* **Java :**
* **Variables : (**A variable is a container which holds the value while the [Java program](https://www.javatpoint.com/simple-program-of-java) is executed.)

To declare a Variable, you must specify the data type and then give the variable a unique name. for egg. int a, double b…like this

To initialize a variable, you must assign it a valid value. For egg. int a=5, double b=143.2….like this.

There are three types of variables in java.

1. Local Variable
2. Instance Variable (Non-Static Variable)
3. Static Variable

Local Variable:

1. Local variables are declared inside the body of the method.
2. It cannot be defined by static keyword.
3. You need to initialize your declared local variable.
4. No access modifier for local variable

Instance Variable (Non-Static Variable) :

1. A variable declared inside the class but outside the body of the method is called an instance or non-static variable.

(for egg.

== class{ 5 (method 10, 12) }

ata he “5” ks class chya under ahe pn method chya nahi..tr mg he “5” mhnje instance variable.) yana call krnyasathi object create karava lagto

Static Variable :

A variable which is declared as static is called a static variable.

For egg. static int a=5, static b=125.

( Jyanchya pudh “static” lihilel raht te zale static variable.)

* Data Types in java:-

Data types specify the different size and values that can be stored in the variable.

There are two types of data types in java---

1. Primitive data type : The primitive data types include Boolean, char, byte, short, long, float, double and int.
2. Non-Primitive data type:- The non-primitive data types include class, interfaces and arrays.

* What is a Class in Java?

--- 1) Class is a combination of methods and variables.

2) it is just a blueprint from which objects are created.

3) it does not occupy memory.

4) Syntax of class : Access modifier class Classname. For egg. public Class Rahul {}

* What is Object in Java?

--- 1) it is an instance of the class.

2) we can create object by using “new” keyword.

3) it is a self contained component.

4) we use object to make particular type of data useful.

Syntax : Classname objectName (kahipn deu shakto)=new Classname ();

For egg. Rahul obj=new Rahul();

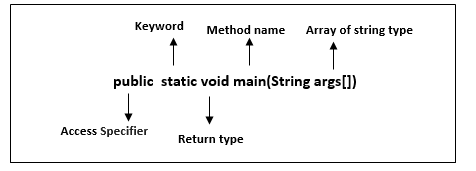
* What is a Method in Java?

--- 1) it is a block of code or collection of statements to perform a certain operation.

2) advantage of method is Code Reusability means once you write a method then you can use it many times. We do not require to write code again and again.

3) The method is executed only when you call it or invoke it.

4) And the most important method in java is main() method.



* What is access modifier in Java?

---1) Access modifiers in java helps to restrict the scope of class, constructor, variable, method or data member.

2) They are also referred as java access specifiers but the correct name is java access modifier.

3) Access modifiers can be specified separately for a class, constructor and methods.

There are four access modifier keywords in java🡪

1. Default Access Modifier
2. Public Access Modifier
3. Private Access Modifier
4. Protected Access Modifier
5. Default Access Modifier:

The access level of default modifier is only within the package.

It cannot be accessed from outside the package.

If you do not specify any access level then it is assume to be ‘Default’.

1. Public Access Modifier:

The access level of public modifier is everywhere.

It can be accessed from within the class, outside the class, within the package and outside the package.

This is the most common access level

1. Private Access Modifier:

The access level of private modifier is only within the class.

It cannot be accessed from outside the class.

1. Protected Access Modifier:

The access level of protected modifier is within the package and outside the package through child class.

If you do not make the child class, it cannot be accessed from outside the package.

* What is Constructor in Java?

It is a special type of method which is used to initialize a newly created object.

It is called just after the memory is allocated for the object.

It is not necessary to write a constructor for a Class, because java compiler creates a default constructor if your class doesn’t have any.

There are some rules for creating a java constructor:🡪

1. Constructor name must be the same as the Class name.
2. It should not return a value not even void.
3. A java constructor cannot be abstract, static, final and synchronized.
4. We can have private, protected, public or default constructor in java.

There are three types of constructors in java :🡪

1. Default Constructor
2. No-arg Constructor
3. Parameterized Constructor
4. Default Constructor:

If we do not create any constructor, then the java compiler automatically creates no-arg constructor during the execution of the program. This constructor is called default constructor.

This constructor is not visible to programmer.

1. No-arg Constructor:

Constructor with no arguments called no-arg constructor.

If a constructor doesn’t have any parameter then we also called it no-arg constructor.

This constructor is visible to the programmer.

1. Parameterized Constructor:

Constructor with arguments or parameters called Parameterized constructor.

And we can pass multiple arguments at same time.

**Java Control Statements:**

Java compiler executes the code from top to bottom.

So java provides statements that can be used to control the flow of java code, Such statements are called control flow statements.

Java provides three types of control flow statements:

1. **Decision making statements**

🡪 1. If statement

🡪 2. Switch statement

1. **Loop statements**

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1. **Jump statements**

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* **Decision Making Statement:**

Decision making statements decide which statement to execute and when.

There are two types of decision making statements in java i.e. If statement and Switch statement.

1. If statement: if statement is used to evaluate a condition.

There are four types of if-statements in java🡪

1. Simple if statement
2. If-else Statement
3. If-else-if ladder statement
4. Nested if Statement
5. Switch Statement: It is similar to if-else-if statement. And it contains multiple blocks of code called cases.

Cases cannot be duplicate.

And there is a Break statement which terminates the switch block when the condition is satisfied. If we not used break statement then next case is executed.

* Difference between method and constructor?

|  |  |
| --- | --- |
| **Constructor** | **Method** |
| 1. There is no need to call in constructor. If constructor is not called then there will be default constructor. | 1. Method is need to call. If we not called then it will not execute. |
| 1. Constructor is used to initialize an object. | 1. Method is used to exhibits functionality of an object |
| 1. Constructor does not return any value not even void. | 1. Method has return type. |
| 1. Name of the constructor must be same as the class name | 1. In methods no such requirement means method name can be anything |
| 1. We cannot override constructor | 1. Method overriding is possible. |

* **OOPs (Object Oriented Programing System):-**

There are four types in it----

1. Inheritance
2. Polymorphism
3. Abstraction
4. Encapsulation
5. **Inheritance:**

Inheritance it is oops principle where one class acquired property of other class.

The class from which property acquired is called super class or parent class.

The class in which property are delivered is called sub class or child class.

For inheritance we used extends keyword.

There are 5 types of inheritance in java but we can use only 3 because other two are not supported in java.

1. Single level inheritance
2. Multi-level inheritance
3. Hierarchical inheritance
4. **Single level inheritance:**

When a class extends another one class then we called it single level inheritance.

Egg. A=parent class, B=child class ( class B extends A)

1. **Multi-level inheritance:**

It is like chain of inheritance, means one sub class acquired the property of parent class then again another sub class acquired property of that sub class.

Egg. A=parent class, B=child class, C=child class ( class B extends A then class C extends B)

1. **Hierarchical inheritance:**

When two or more child classes extends single parent class it is known as Hierarchical inheritance.

Egg. A=parent class, B=child class, C=child class ( class B extends A then class C extends A)

1. **Polymorphism:**

Polymorphism is the concept where an object behaves differently in different situations.

And it also allows us to perform single action in different ways.

There are two types in polymorphism---

1. Compile time polymorphism
2. Run time polymorphism
3. **Compile time polymorphism: (Static Binding)**

Whenever an object is bound with its functionality at compile time, this is known as compile time polymorphism.

We can achieve it by method overloading.

\*\* Method overloading perform only in same class

Overloading means same method name but different arguments or parameters.

In method overloading we can change no. of parameters, change data type of the parameter and also we can change order of parameters.

1. **Run time polymorphism: (Dynamic Binding) (yaat aapn reference create krto)**

Whenever an object is bound with the functionality at run time, this is known as run time polymorphism.

We can achieve it by method overriding.

\*\* Method overriding means same method name, same arguments but class is different.

* Difference between Method overloading and Method overriding?

|  |  |
| --- | --- |
| **Method Overloading (Static Binding)** | **Method Overriding (Dynamic Binding)** |
| 1). Method overloading is a compile time polymorphism means it happens at compile time | 1). Method overriding is a run-time polymorphism means it happens at run-time. |
| 2). The binding of overloaded method is static | 2). The binding of overridden method is Dynamic |
| 3). Method overloading perform only in single class or same class. | 3). While method overriding performed in two classes with inheritance relationship. |
| 4). In method overloading, return type can be same or cannot be same, but we must have change the parameter. | 4). In method overriding, return type must be same or covariant. |

1. **Abstraction:**

It means hiding the implementation and showing the service that has been provided.

Here we hide certain details and show only essential information to the user.

There are two ways to achieve abstraction----

1. By Abstract class
2. By Interface class

**Abstract class:-**

It contains abstract and concrete method.

Abstract method does not have body but the concrete method have body.

It is partially abstracted hence abstraction can be achieved from 0 to 100%.

It is a restricted class that cannot be used to create objects.

So we create reference of it.

Overriding can be done here.

We use extend keyword to inherited from a class.

**Interface:-**

Interface contains only abstract method so abstraction can be achieved 100%.

We create reference in it.

Here we use implements keyword for implementation.

Upto java 1.7 interface allows only abstract method but from 1.8 it allows default and static method.

* Difference between Abstract class and Interface?

|  |  |
| --- | --- |
| **Abstract class** | **Interface** |
| 1). Abstract class can have abstract and non-abstract methods. | 1). Interface can have only abstract methods. |
| 2). Abstract class does not support multiple inheritance. | 2). Interface supports multiple inheritance |
| 3). The abstract keyword is used to declare abstract class | 3). The interface keyword used to declare interface. |
| 4). Abstract class can be extended by using keyword “extends” | 4). Interface can be implemented by using keyword “implements” |
| 5). In abstract class we achieve 0 to 100% abstraction | 5). In interface we achieve 100% abstraction |
| 6). Abstract class can have class members like private, protected | 6). Members of java interface are public by default. |

1. **Encapsulation:**

It is a process of wrapping methods and variables in a single unit.

Encapsulation can be achieved by declaring all the variable in the class as private

And declaring public getter and setter method for viewing and modifying the data.

It is way to achieve data hiding in java. It is used for banking transactions as data hiding is done for security purpose.

* **Java String:**

Java Strings are objects that allows us to store sequence of character. Which may contain alphanumeric values enclosed in double quotes. (“Ram7”)

Strings are immutable in java.

There are two ways to create string objects.

1. By string literal
2. By new keyword
3. **String literal:**

Java string literal is created by using double quote.

Egg. String S=”Rahul”;

Whenever a string object is created as a literal, the object will be created in string constant pool.

If the string is already exist in the pool then reference to the pooled instance is returned.

If string doesn’t exist in the pool then new string instance is created and placed in the pool.

It is use to make java more memory efficient.

1. **By new Keyword:**

String s=new String (“Hello”);

In such case, JVM will create a new string in heap memory and literal “Hello” will be placed in string constant pool. Means the variable s will refer to the object in a heap memory.

* **Why string objects are immutable in java?**

String is immutable means in simply it is unchangeable.

String references are used to store various attributes like username, password etc.

Suppose there are 5 reference variables and all refers to one object.

If one reference variable changes the value of the object then it will be affected by all the reference variable.

Okay so for avoiding this java made string objects immutable.

* **ARRAY:**

Array is a collection of similar data type.

And its objects are stored in heap memory.

Advantages of array:

1. Code optimization – it makes the code optimized, we can retrieve the data.
2. Random access: we can get any data located at index position.

Disadvantages of array:

1. Different datatype cannot be used.
2. Size of array is fixed, means it doesn’t grow its size at runtime.

To solve this problem collection framework is used in java which grows automatically.

* **Collection:**

Collection is a framework that provides an architecture to store and manipulate the group of objects.

Java collection framework provides many interfaces (Set, List, Queue and Deque).

It also provides many classes (ArrayList, HashSet, TreeSet)

* **Keywords:**

**Final** =

1. we can use it with variables, methods and class.
2. If we use final keyword with variable then we can’t change its value.
3. If we use final keyword in method then we can’t override it.
4. If we use final keyword with class then we can’t inherited it in another class.

**Finally** =