** JIT Compiler : [improve the performnace of java program at runtime]

JIT (Just-In-Time) Compiler is a part of the JVM execution engine.

It is used to increase the performance of Java programs.

Internally JVM uses an interpreter, which executes bytecode line by line hence execution slow.

To overcome this limitation, JVM uses JIT Compiler.

How JIT Works:

When the JVM finds some methods or instructions that are repeated frequently (called hotspots), Instead of interpreting them line by line again and again, JIT compiler compiles those bytecode instructions into native machine code.

At the time of execution, JIT compiler directly provides these native machine code to JVM for fast execution.

What is a Variable ?

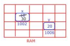
* A variable is a **name given for the memory location**.

Example :

```
int x = 10;

int y = 20;

x = x + y;
```



* It can hold some meaningful value within the range.

Variable

Vary + able

Change + able

* A variable can change it's value during the execution of the program.

Drawback of an Ordinary Variable ?

```
int x = 12, 90; //Invalid
```

* An ordinary variable can hold **only one value at a time** and It stored in the memory in random memory location so to avoid this we introduced next level of concept i.e Array.

* Another drawback is , It is volatile that means once the execution of the program is completed the variable value will be deleted from the memory, In order to hold it permenently we should use File Handling.

What is data type in java ?

It defines the type of data that a variable can store.

It also describes :

a) Size : How much memory it occupies in RAM.

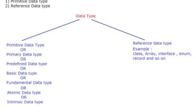
b) Range : What values it can hold (e.g., byte → -128 to 127).

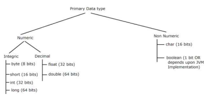
c) Operations : What kind of operations can be performed (e.g., addition for numbers, Concatenation of String).

How many data types in java ?

* Java data types are mainly divided into two categories:

1) Primitive Data type
2) Reference Data type





Note : WE HAVE TOTAL 8 PRIMITIVE DATA TYPES IN JAVA , AMONG THESE 8 DATA TYPES 6 DATA TYPES ARE REPRESENTING NUMBER i.e byte, short, int, long, float, double.

What is the difference between Statically typed langauge and Dynamically typed language ?

Statically typed language :

The languages where data type is compulsory before initialization of a variable are called Statically typed language.

In these languages, once we define the type of the variable then it will hold same kind of value till the end of the program.

Example of statically typed languages :
C,C++, JSE, C# and so on

Dynamically typed language :

The languages where Data type is not compulsory, It is optional to initialize the variable are called Dynamically Typed Language.

In these languages we can provide all different kinds of values to the variable during the execution of the program.

Example of dynamically typed languages :
Visual Basic, Javascript, Python and so on

What is comment in java ?

Comments are used to enhance the readability of the code. It is ignored by the Compiler.

In java, We have 3 types of comments

1) Single line Comment
```
//
```

2) Multiline Commment
```
/*


*/
```

3) Documentation comment
```
/**
Name of the Project : Online Shopping
  Number of Modules : 70 Modules
     Project Date : 12th March 2024
  Last Modification : 9th SEP 2025
          Author : James Goling and his friends
*/
```

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