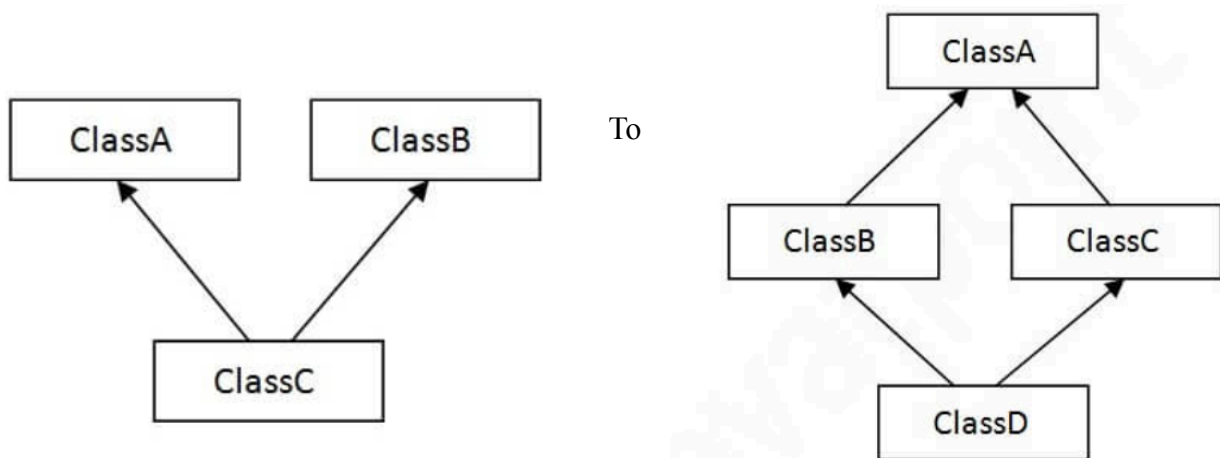# 23-Multiple Inheritance

Introduction: In object-oriented programming, inheritance allows a class to inherit properties and methods from another class. However, Java does not support multiple inheritance for classes, meaning a class cannot inherit from more than one class. This is a key difference from other languages like C++, where multiple inheritance is allowed.

Why Multiple Inheritance is Not Allowed in Java:

Consider a scenario where class C inherits from two classes, A and B. If both A and B contain a method with the same name, it creates ambiguity: the compiler cannot determine whether to use the method from A or B. This issue is known as the **Diamond Problem** or **Ambiguity Problem**.

To avoid this problem and reduce complexity, Java does not support multiple inheritance for classes. Instead, Java promotes code simplicity and consistency by disallowing it, resulting in compile-time errors rather than runtime issues.

Key Points:

- **Diamond Problem:** When a class inherits from two classes that have methods with the same name, the compiler faces ambiguity, leading to confusion about which method to inherit.

- **Compile-Time Error:** Java throws a compile-time error if a class attempts to inherit from more than one class, preventing potential ambiguity and runtime errors.

- **Simplification:** Java's decision to disallow multiple inheritance simplifies the language and reduces the chances of errors.

Example of Multiple Inheritance in Java:

```
1 ▾ class A {
2        // Some methods and fields
3    }
4
5 ▾ class B {
6        // Some methods and fields
7    }
8
9    // This code will not compile in Java
10 ▾ class C extends A, B {
11        // Compiler error: C cannot extend from both A and B
12    }
13
14 ▾ public class Demo {
15 ▾     public static void main(String[] args) {
16            // Code to demonstrate the issue
17        }
18    }
```

```
Output    Generated Files


Demo.java:10: error: '{' expected
class C extends A, B {
                 ^
1 error
```

In this example, class C attempts to inherit from both A and B. However, this is not allowed in Java, and the code will result in a compile-time error. If you try to compile this code in an IDE, you'll see a warning or error indicating that multiple inheritance is not supported.

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