* **Spring** : spring framework is a **Dependency Injection framework** to make java application loosely coupled. Spring was **develoved by Rod Johnson in 2003** and it is the most used and popular framework of java for **J2EE** or application development.

Spring provides alot of modules such as **Spring MVC, Spring Security, Spring Core**. With the help of these our application development becomes more easy.

1. **What is loosely coupled?**

**Loosely coupled** means We can make changes easily in our application.

1. **Why spring is called as dependency injection framework?**

Because it **injects dependencies** or objects itself.

Spring provides **IOC** with the help of which we perform **dependency injection**.

1. **What is dependency injection?**

It is the main functionality provided by Spring **IOC**. Dependency injection is a **design pattern** and a **core part of IOC**, by following which we can develop applications.

**Dependency** means one class is dependent on another class to do the work. In java we create object using new keyword. And if we do this then our application will become **tightly coupled**.

So what does Spring do is, the object we were creating using **new** keyword. Now it will be done by **dependency injection**. It will automatically create the object at **runtime** and will **inject** that object in another class.

**Dependency Injection** is a specific implementation of the IoC principle. It refers to the technique of passing **(injecting) dependencies** (objects) into a class at runtime rather than the class creating them itself. This can be done through **constructor injection, setter injection, or method injection**.

**Advantages:**

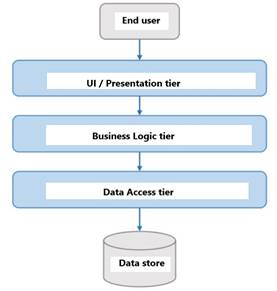
1. **Clean code**
2. **Decoupling** is more effective when objects are provided with their dependencies.
3. **Classes become easier to test**.
4. **What is IOC?**

**Inversion of control** is a design principle in which the control of object creation and management is transferred from the **application code to a container** or framework.

1. **Where this design pattern (Dependency Injection) required?**

It is particularly useful in **scenarios where decoupling components, managing configurations, and improving code quality are priorities**. By leveraging DI, developers can create more **flexible** and **robust applications** that are easier to manage and evolve over time.

1. **Design pattern / N-tier pattern / Layered architecture pattern**



we always follow design patterns while developing a application. This process happens on server side.

1. **UI Layer (ProductController) :** It is a simple java **class**. This class needs to access some services or some business logics. It has the capabilities to accept requests. It will simply use the services of other class (**ProductService).** We do not write logic in this class.
2. **Business/Service Layer (Product Service) :** Business logics are written there and the **ProductController** will simply use these logics.

Business layer does not directly communicate with database. It only provides business services.

1. **Data Access Layer (ProductDao) :** It communicates with database and send that to service layer.

**Spring Dependency Injection** will create the object of **ProductDao** and will inject it to **ProductService**.

And will create the object of **ProductService** and will inject it to **ProductController**. This process will take place by I**OC container.**

* **Spring Modules :**