* **Java**

Java is object-oriented programming language, high level programming language and secure language.

Java was developed by Sun Microsystem in the year

1995. James Gosling is known as the father of Java.

* **components of Java**

There are three main components of Java language: JVM, JRE, and JDK.

**JDK:**

JDK stands for Java Development Kit. It is a package of tools that helps people write and run programs in the Java programming language. It includes everything needed to create and execute Java applications.

**JRE:**

JRE stands for Java Runtime Environment. It is the software on your computer that lets you run programs written in the Java programming language. It provides the necessary components to execute Java applications. If you want to use a Java program, you need the JRE installed on your computer.

**JVM:**

JVM stands for Java Virtual Machine. It is a computer inside your computer. When you run a Java program, the JVM is like a mini virtual world where your Java code can live and run. It takes care of translating and executing the Java instructions so that your program works on different types of computers without you having to change the code. It is the magic behind the scenes that makes Java programs run smoothly.

* **Features of Java**

**Simple and Easy to Learn:** Java was designed to be easy to use and learn. It has a syntax that is similar to C++, making it accessible for developers.

**Platform Independence** (Write Once, Run Anywhere)**:** Java applications can run on any device that has a Java Virtual Machine (JVM). This "write once, run anywhere" capability is a significant advantage.

**Object-Oriented Programming (OOP):** Java is an object-oriented programming language, promoting the use of classes and objects, making code modular and reusable.

**Robust and Secure:** Java's strong memory management, exception handling, and type-checking contribute to its robustness. It also has built-in security features, making it a secure programming language.

**Multithreading:** Java supports multithreading, allowing concurrent execution of two or more parts of a program for maximum utilization of CPU.

**Distributed Computing:** Java supports the creation of distributed applications, allowing for the development of robust and scalable network applications.

**Dynamic and Extensible:** Java is dynamic in nature, meaning it adapts to an evolving environment. It also supports dynamic loading of classes, allowing applications to extend themselves dynamically.

**High Performance:** Java programs are compiled into an intermediate form called bytecode, which is executed by the Java Virtual Machine (JVM). This contributes to the overall performance of Java applications.

**Rich Standard Library:** Java comes with a vast standard library that includes packages and classes for various utilities, such as data structures, networking, and I/O.

* **Concept of Oops**

Object-Oriented Programming (OOP) is a programming paradigm that uses the concept of "objects" to design and organize code. The fundamental idea behind OOP is to structure software in a way that mirrors the real world, making it easier to understand, maintain, and expand. Here are the key concepts of OOP:

**- Class**

**- Object**

**- Polymorphism**

**- Inheritance**

**- Abstraction**

**- Encapsulation**

**Class:** A blueprint or template for creating objects. It defines the attributes (properties) and methods (functions) that the objects will have.

**Object:** An instance of a class. Objects are created based on the structure defined by the class.

**Polymorphism:** same name function but different kind of operation perform it is called polymorphism.

**Inheritance:** Parent class access all properties of child class it’s called inheritance.

**Abstraction:** abstraction as hiding the complex details and showing only the essential features of an object or a system.

**Encapsulation:** Encapsulation bundles data (variables) and the methods (functions) that operate on the data into a single unit called a class. It keeps the inner workings safe and secure, allowing controlled access only through well-defined interfaces.