32,768)	$2^{15}-1$ (32,767)
int	4	32	0	-2^{31} (-2147483648)	$2^{31}-1$ (2147483647)
long	8	64	0	-2^{63}	$2^{63}-1$
float	4	32	0.0	1.4E-45	3.40E38
double	8	64	0.0	4.9E-324	1.79E308
Any Reference Type	8	64	null	Reference of the corresponding type object	

Types of Variables There are two types of variables based on data type used to declare the variable.

1) Primitive Variables - Variables declared with **primitive data types** are called as primitive variables.

byte b; int a; double d; char ch;

2) Reference Variables - Variables declared **with reference data types** are called as reference variables

String str; Hello h;

✅ Constants

- Special variable whose value can't be modified during the program execution.
- Constant is also called as final variable.

```
final int A=99;
final String STR="TTA";
final double D1=999.99;
```

Variables & Constants

1) Default value of char is either ASCII - 0 or UNICODE \u0000.
2) Default value of char is not space.
3) JVM will not provide default value for Local Variable.
4) Local variable must be initialized before using .
5) JVM will provide default value for static Variable.
6) Static variable can be accessed from Static method (main method).
7) JVM will provide default value for instance Variable.
8) Instance variable cannot be accessed directly from Static method (main method).
9) You can't declare multiple variables of different data types in single variable declaration statement.
10) You can declare multiple variables of same data types in a single statement.
11) You can assign same value to multiple variables in a single statement.
12) You can declare and initialize multiple variables of same data type in a single statement.
13) We can't declare two variables with same name in same scope.
14) Value of the variable can be changed any number of times during program execution.
15) Value of the final variable can not be changed.
16) We can't use const keyword to declare constant.

Q1	How many keywords are available prior to Java 5?	48

Q2	What is the keyword added newly in Java 5?	enum
Q3	Which of the following are valid Java keywords? A) instanceof B) goto C) null D) assert E) struct F) true G) Long H) false I) virtual J) signed	B) goto E) struct I) virtual J) signed
Q4	What are the keywords available which can't be used in Java Program?	goto, const
Q5	What is an identifier? What are the rules to follow to define an identifier?	An identifier is a name assigned to a variable, method, class, or package. The rules to follow while defining an identifier are: i) It should start with a letter or underscore, ii) No whitespace or special characters allowed except underscore, iii) It should not be a reserved keyword.
Q6	What is data type? How many types of data types available?	Data type defines the type of value a variable can hold. There are two types of data types: i) Primitive data types, ii) Reference data types.
Q7	How many primitive data types available?	8
Q8	What is the Integral data type that will not allow negative value?	char

Q9	What is the default value of char data type?	'\u0000'
Q10	Why the range of short and char are different even both required 2 bytes of memory?	The range of short and char are different because short is signed and char is unsigned.
Q11	How many types of User defined data types available up to JDK1.4?	2
Q12	How many types of User defined data types available from Java 5?	1
Q13	Is String a data type?	No, it is a class.
Q14	What is the default value of reference data type?	null
Q15	What are the possible values can be used for boolean type?	true or false
Q16	What is a variable?	A variable is a container that stores values.
Q17	How many types of variables are available as per the data type?	2

Q18	How many types of variables are available as per the scope?	3
Q19	What are the differences between Primitive variables and Reference variables?	Primitive variables hold the actual values, while reference variables hold the memory location of the object.
Q20	What is the default value of local variable?	There is no default value for a local variable. It must be initialized before use.
Q21	How can I declare multiple types of variables in one statement?	Not possible. Variables must be declared separately for each data type.
Q22	How can I declare multiple variable of same type in one statement?	Multiple variables of the same type can be declared in one statement by separating each variable name with a comma.
Q23	How can I declare and initialize a variable in one statement?	Declare and initialize a variable in one statement by assigning a value to it when it is declared.
Q24	How can I declare and initialize multiple variables of same type in one statement?	Declare and initialize multiple variables of the same type in one statement by separating each variable name with a comma and assigning a value to each variable when it is declared.

Q25	Can I change the value of variable during program execution?	Yes
Q26	When will the memory be allocated for the variables?	Memory for variables is allocated at runtime, while the program is executing.

UNICODE Characters

- UNICODE stands for UNIversal CODE.
- Every character will have UNICODE value.
- UNICODE Notation
- Syntax:
  - \uXXXX - X will be hexadecimal digit
- Starts with \u followed by four hexadecimal digits.
- UNICODE Range
- \u0000 (0) to \uFFFF (65535)

Character	ASCII	OCTAL	UNICODE	Character	ASCII	OCTAL	UNICODE
A	65	101	\u0041	a	97	141	\u0061
B	66	102	\u0042	b	98	142	\u0062
C	67	103	\u0043	c	99	143	\u0063
D	68	104	\u0044	d	100	144	\u0064
E	69	105	\u0045	e	101	145	\u0065
F	70	106	\u0046	f	102	146	\u0066
G	71	107	\u0047	g	103	147	\u0067
H	72	110	\u0048	h	104	150	\u0068
I	73	111	\u0049	i	105	151	\u0069
J	74	112	\u004A	j	106	152	\u006A
K	75	113	\u004B	k	107	153	\u006B
L	76	114	\u004C	l	108	154	\u006C
M	77	115	\u004D	m	109	155	\u006D
N	78	116	\u004E	n	110	156	\u006E
O	79	117	\u004F	o	111	157	\u006F
P	80	120	\u0050	p	112	160	\u0070
Q	81	121	\u0051	q	113	161	\u0071
R	82	122	\u0052	r	114	162	\u0072
S	83	123	\u0053	s	115	163	\u0073
T	84	124	\u0054	t	116	164	\u0074
U	85	125	\u0055	u	117	165	\u0075
V	86	126	\u0056	v	118	166	\u0076
W	87	127	\u0057	w	119	167	\u0077
X	88	130	\u0058	x	120	170	\u0078
Y	89	131	\u0059	y	121	171	\u0079
Z	90	132	\u005A	z	122	172	\u007A

Practice QnA

Give the output of the following in the following

1. It will not compile.
2. At runtime error
3. Condition 1
4. Condition 2

Question 1
int enum=9;
System.out.println(enum);

Question 2
char char='A'; System.out.println(char);

✅ Literals

- Literals are the actual values assigned
- Literals can be Numeric and Non Numeric.