**Singleton  
Singleton** is a creational design pattern that lets you ensure that a class has only one instance, while providing a global access point to this instance.

## **Problem**

1. Ensure that a class has just a single instance. Why would anyone want to control how many instances a class has? The most common reason for this is to control access to some shared resource — for example, a database or a file.

Here’s how it works: imagine that you created an object, but after a while decided to create a new one. Instead of receiving a fresh object, you’ll get the one you already created.

Note that this behavior is impossible to implement with a regular constructor since a constructor call must always return a new object by design.

1. **Provide a global access point to that instance**. Remember those global variables that you (all right, me) used to store some essential objects? While they’re very handy, they’re also very unsafe since any code can potentially overwrite the contents of those variables and crash the app.

Just like a global variable, the Singleton pattern lets you access some object from anywhere in the program. However, it also protects that instance from being overwritten by other code.

There’s another side to this problem: you don’t want the code that solves problem #1 to be scattered all over your program. It’s much better to have it within one class, especially if the rest of your code already depends on it.

## **Real-World Analogy**

The government is an excellent example of the Singleton pattern. A country can have only one official government. Regardless of the personal identities of the individuals who form governments, the title, “The Government of X”, is a global point of access that identifies the group of people in charge.

**Facade**

**Facade** is a structural design pattern that provides a simplified interface to a library, a framework, or any other complex set of classes.

**Problem**

Imagine that you must make your code work with a broad set of objects that belong to a sophisticated library or framework. Ordinarily, you’d need to initialize all of those objects, keep track of dependencies, execute methods in the correct order, and so on.

As a result, the business logic of your classes would become tightly coupled to the implementation details of 3rd-party classes, making it hard to comprehend and maintain.

## **Real-World Analogy**

When you call a shop to place a phone order, an operator is your facade to all services and departments of the shop. The operator provides you with a simple voice interface to the ordering system, payment gateways, and various delivery services.

**Adapter**Adapter is a structural design pattern that allows objects with incompatible interfaces to collaborate.

## **Problem**

Imagine that you’re creating a stock market monitoring app. The app downloads the stock data from multiple sources in XML format and then displays nice-looking charts and diagrams for the user.

At some point, you decide to improve the app by integrating a smart 3rd-party analytics library. But there’s a catch: the analytics library only works with data in JSON format.

You could change the library to work with XML. However, this might break some existing code that relies on the library. And worse, you might not have access to the library’s source code in the first place, making this approach impossible.

## **Real-World Analogy**

When you travel from the US to Europe for the first time, you may get a surprise when trying to charge your laptop. The power plug and sockets standards are different in different countries. That’s why your US plug won’t fit a German socket. The problem can be solved by using a power plug adapter that has the American-style socket and the European-style plug.