A complete software development package involves 3 parts

1. **Core Java**
2. **Advance java (J2EE)**
3. **MsSQL**

Core Java Syllabus

1. **Introduction of Java**
   - What is Java?
   - Why Java ?
   - Setting up the environment in Java
   - A First Java Program
   - Java Naming Conventions
   - How JVM Works – JVM Architecture?
   - Differences between JDK, JRE and JVM
   - Run Program in Different IDE(Eclipse , NetBeans) and Command Prompt.

2. **OOP concept**
   - Introduction to OOP Concept
   - Inheritance in Java
   - Encapsulation in Java
   - Abstraction in Java
   - Polymorphism in Java
   - Why Java is not a purely Object-Oriented Language?

3. **Data types , Variables and Arrays**
   - Java Identifiers
   - Data types
   - How to define our own data type in java(enum)
   - Literals in Java (Numeric Literals, Character Literals, String Literals)
   - Variable & Declarations of Variable
   - Scope of Variables
   - Final Variable
   - Type Conversion and Casting
   - Arrays

4. **Operators and Expressions**
   - Expressions
   - Arithmetic Operators
   - Bitwise Operators
   - Relational Operators

- Logical Operators
- Assignment Operator
- Increment and Decrement Operators
- The Conditional Operator
- Operator Precedence

5. Control Flow Statements

- Selection Statement (if , Switch)
- Iteration Statements (while, do-while , for , for each & Nested Loop)
- Jump Statements (break , Continue, Return)
- Does Java support goto?

6. Important Keywords

- List of all Java Keywords
- Important Keywords in Java
- this keyword
- super Keyword
- static keyword
- final keyword
- final, finally and finalize in Java
- abstract Keyword
- transient keyword in Java
- volatile keyword in Java
- strictfp keyword

7. Classes and objects

- Classes and Objects
- Java object storage
- Different ways to create objects in Java
- Association, Composition and Aggregation
- Access and Non-Access Modifiers in Java
- Access Modifiers
- this reference
- Object class
- Static class in Java
- Method Overloading
- Method Overriding
- Understanding “static” in “public static void main” in Java
- Overloading or Overriding static methods
- Shadowing of static methods(Also called Method Hiding)
- Static methods vs Instance methods in Java
- Assigning values to static final variables in Java

- Covariant return types
- Flexible nature of java.lang.Object
- Overriding equals method of Object class
- Overriding toString() method of Object class
- Instance Variable Hiding
- Static blocks in Java
- initializer block in java
- instance initializer block in java(non-static block)
- Static vs Dynamic Binding

8. Constructor in Java

- Constructors
- Constructors in Java
- Default constructor
- Assigning values to static final variables
- Copy Constructor
- Constructor Chaining
- Private Constructors and Singleton Classes
- Singleton Class
- Constructor Overloading

9. Inheritance in Java

- Inheritance in Java
- Multiple Inheritance
- Why Java does'nt support Multiple Inheritance – The Diamond Problem
- Java Object Creation of Inherited Class
- Inheritance and constructors
- Interfaces and Inheritance
- Using final with Inheritance
- Override private methods
- More restrictive access to a derived class method in Java
- Parent and Child classes having same data member
- Object Serialization with Inheritance
- Referencing Subclass objects with Subclass vs Superclass reference
- Does overloading work with inheritance

10. Packages

- Packages Introduction
- java.io package
- java.lang package
- java.util package

11. Exception Handling

- Exceptions
- OutOfMemoryError Exception
- Different ways to print Exception messages in Java

- flow control in try-catch-finally
- Types of Exceptions
- Catching base and derived classes as exceptions
- Checked vs Unchecked Exceptions
- Throw and Throws
- User-defined Custom Exception
- Infinity or Exception?
- Multicatch
- Chained Exceptions
- Null Pointer Exception

12. Input/output Streams

- Character Stream Vs Byte Stream
- DoubleStream mapToObj() in Java
- Command Line arguments
- Scanner Class
- Scanner and nextChar()
- Scanner vs BufferReader Class
- Formatted output
- Fast I/O for Competitive Programming
- Reading input from console

13. Collection Framework

- The Collections Framework
- The Set Interface
- Set Implementation Classes
- The List Interface
- List Implementation Classes
- The Map Interface
- Map Implementation Classes

14. Interfaces and Abstract Classes

- Interfaces
- Access specifier for methods in interfaces
- Access specifiers for classes or interfaces
- Abstract Classes
- Difference between Abstract Class and Interface in Java
- Comparator Interface
- Java Interface methods
- Nested Interface
- Nested Classes in Java
- Inner class in java
- Local Inner Class in Java

- Anonymous Inner Class in Java
- Functional Interfaces
- What is a Marker interface
- Questions on Abstract Classes and Interfaces
- Static method in Interface in Java
- Function Interface in Java

15. Multithreading

- Introduction to Multithreading
- Lifecycle and states of a thread
- Main thread
- Methods to prevent thread execution
- inter thread communication
- Java.lang.Thread class
- Start() function in multithreading
- Java Thread Priority
- Joining Threads in Java
- Naming a thread and fetching name of current thread in Java
- Synchronization
- Method and Block Synchronization
- Producer-Consumer solution
- Thread Pools in Java
- Semaphore in Java

- Java.util.concurrent.Semaphore class in Java
- CountDownLatch
- Deadlock in java
- Daemon thread
- Reentrant Lock
- Cyclic Barrier in Java
- Callable and Future in Java
- Runtime Class

16. File Handling in Java

- File class
- Ways of Reading a text file in Java
- file permissions in java

17. Strings in Java

- String Class
- StringBuffer Class
- StringBuilder Class
- StringTokenizer class
- StringJoiner in Java8

18. Reflection

- Reflection in Java
- Method Class in Java
- Reflect Array class in Java
- util.Arrays vs reflect.Array in Java
- new operator vs newInstance()
- instanceof operator vs isInstance()

19. Annotations in Java

- Introduction
- Built-In Java Annotations
- Java Custom Annotations

20. Useful and/or Advanced Features

- Generics
- Wildcards in Java
- Assertions
- Annotations
- Serialization and Deserialization
- Lambda Expressions – Java 8
- Stream
- BigInteger Class

21. Applets , AWT and Swing in Java

- Introduction to applets
- Architecture of Applets
- Event Handling in Applets
- AWT Controls
- Event Handling in AWT
- Basic Difference Between Swing and Applets
- Swing Controls
- Event Handling in Swing

22. JDBC

- Introduction to JDBC
- Architecture of JDBC
- Type of JDBC Architecture
- Difference Between ODBC and JDBC
- Driver Types
- Statement Ojects
- Resultset
- Transaction Processing

J2EE Syllabus

23. Introduction to Enterprise Edition

- Introduction to Web Application
- Installing Eclipse IDE for Web Application
- Installation, Configuring Tomcat Server
- Connecting Eclipse to Tomcat

24. HTML & XML

- Basic Concepts of HTML
- The Skeleton of WebPage
- Overview of XML
- Creating XML File in Eclipse

25. Java Servlet Technology

- Servlet Introduction
- Servlet API
- Servlet Interface
- Generic Servlet
- HttpServlet
- Servlet Life cycle
- Working of Servlet
- Welcome-file-list
- load-on-startup tag
- ServletRequest
- ServletConfig
- ServletContext
- ServletResponse
- HttpSession
- Cookies

26. JSP Technology

- Introduction of JSP
- The Life Cycle of a JSP Page
- Directives in JSP
- Scriptlets in JSP
- Action Tag in JSP
- Expression in JSP
- Declaration in JSP
- Expression language(EL) in JSP

- Exception handling

27. EJB(Enterprise Java Beans)

- Introduction to EJB
- Stateless Bean
- Persistence
- Callbacks
- Transactions
- Security
- Exception Handling
- Web Services

28. Java Server Faces (JSF)

- Introduction of JSF
- Environment Setup
- Architecture of JSF
- Life Cycle of JSF
- First Application
- Managed Beans
- Basic Tags
- Facelet Tags
- Convertor Tags
- Validator Tags

29. Java Persistence API

- Introduction to Java Persistence API (JPA)

30. Java Mail API

- Java Mail Introduction
- Sending Email
- Sending email by Gmail
- Receiving Email
- Sending attachment

31. Web Services

- What is web service
- WS Components
- SOAP Web Service
- RESTful Web Service
- SOAP vs RESTSOA
- Web Services in Java
- Difference between RPC and Document web services
- JAX-WS (SOAP)
- JAX-RS (REST)

MsSQL

Intro to Databases & SQL

1. **What is a database?**

We will discuss what a database is, the different types of databases and what they are used for

2. **An Overview of SQL**

We will discuss what SQL(Structured Query Language) is, what it is used for and some of the different systems that use SQL

3. **RDBMS Concepts**

We will look at the core concepts and structure of a relational database such as tables, columns, rows,Etc

4. **Working With Data Types**

We will discuss some of the important data types that may be used in a relational database, including Integer, varchar, text and much more

Microsoft SQL Server & Management Studio Setup

5. **Setting Up Microsoft SQL Server**

We will install and setup Microsoft SQL Server

6. **Setting Up Microsoft SQL Server Management Studio**

We will install and setup SQL Server Management Studio

7. **Connecting to a Server**

We will connect to a server and look at the Object Explorer

8. **System Databases**

We will take a look at the master and model databases as well as the msdb and tempdb Databases

9. **Creating a New Database**

We will create a new database within MS SQL Server 2016, and create a new table

10. **Adding Data to a Table**

We will add data to our Table

11. **Backing Up & Restoring a Database**

You will learn how to backup a database and how to restore a backup

Selecting & Filtering Data 1

12. **Simple SELECT Statements**

Here we will start to write SQL statements and queries, starting with basic SELECT statements

13. WHERE Clause

We can target specific columns using the WHERE clause along with a SELECT statement

14. AND & OR Clause

We can select data based on multiple conditions using the AND & OR clause

15. ORDER BY Clause

We will look at how we can sort returned data using the ORDER BY clause

16. GROUP BY Clause

We will look at how we can sort returned data using the GROUP_BY clause

Selecting & Filtering Data 2

17. HAVING Clause

The HAVING clause is similar to a WHERE clause but can use aggregation

18. TOP Clause

The TOP clause is used to limit the number of records that will be returned from a SELECT statement

19. SELECT DISTINCT

We can use DISTINCT to only return distinct or different values in a SELECT statement

20. UNION

The UNION operator is used to combine the result-set of two or more SELECT statements

21. Functions

We will look at some built in functions for performing calculations on data

Inserting, Updating & Deleting Data

22.INSERT Statement
We will insert our own records into a database using INSERT INTO

23.UPDATE Statement
The UPDATE statement can be used to change data that already exists in the SQL database

24.DELETE Statement
We can use DELETE FROM to remove data from the SQL database

25.ALTER TABLE
With ALTER TABLE, we can add, remove or change columns, data types and just about anything else

26.Aliases
Aliases can be used to temporary rename columns and tables

27.INNER JOIN
We will discuss and write inner joins to combine more than one table in a specific way

28.OUTER JOIN
We will discuss and write outer joins to combine more than one table in a specific way

29.LEFT JOIN
We will discuss and write left joins to combine more than one table in a specific way

30.RIGHT JOIN
We will discuss and write right joins to combine more than one table in a specific way

Other SQL Concepts

31.Subqueries
We will discuss combining queries together in a subquery

32.Indexing
We will talk about what indexing is and how to do it within MS SQL Server

33.Primary Key

We will discuss the Primary Key and why it's so important