**Programming Language -**

A programming language is a vocabulary and set of grammatical rules given by compiler for instructing a computer or machine to perform specific task.

Keywords - They are pre-defined reserved words. There are 53 reserved words in JAVA. In these 53 reserved words, 50 are keywords and remaining three are literals.

JAVA is a highly case sensitive programming language. And all the reserved are always written in small letters.

Outside Class nothing is possible in JAVA except two statements.

1. Import Statement
2. Package Statement

Phases of Compiler:

1. Lexical Analyzer (Buffering, Tokenizing)
2. Syntax Analyzer
3. Semantic Analyzer
4. Intermediate Code Generation
5. Code Optimization
6. Code Generation

If class is public then class name and file name must be same.

Standards For class\_name:

1. Class name should be meaningful.
2. Class\_name should in camel(eg, EmailSending() ) case.
3. Class\_name should be noun.

Rules For class\_name:

1. Class\_name does not have any white spaces.
2. Class\_name does not have any special character except $ and \_ .
3. Class\_name must start with non-digit character.
4. Class\_name can contain digits but after first place.
5. Class\_name does duplicate keyword.

Reserved words of windows

Prn, Con, aux, Comp1, Comp2, Comp3, Comp4, Comp5, Comp6, Comp7, Comp8, Comp9, Comp10, Ltt1, Ltt2, Ltt3, Ltt4, ltt5, ltt6, ltt7, ltt8, ltt9, nul

After compilation java compiler generates byte code in the form of {public\_class\_name}.class file.

**Executable class** - must have default name method. The syntax of default name method is public static void main(String[] args)

Main method is the entry of a class.

Main method is called by JVM at runtime.

JVM stands for java virtual machine. Without the concept of JVM code cannot be executed.

Manipulation of main method:

**Console:**

* Output window is known as console.
* Standard input and output device is known as console.

System.out.println();

* System is a class in JAVA.
* Out is an outputStream available in system class.
* Println is a method in JAVA. This method is responsible to print something on console.

**Control Statements**:

Control statements are those statements which are responsible to change the flow of execution of a program.

There are mainly three types of control statement:

1. Decision Making statement
2. Iterational Statement
3. Branching statement.

Decision Making Statement

There are four decision making statement

1. If Statement
2. If-else
3. Ladder if-else
4. Nested if-else

If and else both are keywords in JAVA

Syntax of if-else Statement:

If(condition){

}else{

}

If and else both are couple in java must be written in java.

Iterational Statements

1. While Loop
2. For Loop
3. Nested For-loop
4. Labling of loops
5. Break statement
6. Continue statement
7. Do\_while loop
8. Nested do-while
9. For-each loop
10. Manipulation of if-else
11. Manipulation of while
12. Manipulation of for

Branching statements:

Multiway branching statements

1. Switch case

**Android**

1. Android is an open-source Linux base operating system.
   * System Software :
     + Operating system
     + Drivers
   * Operating system:
     + Shell (for user)
     + Kernel (for hardware)

**Operating System**

* In general, operating system is an interface between user and hardware.
* In technical words, Operating system is a collection of subroutines.
* In the year, Android and corp. were established.
* Droid means robot.
* There are two types of application in Android operating system.
  + Static application – application that does not requires internet connection or any other network to run and execute. Eg. Calculator, VLC
  + Dynamic application – It requires internet connection and provides dynamic response on each client request. Eg. Instagram, Facebook

**Frontend and Backend**

Frontend as the name suggest it is the visual part of the application or user interface part.

UI/UX part is also the part of frontend.

XML provides frontend functionalities in android.

**Backend:**

Java and Kotlin provide backend part in android.

XML: Extensible Markup Language – Markup languages are tech based languages.

XML provides the support of custom tags.

XML is a parser-based language. Parser Name: Simple API for XML or SAX Parser.

Parser means converter.

Java is object oriented paradigm.

1. Encapsulation
2. Inheritance
3. Polymorphism
4. Abstraction

**jshell is used to execute java program without class.**

**Encapsulation:** Wrapping up data member and function in a single unit and the unit is known as class and the concept is known as encapsulation.

**Inheritance:** To acquire the properties of parent and to create specialized property is known as inheritance.

Types of Inheritance Supported by JAVA:

1. Single Inheritance
2. Multilevel Inheritance
3. Hierarchal Inheritance

Inheritance is also known as “is a” relationship.

To achieve Inheritance in Java we use extends keyword.

Top most class of JAVA is object class. Every Class is child of object class.

Object Class is the Parent Most class in Java.

Directly or indirectly every class is a child of java.lang.object class.

**Types of Comments:**

There are three types of comments in Java.

1. Single line //
2. Multi line /\* \*/
3. Documentation /\*\* \*/

Multi line comment never includes in the documentation part but documentation comment includes in the documentation part.

We can create the documentation of java classes. (Javadoc file\_name.java)

If the class does not have any constructor then default constructor will be created by Java compiler.

Inheritance that does not supported by java:

1. Multiple Inheritance
2. Hybrid Inheritance
3. Diamond Inheritance
4. Cyclic Inheritance

**Polymorphism**: One name with multiple form is known as polymorphism.

There are two types of polymorphism in Java:

1. Static Polymorphism
2. Dynamic Polymorphism

**Static Polymorphism:** There are two type of static polymorphism

* 1. Method overloading
  2. Method hiding

**Dynamic Polymorphism:** To achieve dynamic polymorphism we have the concept of method overriding.

**Method Overiding:**

1. Method name must be same.
2. Method argument must be same.
3. Method return type must be same but from jdk 1.5 covariant return type is possible.
4. Parent class method is known as overwritten method and child class method is known as overriding method.
5. Not possible without inheritance.
6. Instance time determine which overridden method will be called at run time.
7. Final , abstract, static method and private method cannot be overridden.

**Access Level Modifiers:**

It shows the accessibility of the class method variable in tis scope.

There are four access level modifier in Java: public > protected > default > private

**Final Keyword:**

* It is used with a class method and attribute.
* If we declare a class final then it does not have children.
* If we declare a method final then we cannot override it.
* If we declare an attribute final then we cannot change the value of that attribute.
* **Goto and const from 53 keywords are not defined yet.**

Method overriding means to write a method as it is (with same signature) in a child class that is already available in the parent class is known as method overriding

If child class is not satisfied with parent class method then child class overrides it.

**Abstract class:**

* Abstract is a keyword in java.
* Concrete method: A method having body is known as concrete method
* Concrete class: A class that have only concrete method is known as concrete class.
* Abstract Method: A method that does not have body and declare with a keyword abstract is known as abstract method.
* Abstract class: A class that contains both abstract and concrete methods and declare with a keyword abstract is known as abstract class.

**Interface:**

* Interface contains only abstract methods whether we declaring it or not.
* Interface methods must be public and abstract.
* Interface is defined by the keyword interface
* Interface does not have variables
* Interface contains only constant.
* Interface does not contain final method.
* Interface does not have constructor.
* Interface cannot instantiated.

**Exception Handling:**

* Exception is a condition that normally terminates the Java program.
* There are five keywords in exception handling
  + Try
  + Catch
  + Finally
  + Throw
  + Throws

**SQL: (Structured Query Language)**

* create database ITM\_BU;
* use ITM\_BU;
* create table ITM\_Students(id int primary key, name varchar(10), mobile bigint);
* Insert into ITM\_Students values(100, “Rahul”, 1864568414);
* Key or Key attribute: minimal no. of attributes used to differentiate the tuples of relation
* Attribute means column.
* Tuple means row.
* Relation means table.
* There are seven types of keys in SQL.
  + **Candidate Key:** used for selection of the primary key
  + **Primary Key:** Unique and not null.
  + **Alternate Key:**
  + **Super Key:** Set of attributes used to differentiate tuples of the relation.
  + **Composite Key:** Set of attributes used to differentiate tuples of the relation.
  + **Foreign Key:** An attribute of a table that references to the primary key of another table or primary key of same table then it is said to be Foreign Key.
  + **Unique Key:** Unique key attribute must be unique & must be not null but it accepts only one null value.
* **Practical concept:** Primary key, Composite Key, Foreign Key, Unique Key
* **Theoretical concept:** Candidate Key, Alternate key, Super key

**Q. What is difference between alternate key and primary key?**

**Ans.** Primary key cannot be null but alternate key can be null.

Varchar vs Char : varchar is memory optimized. That means except the used block all other are not considered

**ACID: Atomicity Consistency Isolation Durability**

**Atomicity:** Complete or nothing theory.

**Isolation:** Transaction must be independent.

**Consistency:**

**Durability:**

**Transaction:** A transaction is logical unit of work that changes the state of database

**M.A.D (Mobile App Development)**

**Package-** It is a collection of related classes.

**Naming Convention of Package:**

* Package name should be meaningful.
* It should be in lower case.
* Package name should follow following pattern:
  + Domain of the organization separated by ‘.’
  + Organization name separated by ‘.’
  + Then package name.
  + Example: in.sterling.calculator, in.ac.itmbu.calculator
* **“this” keyword** is responsible to refer current class global variable, current class method and to invoke a constructor in another constructer of the same class.
* **“super” keyword-** It is responsible to refer parent class variable and methods and it is also responsible to invoke a constructor in another constructor of parent class.
* Mainactivity.java is the backend of android application.
* Activity\_main.xml is frontend of the application.

**Note:** We can run android application in two ways.

1. Run on AVD (Android Virtual Device)
2. Run on Physical device5

**APK:**

* APK stands for Android Package.
* The extension of executable file of android application is .apk .
* Apk contains the following things:
  + Source code of application.
  + Resources of application.
  + Assets, etc.

J2SE : Java 2 Standard Edition

JSE: Java Standard Edition

J2EE : Java 2 Enterprise Edition

JEE: Java Enterprise Edition { Advance Java + Frameworks }

J2Me: Java 2 Micro Edition (android)

JME: Java Micro Edition

Embedded System Mobile Application

**XML File**

**XML in android**

* We create xml layout in android and later we will alter them by using java logic.
* XML is a case sensitive Language.

**Resource:**

* They are the additional file and static content and application need such as animation, colours layout and menu layout.
* Each layout file must contain one or more elements

**View:**

* It represents a rectangular area of the screen and it is responsible to display information or content or error handling and event handling.
* Text, image and button are the views in android.

**View Group:**

* It is one of the important container that holds multiple views.
* It is invisible container.
* It is also responsible to define there layout and properties

Common view groups are as follows:

1. List view: It displays a list of scrollable items.
2. Grid view: It displays items in a two-dimensional scrollable grid.
3. Table Layout: It groups elements in rows and columns order.
4. Root View: It is the root element of XML layout file.
5. Linear Layout: a linear layout aligns its content into a single direction, it may be in the vertical direction or horizontal direction.
6. Relative Layout: It displays its child content in positions relative to the parent.
7. Frame Layout: It is a placeholder on a screen that displays only single view.

**XML NS: It stands for xml namespace.**

* **URI: Uniform Resource Identifier.**
* In Computing, it is a string of characters used to identify a name a resource such identification enables interaction of resources over a network it maybe in World Wide Web.
* XML NS are used to provide uniquely named items and attributes in an xml documents.
* XML NS: Android describes the android main space.
* Some of the important attribute are as follows:
  + Android:layout\_width
  + Android:layout\_height
  + Android:layout\_text

**JDBC: JAVA DATABASE CONNECTIVITY**

* It is an API used to connect Java program to the database.
* In JDBC, we use third party APIs.
* API stands for Application Programming Interface.
* We use Fire base or postgre SQL.

**Steps to connect a Java program to Database as follows:**

1. Load the driver.
2. Connection Establishment.
3. Create Statement.
4. Execute the Query.
5. Release the resources.

“**sun.jdbc.odbc.JdbcOdbcDriver**” driver is deprecated (Not recommended to use) from JDK 1.8

**Q. What is the difference between Checked Exception and Unchecked Exception?**

* Exception that are checked by compiler is know as checked exception and is mandatory to handle checked exception.
* If we do not handle checked exception then compilation error will be raised saying a unreported exception **ClassNotFoundException** must be caught or declare to be thrown.

**Q. How to set class path temporally?**

**Ans:** Set classpath=;e:/Software Technical/Java/Jar\_File/mysql-connector-java-5.0.8-bin.jar

SQL Query are subdivided into

1. DDL
2. DML
3. DQL
4. DRL

Execution of a program is from left to right and top to bottom.

Java program follows BODMAS.

**Q. How to fetch data from database by using Java program?**

**Ans.** To fire DQL JDBC provide us execute query method in object of statement.

**Result set:** It is an Interface available in java.sql package. Result set is a cursor.