* Java :-

It is general purpose programming language that is class based, object-oriented, platform independent & paltform to develop an application.

It provides software platform that runs on billions of devices, including notebook computers, mobile devices, gaming consoles, medical devices & many others

* History of JAVA :-

- It was originally developed by James Gosling's at Sun microsystem (which has been aquired by oracle in 2010) & released in 1995.

- James Gosling, Mike Sheriden, & patrick Naughton initiated the java language project in june 1991.

- The small team of Sun engineers called Green team.

- Initially it was designed for small, embedded systems in electronic appliances like set-top boxes.

- It was called Oak & was developed as a part of the Green project.

* why was "oak" renamed as "java":-

- Because of trade mark issue name was changed as "Java"
- Same name Company was there i.e Oak Tech
- It is a symbol of strength & Chosen as a national tree of many Countries like the U.S.A, France, etc.
- Java is island in indonesia.
- Java named in 1995, one of the Ten Best products of 1995.

* How java is WORA?

- WORA, which is abbreviated as write once Run Anywhere, is the feature applicable to those programs which will be run on any operating System or any machine. Sun microSystem gave this terminology for their programming language - Java.

- According to this Concept, the same Code must run on any machine, & hence the Source Code needs to be portable

- So java allows run java bytecode on any Computer irrespective of the machine or the hardware, using JVM (Java Virtual Machine)

- Bytecode generated by the Complier is not platform-Specific & hence takes the help of JVM to run on a wide range of machine. So we can call java programs as a write once & run on any Computer residing anywhere.

* Application of java :-

There are mainly 4 types of applications that can be created using java programming.

Types of java application :-
1) Desktop / windows-base / standalone application
2) web applications
3) Enterprise applications
4) mobile applications

1) Standalone Application :-
- These are software that we need to install on every machine. Ex. media player, antivirus, etc.

- AWT & Swing are used in java for creating standlone applications

2) Web Application :-

- Application that runs on the server side & creates a dynamic page is called a web application. Ex- facebook, amazon etc.

- Servlet, JSP, Struts, Spring, Hibernate, JSF, etc. technologies are used for creating web applications in java

3) Enterprise Applications :-
- Application that is distributed in nature, such as banking applications, etc. is called an enterprise applications
- It has advantage like high-level security, load balancing, & clustering. In java, EJB is used for creating enterprise applications.

4) mobile Application

- Application which is Created for mobile devices is called as mobile application

- Currently, Andraid & java ME are used for Creating mobile applications

* Java platforms / Editions / Classification :-

1) Java SE (java Standard Edition)

- It is a java programming platform it includes java programming APIs such as java.lang, java.io, java.net, java.util, java.sql, java.math etc.

- It includes core topics like OOPs, String, Regex, Exception, inner classes, multithreading, I/O Stream, networking, AWT, Swing, Reflection, Collection, etc.

2) Java EE (Java Enterprise Edition)

- It is an enterprise platform that is mainly used to develop web & enterprise applications.

- It is built on top of the java SE platform. It includes topics like Servlet, JSP, web services, EJB, JPA, etc.

8) Java ME (Java Micro Edition)

- It is a micro platform that is dedicated to mobile applications.

* Features of java :-

1) Simple

2) object-oriented

3) portable

4) platform independent

5) Secured.

6) Robust

7) Architecture neutral

8) Interpreted

9) High performance.

10) multithreaded

11) Distributed

12) Dynamic.

Assignment no 8-01

① Difference between application & Software?

Software	Application
1) Software is a set of instruction that operate the hardware	1) Application is a package to perform a specifice task
2) Software is used as mediator between user & hardware	2) Application is used only by end users.
3) Software handles all type of Computer tasks, data & info	3) Application only have particular tasks assigned to them. They may be integrated tasks as well.
4) It may or may not perform administration	4) It always performs administration

② what is operating System & it's example.

-> operating System is a Software that acts as a interface between Computer hardware Components & the user. every Computer System must have atlest one operating System to run other program.

The OS helps us to Communicate with the Computer without knowing how to Speak the Computer's language. It is not possiable for the user to use any Computer or mobile device without having an operating System.

following are the operating System example :-

1) Windows
2) Android OS
3) iOS
4) Mac OS
5) Linux OS
6) Chrome OS
7) Window phone OS
8) MS DOS
9) Ubuntu OS
10) Fedora OS.

③ List all IDE's?

1) Microsoft Visual Studio

2) NetBeans

3) pycharm

4) Intellij IDEA

5) Eclipse.

6) Code::Blocks.

7) Aptana Studio 3

8) komodo

9) Rubymine.

10) XCode.

Assignment no:- 02

① Explain Jdk, Jre, JVM & difference.

-> i) JDK (Java Development Kit) - It is a kit that provided the enviroment to develop & execute (run) the java program. JDK is a kit (or package) that includes two things
- Development Tools [to provide a enviroment to develop your java program]
- JRE [to execute your java program]

ii) JRE (Java Runtime Enviroment) -> It is an important package that provides an enviroment to only run (not develop) the java program (or application) on to your machine JRE only used by those who only want to run java programs that are end-users of your System

iii) JVM (Java Virtual machine) - It is a very important part of both JDK & JRE because it is contained or inbuilt in both whatever Java program you run using JRE & JDK goes into JVM & JVM is responsible for executing the java program line by line, hence it is also known as an interpreter.

* Difference between JDK, JRE & JVM.

Sr NO	parameter	JDK	JRE	JVM
1	Full-form	The JDK is an abbreviation for java development kit	The JRE is an abbreviation for java Runtime Envo-	The JVM is an abbreviation for java Virtual machine
2	Defination	It is Software deup kit to develop appli in java, In addition to JRE, JDK also Contains number of development tools	It is the implemental not JVM & is defined as a Software package that provides Java class libries, along with Java Virtual machine (JVM) & other Components to run application written in java programming	JVM is an abstract machine that is platform dependent & has three notions as a Specification a doc. that describes requirement of JVM implementation a Computer program that meet JVM requirements & instance an implement that executes Java byte Code provide a runtime environment for executing Java byte code.

3) prime functionality	JDK is primarily used for code execution & has prime functionality of development	on other hand JRE is majority responsible for creating environment code execution	JVM on other hand specifies all the implements & responsiable to provide these implementation to JRE.
4) paltform independent	JDK is paltform dependent i.e for different paltform different JDK required	on other hand JRE is majorly responsiable for creating environment for code execution	JVM on other hand specifies all the implemantions to responsible to provide these implementation to JRE
5) Tools	As JDK is responsible for prime development & it contains tools for developing debugging & maintaining java application	on other hand JRE does not contain tools such as compiler or debugger etc. Rather it contains class libraries & other supporting file that JVM requires to run the program	JVM does not include software development tools.
6) Implementation	JDK = Java Runtime Environment (JRE) + Development tools	JRE = Java virtual machine (JVM) + libraries to run the application	JVM = only Runtime environment for executing the java byte code.

* Description about java program structure :-

1) project :-

- project is a Collection of multiple package, multiple classes, user defined folder (for test data) Supporting libraries, jar files & Soon.

- we can Create many package & Classes inside a project

2) packages :-

- packages is a Collections of multiple Classes.

- There are two types of package
  i) User defined package - If we Create package
  ii) Defult package - If we are Created number of Classes without generating package & Shows under defult package

3) Class :-

- A Class is Collection of member function (methods), Variable, datatypes, printing statements, Saving statement, object, Constructor etc.

- for all Class name the first letter should be uppercase.

4) method :- It is Collection of instruction to performs Specific task

5) open :-
while Space → editor - where we run code.

6) Console Box :-
where we get program output.

* Case Sensitivity / Name Convention :-

Java is a Case Sensitive which means identifire "Hello" & "hello" which have different meaning in java.

1) projectName

- All project name start with uppercase letter
- If have multi name project, then uppercase of each first letter of word.

2) packageName.

- All method starts with lower case letter
- If have multi name package, then lowercase of first word & upper case of next words.

3) ClassName
- All ClassName start with uppercase letter
- If have multi name Class, then uppercase of each first letter of word.

4) method name:

- All method starts with lower case letter
- If have multi name method, then lowercase of first word & upper case of next words.

* Basic Terms & Rules:-

1) Comments (//)

- These line are used for comment or writing some statement that will be not considered during execution of programs.

2) Signature Bracket ()

- This bracket we called as signature bracket or argument bracket.

3) + Sign

This + sign is used for concatinating or we can say that join the string or statements

4) JRE library.

- In JRE library there are supporting jar files to write java programs.

5) { }

- It is called as body or Curly brakes

6) Src

- Src is a Source folder where the project Source file Content programs.

7) System.out.println()

- System - It is name of java utility Class.

- Out - It is object which belongs to System Class to call predefined method

- println - It is predefined method or utility method which is used to send any String to Console.

* Method / member function & Business method in java :-

- Method in java is a collection of instructions that perform specific ~~task~~ task without method we are not able to write program.

- It is also called member function & Business method.

- It is memory location in JVM to store the data & information

- A method must be dellared within a class.

There are two types of methods.
1) Business method - main method
2) Regular method.

Java main() method

- The main() is the starting point for JVM to start execution of a java program. without the main() method, JVM will not execute the program.

- The syntax of the main() method is :

```
public static void main (String args[])
{
    statements;
}.
```

public : access modifire >> scope global.

static : keywords >> static method

Void: return time >> not return any value.

main: method name - identifire.

(): Signature bracket / Argument bracket

[]: Array

String: datatype

args: argument

Regular method

Two types of methods
1.) Static method
2) non-Static method

1) Static method

- method which Contains Static keyword & used to perform particular task
- To Call static method there is no need to Create object.
- It is static in nature
- main method is the best example of static method
- Syntax for static method

```
public static void methodname()
{
  statement;
}
```

To call static method in to main method

Classname.methodname();
Sample.XYZ();

2) Non-Static method

- The method which don't have static keywords
- It is dynamic in nature
- To call non-static method we need to create object.

- Syntax for non-static method.

```
public void methodname()
{
    Statement;
}
```

- object -

- It is instance of class / Example of class is used to call non-static method
- Any entity that has state & behaviour is know as an object
- Syntax:-

Classname object = new Classname();

Assignment No:- 04

1) what if we not declared main method?

→ If the program don't Contain main method then it will show error "main method not found in the class"

- Error will displayed in Console box.

- while exeution JVM Searches for main method.

2) what if we change the Sequence of main method?

- Yes we can change the order from public static void main() to static public void main() it do not show error

- But void should always Come before main()

Assignment No:- 06

① Write a different between Static & non-Static methods?

Static	Non-Static
1) A Static method can access only Static member & cannot access non-Static method	1) A non-Static method can access both Static as well as non-Static members.
2) Static method uses Complie time binding	2) non-Static method uses run time binding
3) A Static method cannot be overridde being Compile time binding	3) A non-Static method can be overridden being dynamic binding
4) Static method occupies less Space & memory allocation happen once.	4) A non-Static method may occupy more Space memory allocation happen when method is invated & memory is dellocated once methods is exclutd Completely
5) A Static methods is dellared using Static keyword	5) A normal is not required to have any

* Data Types in java :-

- Datatypes are used to represent types of data or information that we going to used in the programming

- It is mandatory / compulsary to declare datatype before variable.

Types of data types in java :-

1) primative data type :

- The primative data type include boolean, char, byte, short int, long, float & double.

- Have fixed size.

2) non-primative data types :-

- The non-primative data types include classes, interface & Arrays.

- Not have fixed size.

Java primative data type

primative data type are the building blocks of data manipulation. These are the most basic datatype avaliable in java language.

There are 8 types of primative data types.

1) Boolean data type

2) Byte data type

3) Char data type

4) Short data type

5) Int data type

6) long data type

7) float data type

8) Double data type

1) Boolean Data type :-

Default value - false
Default size - 1 bit

Ex:-

Boolean a - true ; 1>> true
Boolean b - false ; 0>> false.

2) Byte Data Type :-

Defult value - 0
Defult size - 1 byte = 8 bit

- It value range lies between -2^7 to 2^7-1
= -128 to 127

3) Char data Type :-

Defult value - ('u0000')

Defult size - 2 byte = 16 bit

Ex:-

```
Char x = '#';
char y = 'a';
```

4) Short Data Type :-

Defult Value = 0

Defult size = 2 byte = 16 bit

It value range is between -2^{15} to $2^{15}-1$

= -32768 to 32767

Ex:-

```
Short a = 10000; // vaild;
Short b = -19999; // vaild
Short c = 36758; // invaild
```

5) Int Data Type

Defult value = 0

Default size = 4 byte = 32 bit

It value range is between -2^{31} to $2^{31}-1$

= -2,147,483,648 to 2,147,483,647

Ex-

```
int a = 8412698;
int b = 8669971558;
int c = 8151555;
```

6) long Data Type :-

Default value = 0L
Default size = 8 byte = 64 bit
It value range lie between = -2^{63} to 2^{63-1}
= -9,228,372,036,854,775,808 to
9,223,372,036,854,775,807.

Ex:-

long a = 98426984268 4 1;
at L is Compulsary to declare.

7) float Data Type :-

Default value = 0.0f
Default size = 4 byte = 32 bit

It value lies between --- -2^{31} to 2^{31-1}

Ex:-

float a = 10.23f

8) Double Data Type :-

Default value = 0.0d
Default size = 8 byte = 64 bit

It value range is between = -2^{63} to 2^{63-1}

Assignment no:- 07

* Variable:-

- It is nothing but piece of memory used to store information

- It is a name given to a memory location It is the basic unit of storage a program.

- It is a Container which holds the value while the java program is executed.

- It is assigned with a data type.

- It help us the info will use again & again.

How to declare variable?

datatype variable = information;

datatype: Type of data that can be stored in this variable

Variable name: Name given to the variable

Value : It is the initial value stored in the variable.

Types of variable
1> Local variable
2> static variable / class variable
3> Global variable / Instance variable.