**Full Stack Development Java**

**Front End**

**Back End**

Core Java

Basics of Java

Java intro, Installation and Setup for Java, Writing and executing first java program, Data Type, Control flow statements, Operators, Array, Class, Objects, methods, Java Build-class, String classes.

Object Oriented Programing in Java

Encapsulation, Inheritance, Polymorphism, Abstraction, constructor, Java keyword, final, static, super, this, access modifier, package

Advance of Core Java

Exception Handling, Threading, Collection, JDBC.

Spring Boot Framework

**Database**

SQL, MYSQL Database

Tools (**Dev and DevOps Tool**)

**Git**

**GitHub**

**Maven**

Postman

Swagger

Software

JDK (JDK-11)

Eclipse IDE

MySql Database

Git

Maven

Postman

Download JDK (1.8 and above).

<https://www.oracle.com/in/java/technologies/downloads/>

**Note: Download Installer instead of zip file**

**Java Documentation**

<https://docs.oracle.com/en/java/javase/11/docs/api/>

**Logical Program Solving:**  
<https://www.hackerearth.com/>

<https://www.hackerrank.com/>

**Java Setup**

1. Download JDK

<https://www.oracle.com/java/technologies/downloads/>

Download the Installer for you operating System.

1. Install JDK
2. Verify the Installation
   1. You can verify the installation file into C:\Program File\java\<jdk-version-folder>



1. Setup Environment Variable
   1. **Set JAVA\_HOME**
      1. Go to Start and Search for “Environment” word and select the “Edit System Environment Variable” option.
      2. Click on the “Environment Variable” button on the new window.
      3. Select “New” Button from the ‘System Variables’ section
      4. Provide the following details into text box
         1. Variable Name: **JAVA\_HOME**
         2. **Variable Value: <JDK-Path>**



* 1. **Set Path**
     1. Check for “path” variable inside ‘system variables’ section
     2. Select “Path” variable and click on “Edit” Button
     3. Click the “New” button on the new window
     4. And set the variable value as follows

**%JAVA\_HOME%\bin**

* + 1. Click on “OK”



1. Verify the Environment Variable Setup
   1. Open CMD
   2. Try the following commands
      1. **java -version**
      2. **javac**



**Type of Application**

1. Desktop Application
2. Web Application
3. Mobile Application
4. Embedded Application
5. Console Application

**Java Introduction**

1. Java Editions
   1. JSE
      1. Java Standard Edition
      2. Also known as Core Java
      3. It is use to develop the console based app and desktop application
   2. JEE
      1. Java Enterprise Edition
      2. Also known as Advance Java
      3. It is use to create Web Application
   3. JME
      1. Java Micro Edition
      2. It is use to create Mobile and embedded application

**Important components**

1. JVM
   1. Java Virtual Machine
   2. It is use to execute the java program.
   3. The memory required from the program execution will be provided by JVM.
   4. Heap and Stack is the main memories which is allocated by JVM.
2. JRE
   1. Java Runtime Environment.
   2. JRE is a combination of the JVM and the APIs.
   3. It help you to create a runtime environment for the application.
   4. This has be present on the client system.
3. APIs
   1. Application Programming Interface.
   2. APIs are the predefine class, interfaces or functionalities by the programming language.
   3. These functionalities you can use to achieve you purpose.
4. JDK
   1. Java Development Kit
   2. It help us to develop and execute the java program, It is combination of Dev. Tools, JRE, JVM, APIs.
   3. It has to be install on developers system.

**Writing First Java Program and Execution of the program**

1. Open Notepad
2. Write a Java Program
   1. Create a Class
      1. Everything in java must be in a class except import and package statement.
      2. Syntax for Class

**public class <className>**

**{**

**}**

* 1. Create a main method
     1. At the time of execution of the program java search for main method internally.
     2. This method is a start point of all java program.
     3. The main purpose of method is use to write a logic and execute it to produce an output
     4. Syntax:

**public static void main(String args[])**

**{**

**}**

* 1. Write an executable statement
     1. These statement executes and produce an output
     2. To print the output you can use following line of code

**System.out.println(“Message”);**

1. Save the file
   1. File Name must be same as public class Name
   2. File extension must be .java.
2. Open a CMD to compile and execute the java program
   1. Open a command prompt from a location where you save your java file.
      1. Go to a location where you save your java file.
      2. Type ‘CMD’ in the address bar
      3. Hit Enter.
3. Compile the Java code
   1. To Compile A java code use following command

**javac <filename with extension>**

* 1. As a outcome of the compilation you will get a .class file.

1. Execute The Java Code
   1. To Execute use following command

**java <ClassName>**



**Rules**

1. You can create multiple java classes in a file but, only one class must be public and your java file name must be save as a public class name.
2. The .class file will be generated after compilation of the java file. The .class file is generated for the java classes created inside the file. Every java class will have a separate .class file.
3. It is not mandatory to provide the main method inside java class. but if you are trying to execute the java class from JVM then you class must have a main method.
4. The main method internally called by the JVM at the time of your class execution.



**Keyword, Identifier, Literals**

**Keyword**

1. Are the words which are reserve by the java programing language.
2. These words cannot used for your own purpose.
3. There are total 52 words are serve by java.
4. All keyword are in small case only.
5. Example:

public, class, static void, if, else, do, for, int, byte, short, long, char, float, double, boolean, case, break, continue etc.

**Identifier**

1. The words which are used by the developer, these words are use to identify the java components.
2. The words which are used to create class, method, object, variable name are called identifier.
3. Using Identifier, you can provide the name which can be further use for the reference.
4. Rules to create identifier
   1. Identifier must not be a keyword.
   2. Identifier can contains alphabets, symbol, number.
   3. There are only 2 symbols are allowed \_ and $
   4. The identifier must start with alphabets or symbol and it must not start with number.
   5. Identifier cannot contain spaces.
   6. There is no character limit to create identifier.
   7. Java is Case sensitive and hance you have to use it in a same way in which you declare.
5. Conventions to use Identifier
   1. Identifier for class
      1. The name should be start with capital case.
      2. If there is a combination of multiple words then every word should be start with capital.
      3. Example: Welcome, System, String, EmployeeDetails
   2. Convention to create Method, variable and object
      1. The name should be start with small case.
      2. If there is more than one word then 2nd word onward it should start with capital case.
      3. Example: main, println, args, out, printDetails
   3. Convention for Constants
      1. The name of the constants should in capital case.
      2. If it is a combination of multiple words then it should be separated by ‘\_’
      3. Example: PI, GRAVITY, COMPANY\_NAME

**Literal**

1. Literals are the values, mostly string values are also consider as a literal.
2. The values which is reserve by java is also known are literals. These values are also consider as keyword.
3. Example: null, true, false.

**Comments in Java**

1. Comments are use to add code level documentation, to skip the specific line of code from the execution.
2. There are 3 types of comments in java
   1. **Single Line Comment**
      1. Syntax

// line to comment.

* 1. **Multi-line comment**
     1. Syntax

/\*

Lines to comment

\*/

* 1. **Documentation comment**
     1. This comment is use to write a code level documentation.
     2. The commented lines will be included inside the .class file after compilation.
     3. Syntax:

/\*\*

Comments

\*/

**Data type and variable**

**Operator**

1. **Arithmetic Operator**

+, -, \*, /, %

1. **Assignment Operator**

=, +=, -=, /=, \*=

1. **Increment and Decrement Operator**

++, --

These operators are used to increment and decrement the value by 1.

There is pre and post operation in this operator.

Post Operation: First assign the value then increment the value and update the value

Pre Operation: First increment and update the value then assign the value then

1. **Relational Operator** 
   1. Always returns Boolean value only.
   2. It use to create a conditional/logical expression (decision making statement)

>, >=, <, <=, ==, !=

1. **Logical Operator**
   1. Logical operator can return numeric value or Boolean values.
   2. It can be use with the numeric value or to combine the 2 or more conditional expression.
   3. It can be use to perform operation on Bit level.

& , |, !

1. **Short Circuit Operator**
   1. Is use to combine the 2 or more conditional expression.
   2. It cannot be use for a numeric value bit level operations.

&&, ||

1. **Ternary Operator** 
   1. It is use to execute the operations based on the conditional expression
   2. Here ‘?’ is consider as If and ‘:’ is consider as else.
   3. Example :

(salary<25000) ? 200\*10 : 200\*5 ;

If \_\_\_\_\_ else \_\_\_\_\_

?, :

****

**Control Flow Statement**

**Task-10-May-2023**

**Task-1**

WAP to find the vaccination slot

age is between 60-120

Your are in 1stslot of vaccination

age is between 40-60

Your are in 2stslot of vaccination

age is between 18-40

Your are in 3stslot of vaccination

If age is between 1-18

Your are in 4stslot of vaccination

If age not between 1-120

Invalid age

**Task-2**

WAP program to print the Day

Create a char variable and print a Day for it. Using switch case

‘M’ or ‘m’: Monday

‘T’ or ‘t’: Tuesday or Thursday

‘W’ or ‘w’: Wednesday

‘F’ or ‘f’: Friday

‘S’ or ‘s’: Saturday or Sunday

**Array**

**Class, Method and Object**

**Class:**

1. Class is a collection of state/variables/data member and behavior/method/member function.
2. Along with variable and method you can also create constructor and class (Inner class).
3. To access the data member and member function of one class into another class you can use the object.
4. Syntax for Class



**Method**

1. Method is collection of variable and the statements (executable statement).
2. Methods are use to write a logical code. this logic can be reuse from the multiple location.
3. Methods use to divide the complex logic into a smaller chunks.
4. To execute the logic from the method you have to call the method explicitly either by using object or by making a direct call.
5. Methods can accept the values which is knowns as **input parameter**. There can be more than one parameter. The values pass to this parameter is called **argument**.
6. Method can return the output of the logic as a **return type**. You can return one value at a time max from the methods.
7. Type of methods
   1. Build-in (predefine) Method
   2. Custom (user define) Method
8. Syntax for Method



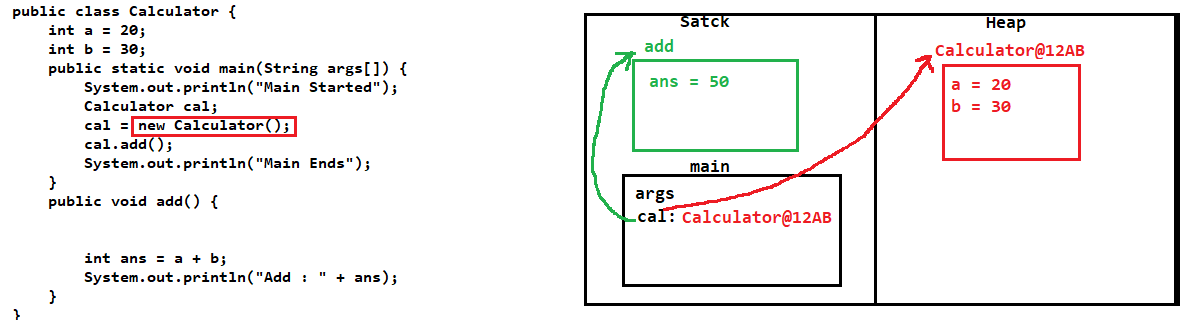
**Object**

1. Object is representation of class.
2. Using Object you can access the properties(Variable & Method) of the class.
3. To access the properties of the class using object you have to use dot(.) operator.
4. In java you can create Object using **new** operator.
5. Syntax

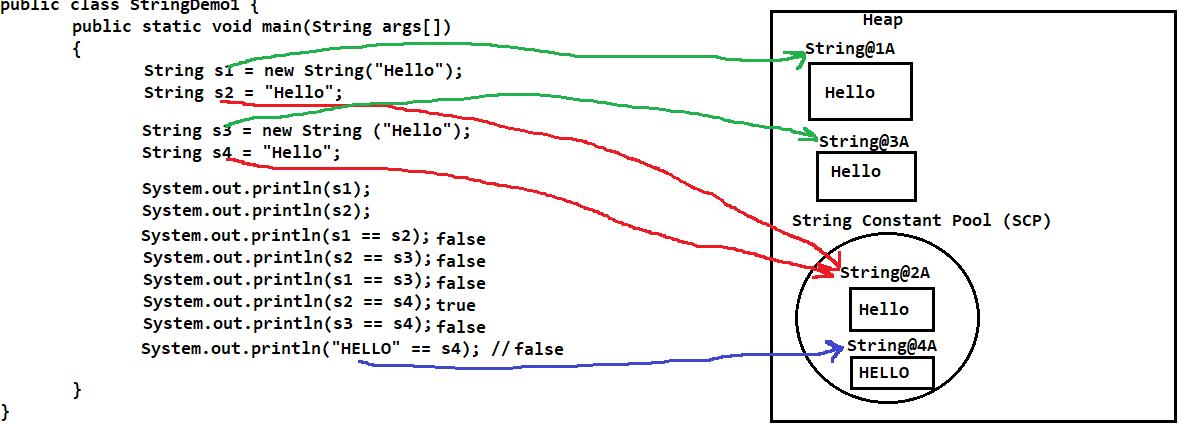


**Java Memory**

1. Stack
   1. This memory is allocated for the method execution
   2. The data created inside method will be applicated in this memory.
   3. This is based on the LIFO (Last In First Out).
   4. This memory keep on clearing as an when the method execution is completed.
2. Heap
   1. This memory is allocated for Objects
   2. The object creation happened inside this memory.
   3. To clear this memory java performs the Garbage Collection (GC) process.
   4. GC process happens after a specific interval.



**String**



**User Input**

1. You can accept the data from the user at the program execution time of before program start up.
2. To accept the input from user you can use following options
   1. Command line argument
   2. Console class
   3. Scanner Class
   4. Buffer Class
3. Command Line Argument
   1. This option is use to accept user data at the start of the program.
   2. The arguments (values) will be provided from the execution command line.
   3. These arguments (values) are for the String array parameter of main method.
   4. Every value will be added in the separate index of the string array.
   5. Value must be provided separated by space and all the value will be received in main method in string format only.
4. Scanner Class
   1. Scanner is a build-in class.
   2. This class is present inside java.util package.
   3. Using this class you can accept the value from the user.
   4. You have to create object of scanner class and use the predefine methods to accept the input from the user.
   5. In this class you will get a specific method to accept the specific type of values.
   6. You can accept the value at the runtime of the program.

**Eclipse Installation and Setup**

<https://www.eclipse.org/downloads/download.php?file=/technology/epp/downloads/release/2023-03/R/eclipse-jee-2023-03-R-win32-x86_64.zip>

Set the Eclipse perspective to “Java”

Create Java Project into eclipse

1. Go To “File” menu -> “New” Option -> Click on “Java Project” option.
2. Set the Name of the project
3. Unchecked the Module checkbox.
4. Click on Next -> click on Finish

Creating Java File

1. Right click on the “src” folder -> Go To “New” option -> Click on “Class” option
2. Set the java class name
3. Select the main method option if you wanted to create main method.
4. Click on Finish

**Object Oriented Programing Concepts (OOPs)**

* + - 1. Java is an Object Oriented Programing language.
      2. Java is not a fully Object oriented because it has primitive data types. In Fully object oriented language you can get everything with class and object.
      3. There are 4 concepts of the OOPs
         1. **Encapsulation**

Wrapping of data member and member function into single unit.

* + - * 1. **Inheritance**

Acquiring the properties of parent class to child class.

* + - * 1. **Polymorphism**

Single thing can be represent in multiple (different) ways.

* + - * 1. **Abstraction**

Hiding the complexity and display only the important functionalities to the user.

**Encapsulation task**

* + - 1. Create a class Employee with id, name, salary, city variable. Create the employee class as encapsulated class. Set and print the employee information from the main class.

**Advantages of Inheritance**

Can achieve the reusability

Can achieve the extensibility

It is used to achieve the Runtime Polymorphism.

**Inheritance Task**

1. WAP to create Calculator class which has 2 numeric variable.
2. Create a child classes Add, Sub, Mul, Dev as a child class of Calculator class and perform the appropriate operation into the class and print the Operation result.