Object oriented Programming Using Java

Chapter-1

Q-1] Explain DataTypes ? Types of Conversion ?

Data Types in Java

Data types specify the different sizes and values that can be stored in the variable. There are two types of data types in Java:

1. **Primitive data types:** The primitive data types include boolean, char, byte, short, int, long, float and double.
2. **Non-primitive data types:** The non-primitive data types include Classes, Interfaces, and Arrays.

Let's understand in detail about the two major data types of Java in the following paragraphs.

Java Primitive Data Types

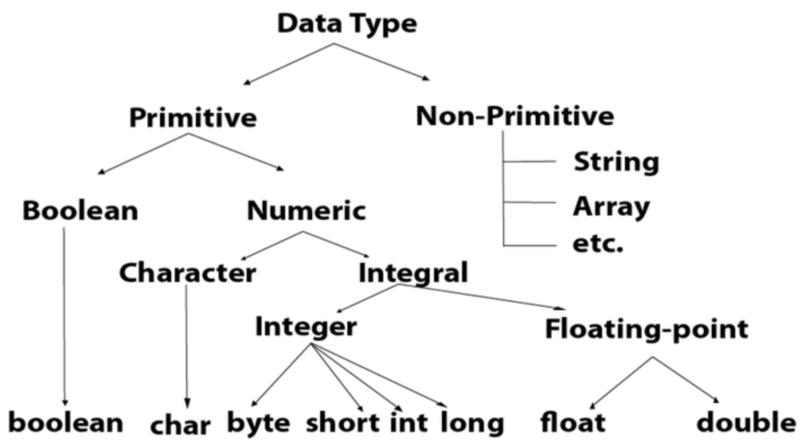
In Java language, primitive data types are the building blocks of data manipulation. These are the most basic data types available in Java language.

Java is a statically-typed programming language. It means, all variables must be declared before its use. That is why we need to declare variable's type and name.

In Java, there are mainly eight primitive data types and let's understand about them in detail in the following paragraphs.

Java Primitive 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



Data Type	Default Value	Default size
boolean	false	1 bit
char	'\u0000'	2 byte
byte	0	1 byte
short	0	2 byte
int	0	4 byte
long	0L	8 byte
float	0.0f	4 byte
double	0.0d	8 byte

Boolean Data Type

In Java, the **boolean** data type represents a single bit of information with two possible states: **true** or **false**. It is used to store the result of logical expressions or conditions. Unlike other primitive data types like **int** or **double**, **boolean** does not have a specific size or range. It is typically implemented as a single bit, although the exact implementation may vary across platforms.

Example:

```
Boolean a = false;
Boolean b = true;
```

One key feature of the **boolean** data type is its use in controlling program flow. It is commonly employed in conditional statements such as **if**, **while**, and **for** loops to determine the execution path based on the evaluation of a boolean expression. For instance, an **if** statement executes a block of code if the boolean expression evaluates to **true**, and skips it if the expression is **false**.

Byte Data Type

The **byte** data type in Java is a primitive data type that represents an 8-bit signed two's complement integer. It has a range of values from -128 to 127. Its default value is 0. The **byte** data type is commonly used when working with raw binary data or when memory conservation is a concern, as it occupies less memory than larger integer types like **int** or **long**.

Example:

```
byte a = 10, byte b = -20
```

One common use of the **byte** data type is in reading and writing binary data, such as files or network streams. Since binary data is often represented using bytes, the **byte** data type provides a convenient way to work with such data. Additionally, the **byte** data type is sometimes used in performance-critical applications where memory usage needs to be minimized.

Short Data Type

The **short** data type in Java is a primitive data type that represents a 16-bit signed two's complement integer. It has a range of values from -32,768 to 32,767. Similar to the **byte** data type, **short** is used when memory conservation is a concern, but more precision than **byte** is required. Its default value is 0.

Example:

```
short s = 10000, short r = -5000
```

In Java, **short** variables are declared using the **short** keyword. For example, **short myShort = 1000;** declares a **short** variable named **myShort** and initializes it with the value **1000**. As with the **byte** data type, **short** variables must be explicitly cast when used in expressions with larger integer types to avoid loss of precision.

Int Data Type

The int data type in Java is a primitive data type that represents a 32-bit signed two's complement integer. It has a range of values from -2,147,483,648 to 2,147,483,647. The int data type is one of the most commonly used data types in Java and is typically used to store whole numbers without decimal points. Its default value is 0.

```
int a = 100000, int b = -200000
```

In Java, int variables are declared using the int keyword. For example, int myInt = 100; declares an int variable named myInt and initializes it with the value 100. int variables can be used in mathematical expressions, assigned to other int variables, and used in conditional statements.

Long Data Type

The **long** data type in Java is a primitive data type that represents a 64-bit signed two's complement integer. It has a wider range of values than **int**, ranging from -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807. Its default value is 0.0F. The **long** data type is used when **int** is not large enough to hold the desired value, or when a larger range of integer values is needed.

Example:

```
long a = 100000L, long b = -200000L
```

The **long** data type is commonly used in applications where large integer values are required, such as in scientific computations, financial applications, and systems programming. It provides greater precision and a larger range than **int**, making it suitable for scenarios where **int** is insufficient.

Float Data Type

The **float** data type in Java is a primitive data type that represents single-precision 32-bit IEEE 754 floating-point numbers. It can represent a wide range of decimal values, but it is not suitable for precise values such as currency. The **float** data type is useful for applications where a higher range of values is needed, and precision is not critical.

Example:

```
float f1 = 234.5f
```

One of the key characteristics of the **float** data type is its ability to represent a wide range of values, both positive and negative, including very small and very large values. However, due to its limited precision (approximately 6-7 significant decimal digits), it is not suitable for applications where exact decimal values are required.

Double Data Type

The **double** data type in Java is a primitive data type that represents double-precision 64-bit IEEE 754 floating-point numbers. Its default value is 0.0d. It provides a wider range of values and greater precision compared to the **float** data type, making it suitable for applications where accurate representation of decimal values is required.

Example:

```
double d1 = 12.3
```

One of the key advantages of the **double** data type is its ability to represent a wider range of values with greater precision compared to **float**. It can accurately represent values with up to approximately 15-16 significant decimal digits, making it suitable for applications that require high precision, such as financial calculations, scientific computations, and graphics programming.

Char Data Type

The **char** data type in Java is a primitive data type that represents a single 16-bit Unicode character. It can store any character from the Unicode character set, that allows Java to support internationalization and representation of characters from various languages and writing systems.

Example:

```
char letterA = 'A'
```

Non-Primitive Data Types in Java

In Java, non-primitive data types, also known as reference data types, are used to store complex objects rather than simple values. Unlike primitive data types that store the actual values, reference data types store references or memory addresses that point to the location of the object in memory. This distinction is important because it affects how these data types are stored, passed, and manipulated in Java programs.

Class

One common non-primitive data type in Java is the class. Classes are used to create objects, which are instances of the class. A class defines the properties and behaviors of objects, including variables (fields) and methods. For example, you might create a **Person** class to represent a person, with variables for the person's name, age, and address, and methods to set and get these values.

Interface

Interfaces are another important non-primitive data type in Java. An interface defines a contract for what a class implementing the interface must provide, without specifying how it should be implemented. Interfaces are used to achieve abstraction and multiple inheritance in Java, allowing classes to be more flexible and reusable.

Arrays

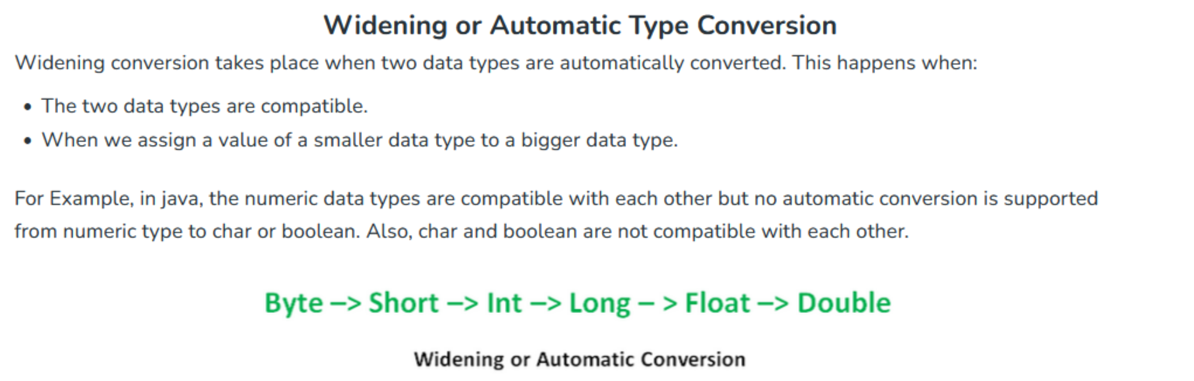
Arrays are a fundamental non-primitive data type in Java that allow you to store multiple values of the same type in a single variable. Arrays have a fixed size, which is specified when the array is created, and can be accessed using an index. Arrays are commonly used to store lists of values or to represent matrices and other multi-dimensional data structures.

Enum

Java also includes other non-primitive data types, such as enums and collections. Enums are used to define a set of named constants, providing a way to represent a fixed set of values. Collections are a framework of classes and interfaces that provide dynamic data structures such as lists, sets, and maps, which can grow or shrink in size as needed.

Overall, non-primitive data types in Java are essential for creating complex and flexible programs. They allow you to create and manipulate objects, define relationships between objects, and represent complex data structures. By understanding how to use non-primitive data types effectively, you can write more efficient and maintainable Java code.

Implicit Conversion



Widening or Automatic Type Conversion

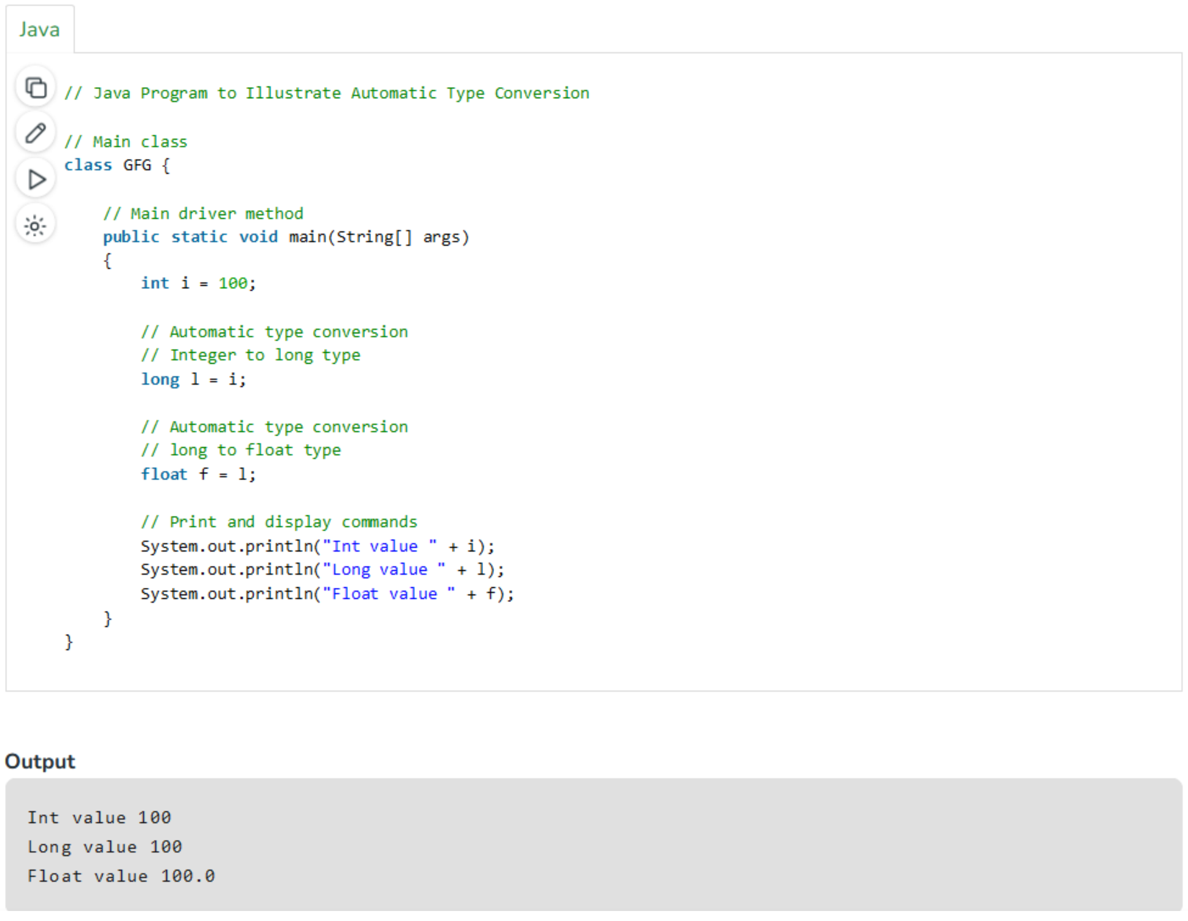
Widening conversion takes place when two data types are automatically converted. This happens when:

- The two data types are compatible.
- When we assign a value of a smaller data type to a bigger data type.

For Example, in java, the numeric data types are compatible with each other but no automatic conversion is supported from numeric type to char or boolean. Also, char and boolean are not compatible with each other.

Byte –> Short –> Int –> Long – > Float –> Double

Widening or Automatic Conversion



Java

```java
// Java Program to Illustrate Automatic Type Conversion

// Main class
class GFG {

    // Main driver method
    public static void main(String[] args)
    {
        int i = 100;

        // Automatic type conversion
        // Integer to long type
        long l = i;

        // Automatic type conversion
        // long to float type
        float f = l;

        // Print and display commands
        System.out.println("Int value " + i);
        System.out.println("Long value " + l);
        System.out.println("Float value " + f);
    }
}
```

Output

```
Int value 100
Long value 100
Float value 100.0
```

Explicit Conversion

Narrowing or Explicit Conversion

If we want to assign a value of a larger data type to a smaller data type we perform explicit type casting or narrowing.

- This is useful for incompatible data types where automatic conversion cannot be done.
- Here, the target type specifies the desired type to convert the specified value to.

Double –> Float –> Long –> Int –> Short –> Byte

Narrowing or Explicit Conversion

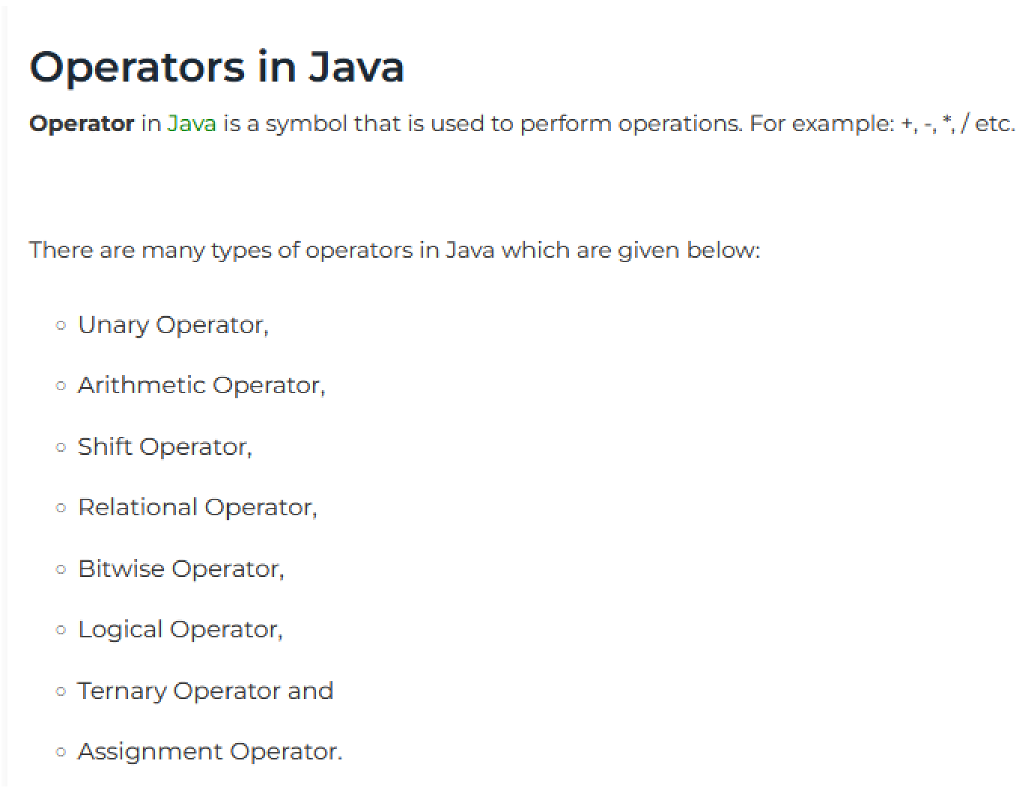
char and number are not compatible with each other. Let's see when we try to convert one into another.

```java
// Java program to Illustrate Explicit Type Conversion

// Main class
public class GFG {

    // Main driver method
    public static void main(String[] args)
    {

        // Double datatype
        double d = 100.04;

        // Explicit type casting by forcefully getting
        // data from long datatype to integer type
        long l = (long)d;

        // Explicit type casting
        int i = (int)l;

        // Print statements
        System.out.println("Double value " + d);

        // While printing we will see that
        // fractional part lost
        System.out.println("Long value " + l);

        // While printing we will see that
        // fractional part lost
        System.out.println("Int value " + i);
    }
}
```

Output

```
Double value 100.04
Long value 100
Int value 100
```

Q-2] Explain Operators , Types, Presedence and associativity ? Expression evaluation ?



Operators in Java

Operator in Java is a symbol that is used to perform operations. For example: +, -, *, / etc.

There are many types of operators in Java which are given below:

- Unary Operator,
- Arithmetic Operator,
- Shift Operator,
- Relational Operator,
- Bitwise Operator,
- Logical Operator,
- Ternary Operator and
- Assignment Operator.

Java Operator Precedence

Operator Type	Category	Precedence
Unary	postfix	`expr++ expr--`
prefix	`++expr --expr +expr -expr ~ !`	
Arithmetic	multiplicative	`* / %`
additive	`+ -`	
Shift	shift	`<< >> >>>`
Relational	comparison	`< > <= >= instanceof`
equality	`== !=`	
Bitwise	bitwise AND	`&`
bitwise exclusive OR	`^`	
bitwise inclusive OR	`|`	
Logical	logical AND	`&&`
logical OR	`||`	
Ternary	ternary	`? :`
Assignment	assignment	`= += -= *= /= %= &= ^= |= <<= >>= >>>=`

Java Unary Operator Example: ++ and --

```
public class OperatorExample{
public static void main(String args[]){
int x=10;
System.out.println(x++);//10 (11)
System.out.println(++x);//12
System.out.println(x--);//12 (11)
System.out.println(--x);//10
}}
```

Output:

```
10
12
12
10
```

Java Arithmetic Operators

Java arithmetic operators are used to perform addition, subtraction, multiplication, and division. They act as basic mathematical operations.

Java Arithmetic Operator Example

```
public class OperatorExample{
public static void main(String args[]){
int a=10;
int b=5;
System.out.println(a+b);//15
System.out.println(a-b);//5
System.out.println(a*b);//50
System.out.println(a/b);//2
System.out.println(a%b);//0
}}
```

Output:

```
15
5
50
2
0
```

Java Left Shift Operator

The Java left shift operator << is used to shift all of the bits in a value to the left side of a specified number of times.

Java Left Shift Operator Example

```
public class OperatorExample{
public static void main(String args[]){
System.out.println(10<<2);//10*2^2=10*4=40
System.out.println(10<<3);//10*2^3=10*8=80
System.out.println(20<<2);//20*2^2=20*4=80
System.out.println(15<<4);//15*2^4=15*16=240
}}
```

Output:

```
40
80
80
240
```

Java Right Shift Operator

The Java right shift operator >> is used to move the value of the left operand to right by the number of bits specified by the right operand.

Java Right Shift Operator Example

```
public OperatorExample{
public static void main(String args[]){
System.out.println(10>>2);//10/2^2=10/4=2
System.out.println(20>>2);//20/2^2=20/4=5
System.out.println(20>>3);//20/2^3=20/8=2
}}
```

Output:

```
2
5
2
```

Java AND Operator Example: Logical && and Bitwise &

The logical && operator doesn't check the second condition if the first condition is false. It checks the second condition only if the first one is true.

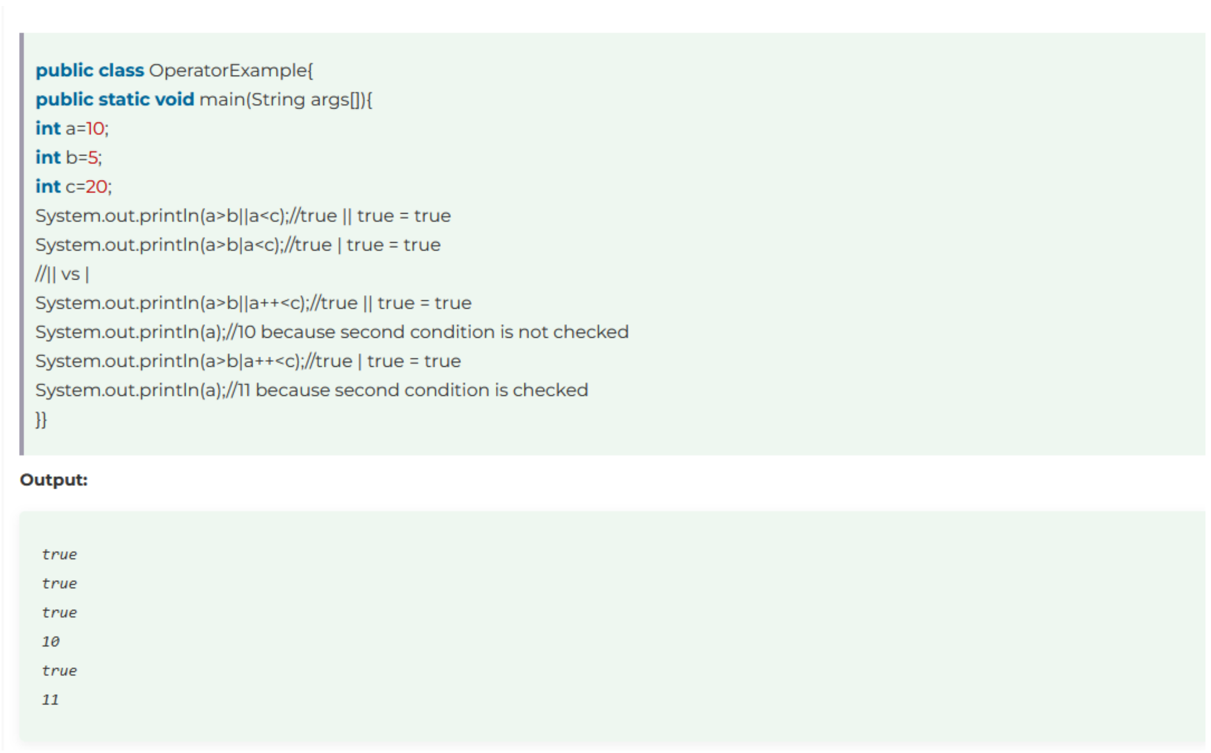
The bitwise & operator always checks both conditions whether first condition is true or false.

```
public class OperatorExample{
public static void main(String args[]){
int a=10;
int b=5;
int c=20;
System.out.println(a<b&&a<c);//false && true = false
System.out.println(a<b&a<c);//false & true = false
}}
```

Output:

```
false
false
```

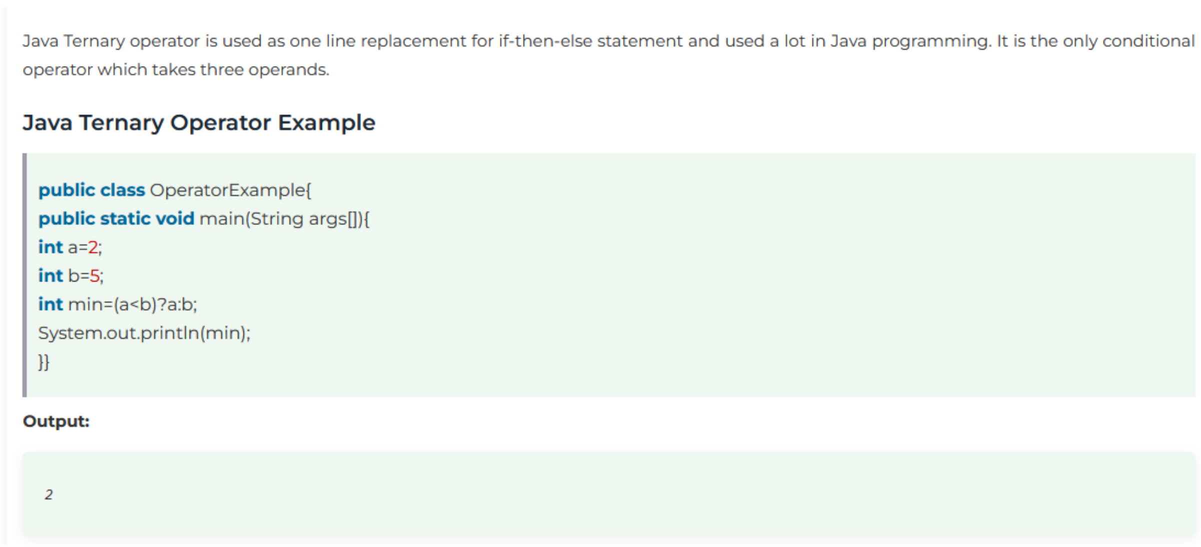
Java Or operator : logical and bitwise



```
public class OperatorExample{
public static void main(String args[]){
int a=10;
int b=5;
int c=20;
System.out.println(a>b||a<c);//true || true = true
System.out.println(a>b|a<c);//true | true = true
//|| vs |
System.out.println(a>b||a++<c);//true || true = true
System.out.println(a);//10 because second condition is not checked
System.out.println(a>b|a++<c);//true | true = true
System.out.println(a);//11 because second condition is checked
}}
```

Output:

```
true
true
true
10
true
11
```



Java Ternary operator is used as one line replacement for if-then-else statement and used a lot in Java programming. It is the only conditional operator which takes three operands.

Java Ternary Operator Example

```
public class OperatorExample{
public static void main(String args[]){
int a=2;
int b=5;
int min=(a<b)?a:b;
System.out.println(min);
}}
```

Output:

```
2
```

Java Assignment Operator

Java assignment operator is one of the most common operators. It is used to assign the value on its right to the operand on its left.

Java Assignment Operator Example

```
public class OperatorExample{
public static void main(String args[]){
int a=10;
int b=20;
a+=4;//a=a+4 (a=10+4)
b-=4;//b=b-4 (b=20-4)
System.out.println(a);
System.out.println(b);
}}
```

Output:

```
14
16
```

Q-3] Explain All Control Flow Statement with Examples ?

Java Control Statements | Control Flow in Java

Java compiler executes the code from top to bottom. The statements in the code are executed according to the order in which they appear. However, Java provides statements that can be used to control the flow of Java code. Such statements are called control flow statements. It is one of the fundamental features of Java, which provides a smooth flow of program.

Java provides three types of control flow statements.

1. Decision Making statements
   - if statements
   - switch statement
2. Loop statements
   - do while loop
   - while loop
   - for loop
   - for-each loop
3. Jump statements
   - break statement
   - continue statement

Decision-Making statements:

As the name suggests, decision-making statements decide which statement to execute and when. Decision-making statements evaluate the Boolean expression and control the program flow depending upon the result of the condition provided. There are two types of decision-making statements in Java, i.e., If statement and switch statement.

1) If Statement:

In Java, the "if" statement is used to evaluate a condition. The control of the program is diverted depending upon the specific condition. The condition of the If statement gives a Boolean value, either true or false. In Java, there are four types of if-statements given below.

1. Simple if statement
2. if-else statement
3. if-else-if ladder
4. Nested if-statement

Let's understand the if-statements one by one.

1) Simple if statement:

It is the most basic statement among all control flow statements in Java. It evaluates a Boolean expression and enables the program to enter a block of code if the expression evaluates to true.

Syntax of if statement is given below.

```
if(condition) {
statement 1; //executes when condition is true
}
```

Consider the following example in which we have used the **if** statement in the java code.

```
public class Student {
public static void main(String[] args) {
int x = 10;
int y = 12;
if(x+y > 20) {
System.out.println("x + y is greater than 20");
}
}
}
```

Output:

```
x + y is greater than 20
```

2) if-else statement

The if-else statement is an extension to the if-statement, which uses another block of code, i.e., else block. The else block is executed if the condition of the if-block is evaluated as false.

Syntax:

```
if(condition) {
statement 1; //executes when condition is true
}
else{
statement 2; //executes when condition is false
}
```

Consider the following example.

Student.java

```
public class Student {
public static void main(String[] args) {
int x = 10;
int y = 12;
if(x+y < 10) {
System.out.println("x + y is less than      10");
}  else {
System.out.println("x + y is greater than 20");
}
}
}
```

3) if-else-if ladder:

The if-else-if statement contains the if-statement followed by multiple else-if statements. In other words, we can say that it is the chain of if-else statements that create a decision tree where the program may enter in the block of code where the condition is true. We can also define an else statement at the end of the chain.

Syntax of if-else-if statement is given below.

```
if(condition 1) {
statement 1; //executes when condition 1 is true
}
else if(condition 2) {
statement 2; //executes when condition 2 is true
}
else {
statement 2; //executes when all the conditions are false
}
```

```
public class Student {
public static void main(String[] args) {
String city = "Delhi";
if(city == "Meerut") {
System.out.println("city is meerut");
}else if (city == "Noida") {
System.out.println("city is noida");
}else if(city == "Agra") {
System.out.println("city is agra");
}else {
System.out.println(city);
}
}
}
```

Output:

```
Delhi
```

In nested if-statements, the if statement can contain a **if** or **if-else** statement inside another if or else-if statement.

Syntax of Nested if-statement is given below.

```
if(condition 1) {
statement 1; //executes when condition 1 is true
if(condition 2) {
statement 2; //executes when condition 2 is true
}
else{
statement 2; //executes when condition 2 is false
}
}
```

Consider the following example.

Student.java

```
public class Student {
public static void main(String[] args) {
String address = "Delhi, India";

if(address.endsWith("India")) {
if(address.contains("Meerut")) {
System.out.println("Your city is Meerut");
}else if(address.contains("Noida")) {
System.out.println("Your city is Noida");
}else {
System.out.println(address.split(",")[0]);
}
}else {
System.out.println("You are not living in India");
}
}
}
```

Output:

```
Delhi
```

Points to be noted about switch statement:

- The case variables can be int, short, byte, char, or enumeration. String type is also supported since version 7 of Java
- Cases cannot be duplicate
- Default statement is executed when any of the case doesn't match the value of expression. It is optional.
- Break statement terminates the switch block when the condition is satisfied.
  It is optional, if not used, next case is executed.
- While using switch statements, we must notice that the case expression will be of the same type as the variable. However, it will also be a constant value.

The syntax to use the switch statement is given below.

```
switch (expression){
  case value1:
   statement1;
   break;
  .
  .
  .
  case valueN:
   statementN;
   break;
  default:
   default statement;
}
```

Consider the following example to understand the flow of the switch statement.

Student.java

```
public class Student implements Cloneable {
public static void main(String[] args) {
int num = 2;
switch (num){
case 0:
System.out.println("number is 0");
break;
case 1:
System.out.println("number is 1");
break;
default:
System.out.println(num);
}
}
}
```

Output:

```
2
```

While using switch statements, we must notice that the case expression will be of the same type as the variable. However, it will also be a constant value. The switch permits only int, string, and Enum type variables to be used.

In Java, we have three types of loops that execute similarly. However, there are differences in their syntax and condition checking time.

1. for loop
2. while loop
3. do-while loop

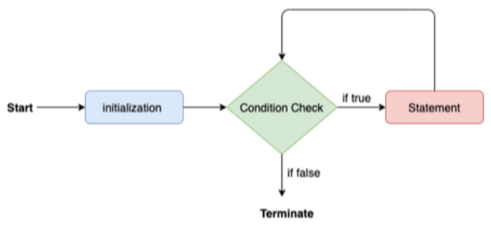
Let's understand the loop statements one by one.

Java for loop

In Java, for loop is similar to C and C++. It enables us to initialize the loop variable, check the condition, and increment/decrement in a single line of code. We use the for loop only when we exactly know the number of times, we want to execute the block of code.

```
for(initialization, condition, increment/decrement) {
//block of statements
}
```

The flow chart for the for-loop is given below.



Consider the following example to understand the proper functioning of the for loop in java.

```
public class Calculattion {
public static void main(String[] args) {
// TODO Auto-generated method stub
int sum = 0;
for(int j = 1; j<=10; j++) {
sum = sum + j;
}
System.out.println("The sum of first 10 natural numbers is " + sum);
}
}
```

Output:

```
The sum of first 10 natural numbers is 55
```

Java for-each loop

Java provides an enhanced for loop to traverse the data structures like array or collection. In the for-each loop, we don't need to update the loop variable. The syntax to use the for-each loop in java is given below.

```
for(data_type var : array_name/collection_name){
//statements
}
```

Consider the following example to understand the functioning of the for-each loop in Java.

Calculation.java

```
public class Calculation {
public static void main(String[] args) {
// TODO Auto-generated method stub
String[] names = {"Java","C","C++","Python","JavaScript"};
System.out.println("Printing the content of the array names:\n");
for(String name:names) {
System.out.println(name);
}
}
}
```

Java while loop

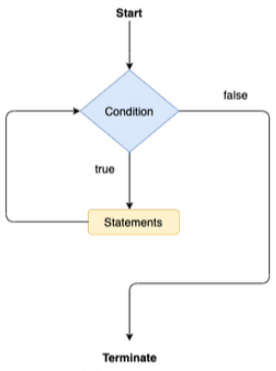
The while loop is also used to iterate over the number of statements multiple times. However, if we don't know the number of iterations in advance, it is recommended to use a while loop. Unlike for loop, the initialization and increment/decrement doesn't take place inside the loop statement in while loop.

It is also known as the entry-controlled loop since the condition is checked at the start of the loop. If the condition is true, then the loop body will be executed; otherwise, the statements after the loop will be executed.

The syntax of the while loop is given below.

```
while(condition){
//looping statements
}
```

The flow chart for the while loop is given in the following image.



Consider the following example.

Calculation .java

```
public class Calculation {
public static void main(String[] args) {
// TODO Auto-generated method stub
int i = 0;
System.out.println("Printing the list of first 10 even numbers \n");
while(i<=10) {
System.out.println(i);
i = i + 2;
}
}
}
```

Output:

```
Printing the list of first 10 even numbers

0
2
4
6
8
10
```

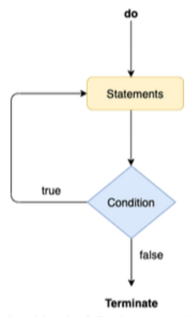
Java do-while loop

The do-while loop checks the condition at the end of the loop after executing the loop statements. When the number of iteration is not known and we have to execute the loop at least once, we can use do-while loop.

It is also known as the exit-controlled loop since the condition is not checked in advance. The syntax of the do-while loop is given below.

```
do
{
//statements
} while (condition);
```

The flow chart of the do-while loop is given in the following image.



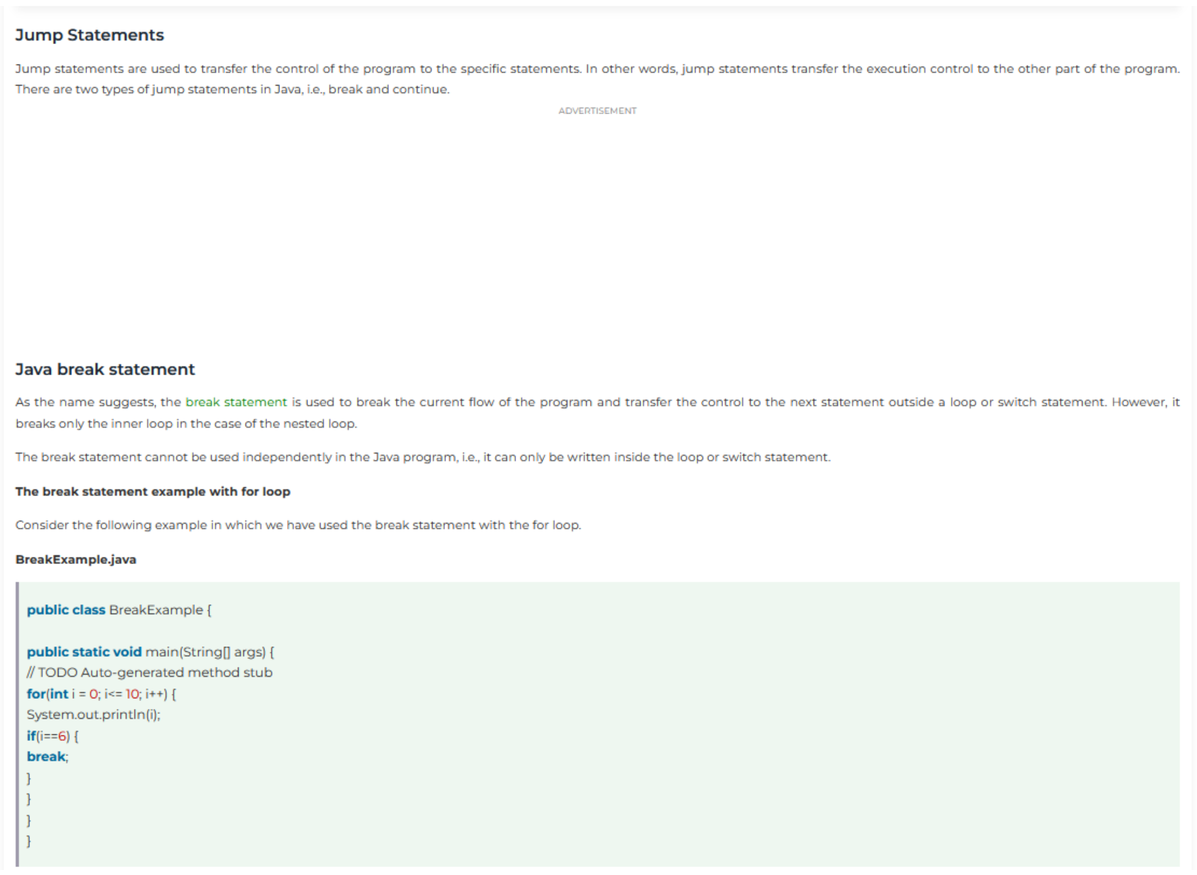
Consider the following example to understand the functioning of the do-while loop in Java.

Calculation.java

```
public class Calculation {
public static void main(String[] args) {
// TODO Auto-generated method stub
int i = 0;
System.out.println("Printing the list of first 10 even numbers \n");
do {
System.out.println(i);
i = i + 2;
}while(i<=10);
}
}
```

Output:

```
Printing the list of first 10 even numbers
0
2
4
6
8
10
```



Jump Statements

Jump statements are used to transfer the control of the program to the specific statements. In other words, jump statements transfer the execution control to the other part of the program. There are two types of jump statements in Java, i.e., break and continue.

ADVERTISEMENT

Java break statement

As the name suggests, the break statement is used to break the current flow of the program and transfer the control to the next statement outside a loop or switch statement. However, it breaks only the inner loop in the case of the nested loop.

The break statement cannot be used independently in the Java program, i.e., it can only be written inside the loop or switch statement.

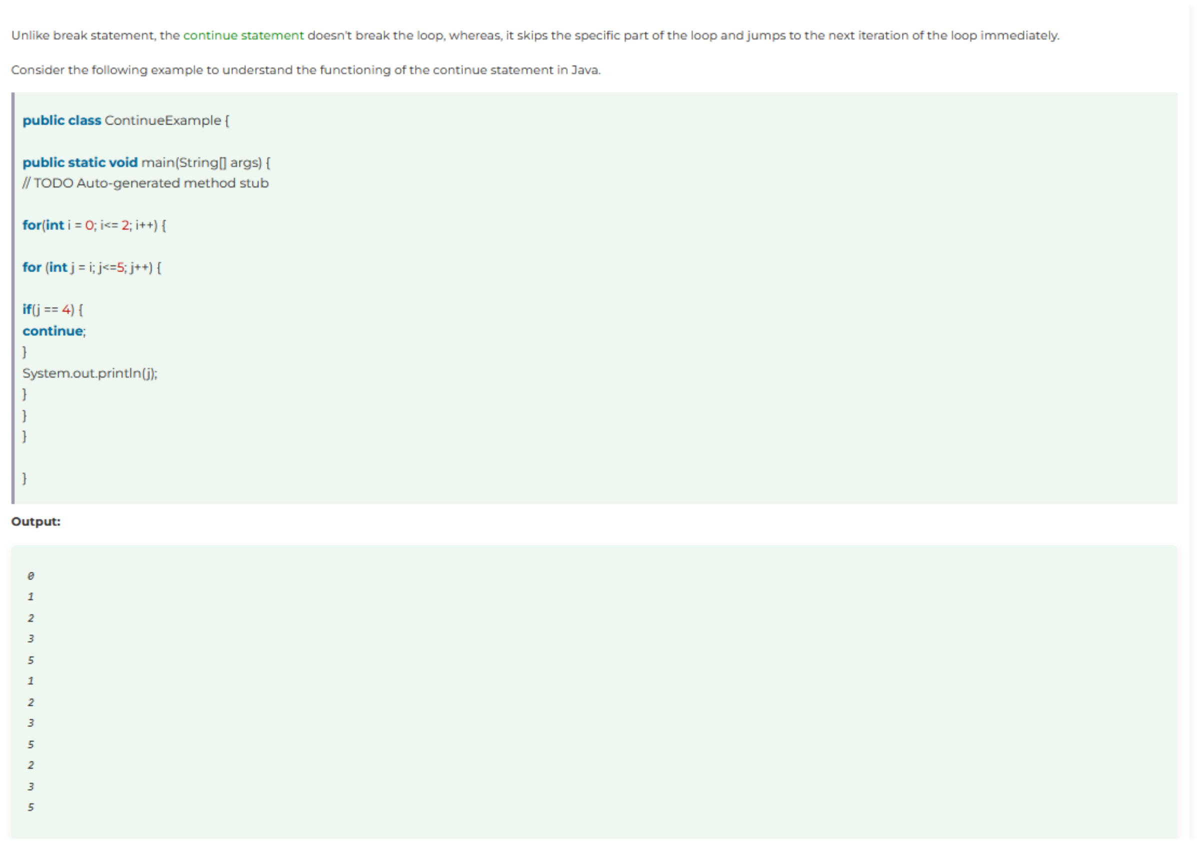
The break statement example with for loop

Consider the following example in which we have used the break statement with the for loop.

BreakExample.java

```
public class BreakExample {

public static void main(String[] args) {
// TODO Auto-generated method stub
for(int i = 0; i<= 10; i++) {
System.out.println(i);
if(i==6) {
break;
}
}
}
}
```

Java Continue Statement –



Unlike break statement, the continue statement doesn't break the loop, whereas, it skips the specific part of the loop and jumps to the next iteration of the loop immediately.

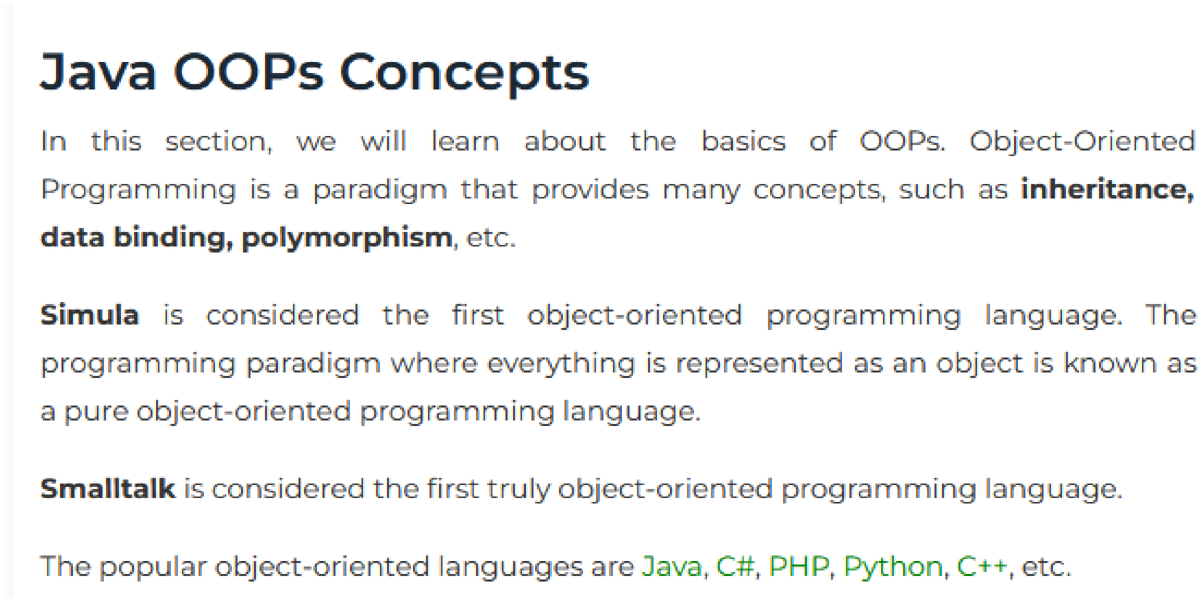
Consider the following example to understand the functioning of the continue statement in Java.

```
public class ContinueExample {

public static void main(String[] args) {
// TODO Auto-generated method stub

for(int i = 0; i<= 2; i++) {

for (int j = i; j<=5; j++) {

if(j == 4) {
continue;
}
System.out.println(j);
}
}
}

}
```

Output:

```
0
1
2
3
5
1
2
3
5
2
3
5
```

Q-4] Explain OOPs ? Advantages ? Needs ? Use cases ?



Java OOPs Concepts

In this section, we will learn about the basics of OOPs. Object-Oriented Programming is a paradigm that provides many concepts, such as **inheritance, data binding, polymorphism**, etc.

Simula is considered the first object-oriented programming language. The programming paradigm where everything is represented as an object is known as a pure object-oriented programming language.

Smalltalk is considered the first truly object-oriented programming language.

The popular object-oriented languages are Java, C#, PHP, Python, C++, etc.

The aim of object-oriented programming is to implement real-world entities, for example, object, classes, abstraction, inheritance, polymorphism, etc.

OOPs (Object-Oriented Programming)

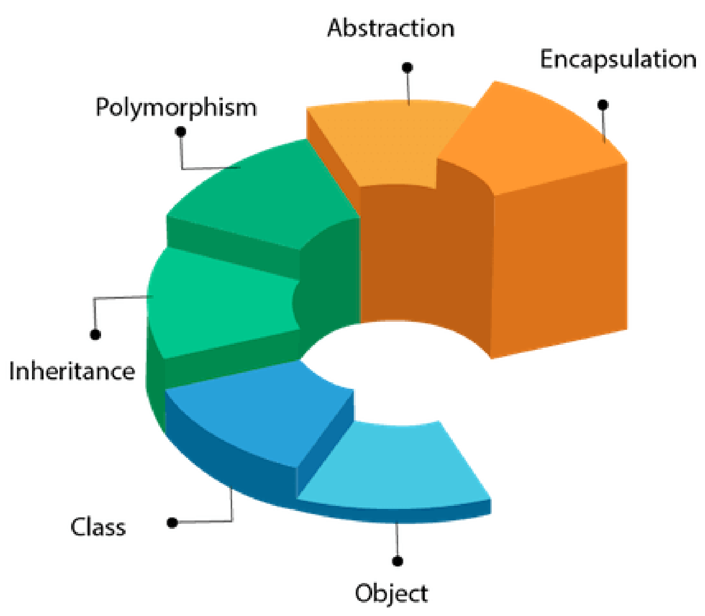
Object means a real-world entity such as a pen, chair, table, computer, watch, etc. **Object-Oriented Programming** is a methodology or paradigm to design a program using classes and objects. It simplifies software development and maintenance by providing some concepts:

- Object
- Class
- Inheritance
- Polymorphism
- Abstraction
- Encapsulation

Apart from these concepts, there are some other terms which are used in Object-Oriented design:

- Coupling
- Cohesion
- Association
- Aggregation
- Composition

OOPs (Object-Oriented Programming System)



Advantage of OOPs over Procedure-Oriented Programming Language

1) OOPs makes development and maintenance easier, whereas, in a procedure-oriented programming language, it is not easy to manage if code grows as project size increases.

2) OOPs provides data hiding, whereas, in a procedure-oriented programming language, global data can be accessed from anywhere.

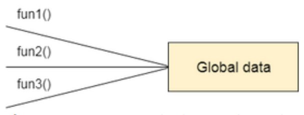


Figure: Data Representation in Procedure-Oriented Programming

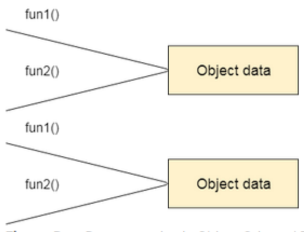


Figure: Data Representation in Object-Oriented Programming

3) OOPs provides the ability to simulate real-world event much more effectively. We can provide the solution of real word problem if we are using the Object-Oriented Programming language.