Agenda:-

1) Project Overview
2) Microservices vs Monolothic
3) Intro to Spring framework.
4) Dependency Injection & IOC.
5) SpringBoot
6) Build our first API.

⇒ Backend arch. of an Ecommerce Appl^n.

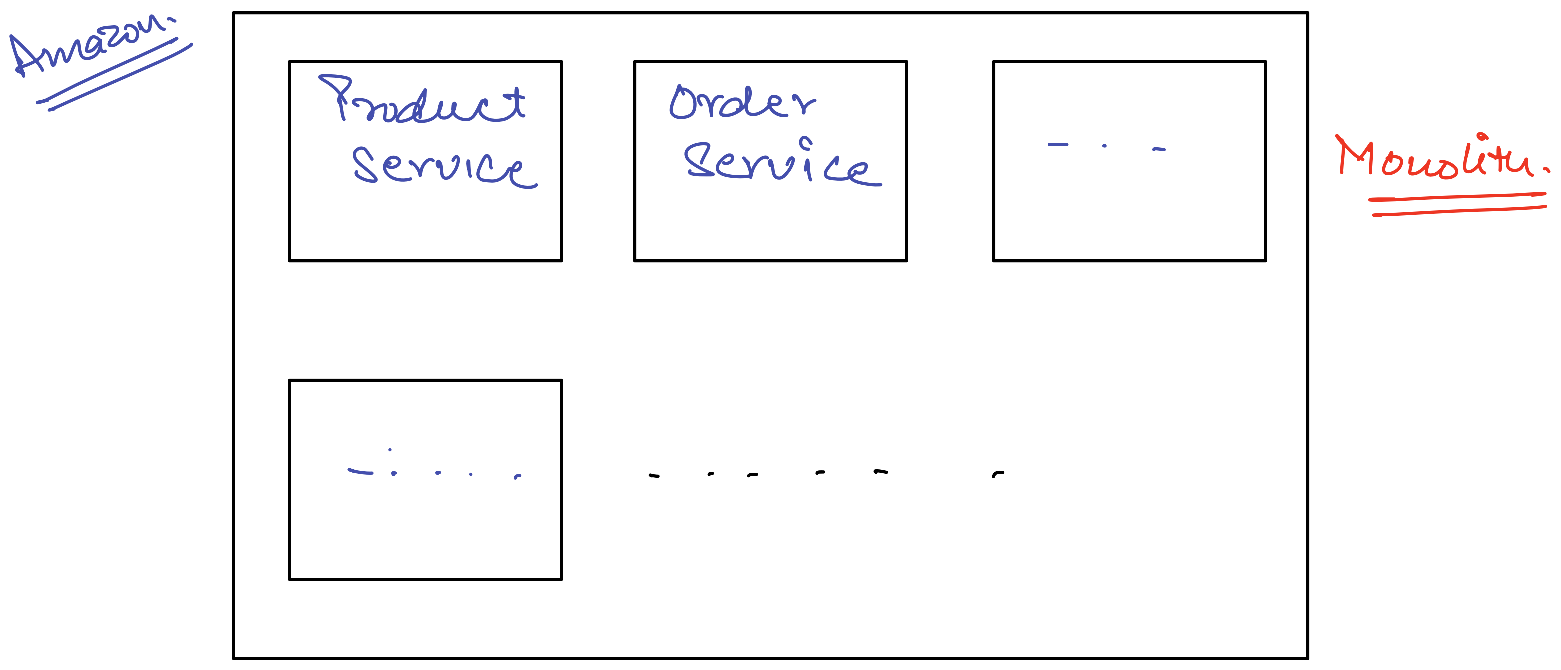
UserService
Product Service
Search service
PaymentService
LogisticsService
OrderService
CartService
NotificationService

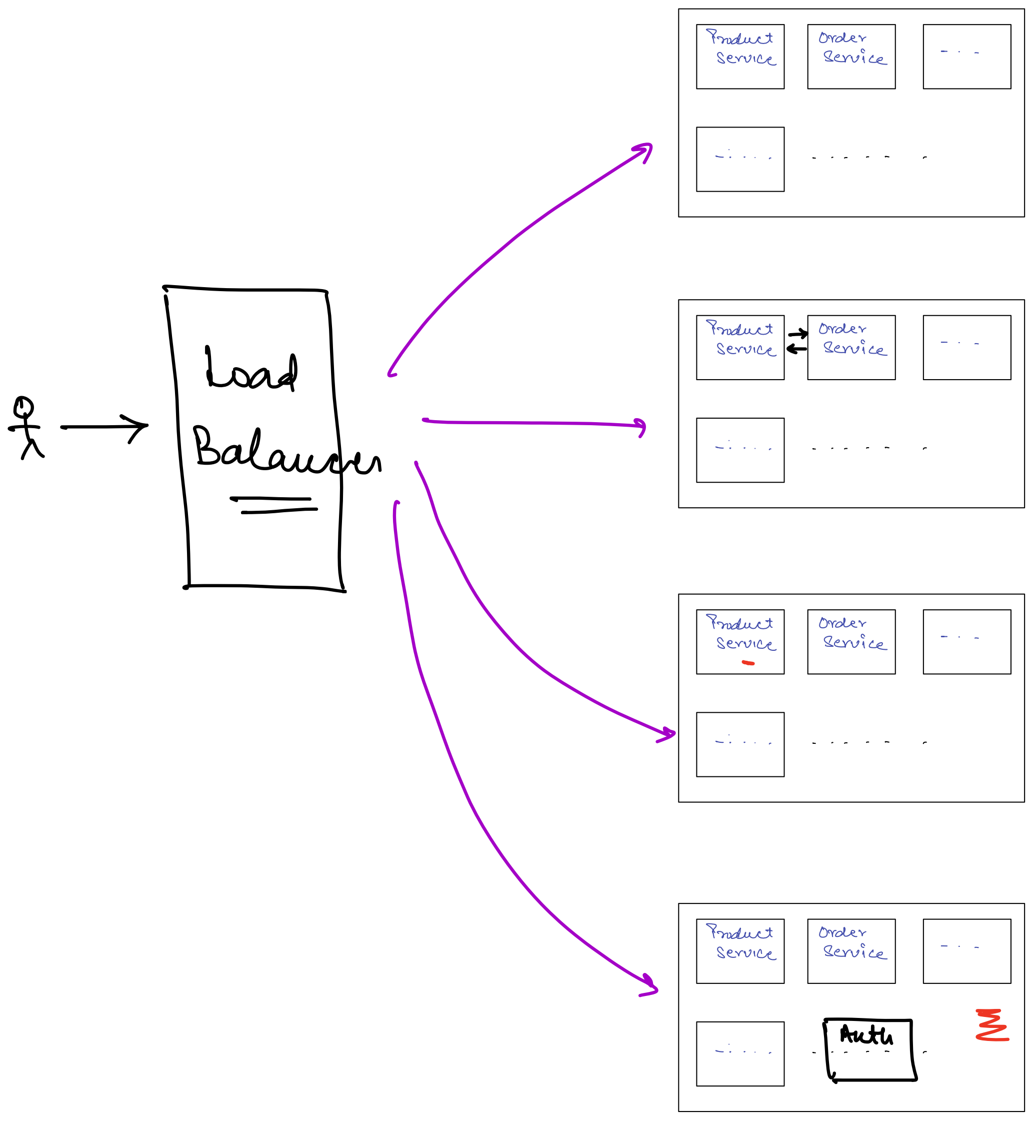
Monolithic Architecture

⇒ All the services are part of a single project.

MicroService

⇒ Different project for each service.


Amazon.
Product Service
Order Service
Monolith.


Load Balancer
Product Service
Order Service
Auth

Pros

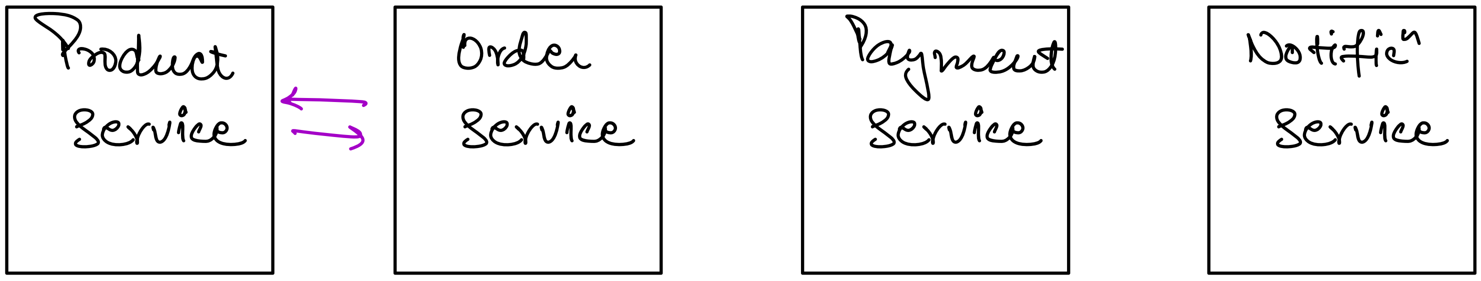
1) Single deployment.
2) No n/w latency.
3) Easy debugging

Cons.

1) More deployment time.
2) No tech stack flexibility
3) No selective scaling.
4) A small bug can get the entire appⁿ down.

Traffic of SearchService >>> Payment Service

MicroServices.



Pros.

1) Selective Scaling.
2) faster deployment
3) TechStack flexibility.

Cons.

1) Difficult Debugging
2) N/w call b/w microservices Communication.

MicroServices.

ProductService

UserService

Auth

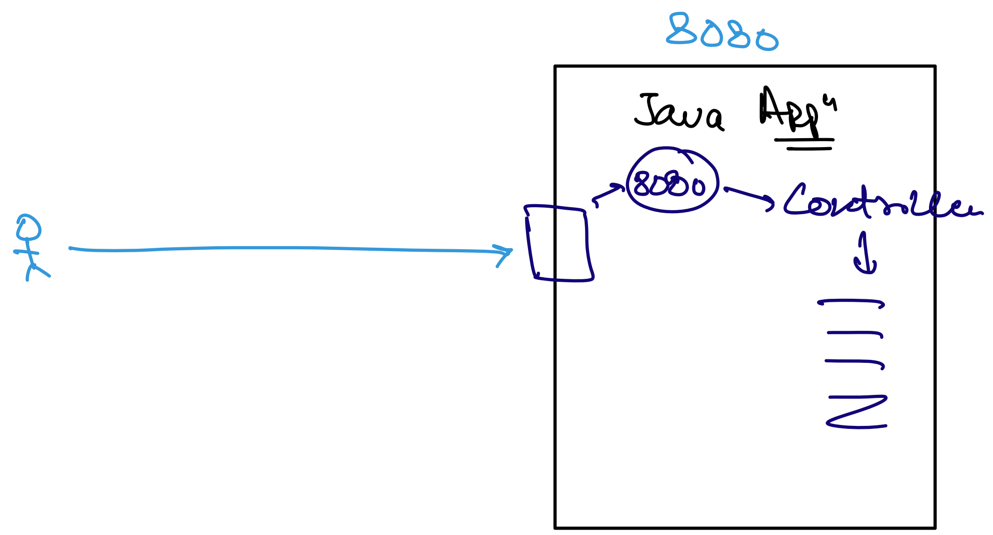
Notific^n Service

APIG/w.

Frameworks.

↳ Provides us ready to use implementation of the most common thing that we generally do as a Software Engineer.

⇒ We should mostly spend time on implementing the business logic.



Frameworks provides ready to use functionalities to implement most common things :-

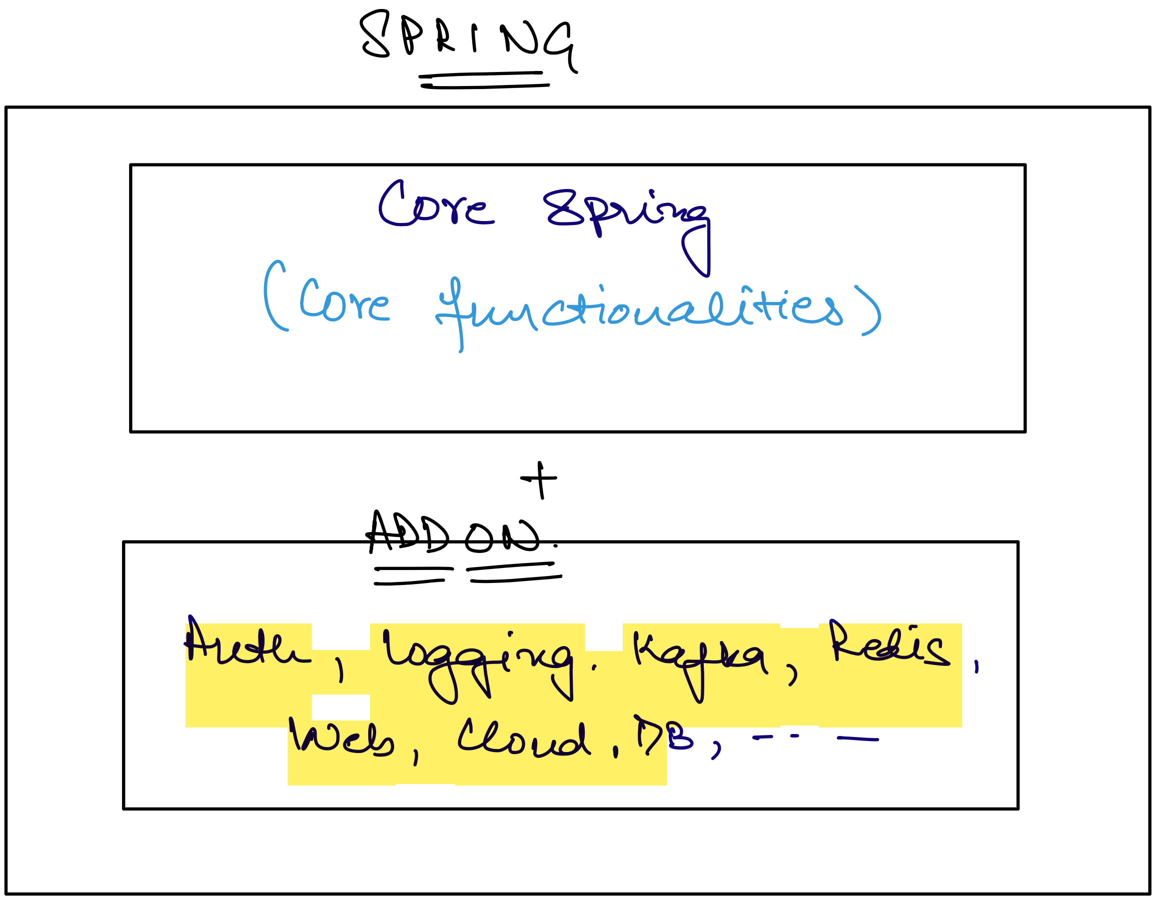
1) Creating API's
2) Connecting to DB
3) Auth
4) logging

⇒ Spring framework + Java.

⇒ Python + Django. ⇒ Recorded Videos.

# Spring framework.

↳ Set of Projects that allows creation of Production level java application by providing ready to use functionalities.



Dependency Injection.

```
Class A {
    B b;
}
```

⇒ A is depending on B.

Inside of A class we have object b
of class B

1) ✗

```
Class A {
        B b = new B()

        ____
        ____
        ____
}
```

Creating the dependency within the class.

2) ✓

```
Class A {
      B b;
      A(B b) {
          this.b = b;
      }
}

main() {
      B b = new B()
      A a = new A(b);
```

```
Class A {
      B b;
      SetB (B b) {
          this.b = b;
      }
}

B b = new B()
A a = new A()
a.setB(b);
```

⇒ Dependency Injection.

1

```
UserService {  ✗
      DB db = new DB()

}
```

```
SearchService {  ✗
      DB db = new DB()

}
```

```
ProdService {  ✗
      DB db = new DB()

}
```

⇒ We can Reuse the DB instance

```
main()
      DB db = new DB()
      US us = new US(db);
      PS ps = new PS(db);

}
```

Injecting db object in UserService class

Here instead of creating an object in each class. Just create one object in main class using dependency injection

②

```
UserService {
    DB db = new ~~MySQL()~~ PSQL()
    ≡
}
```

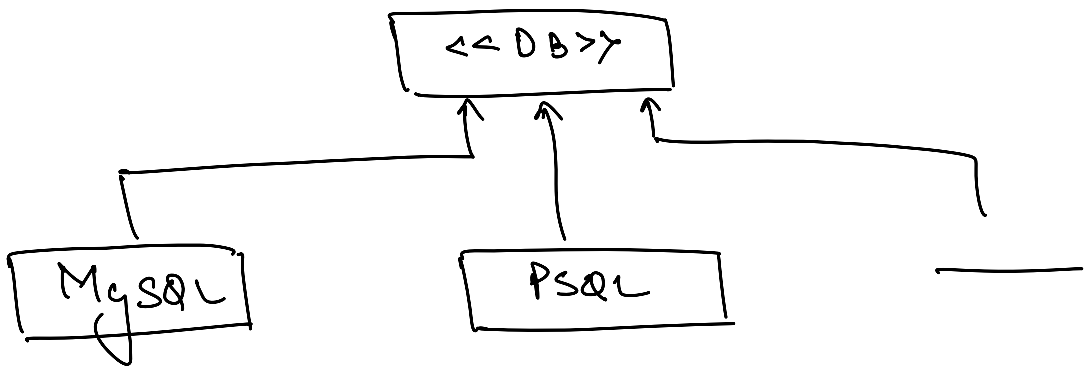
```
SearchService {
    DB db = new ~~MySQL()~~ PSQL()
    ≡
}
```

```
ProdService {
    DB db = new ~~MySQL()~~ PSQL()
    ≡
}
```

⇒ Tightly Coupled.

If we have a class of MYSQL() database and if I want to migrate to PSQL database you have to change the implementation from MYSQL() to PSQL() at every place in each class

Migrate from MySQL to PSQL.



⇒ If we want to migrate to another DB then we'll have to go & change at every place.

main() {

DB db = new ~~MySQL()~~ PSQL()

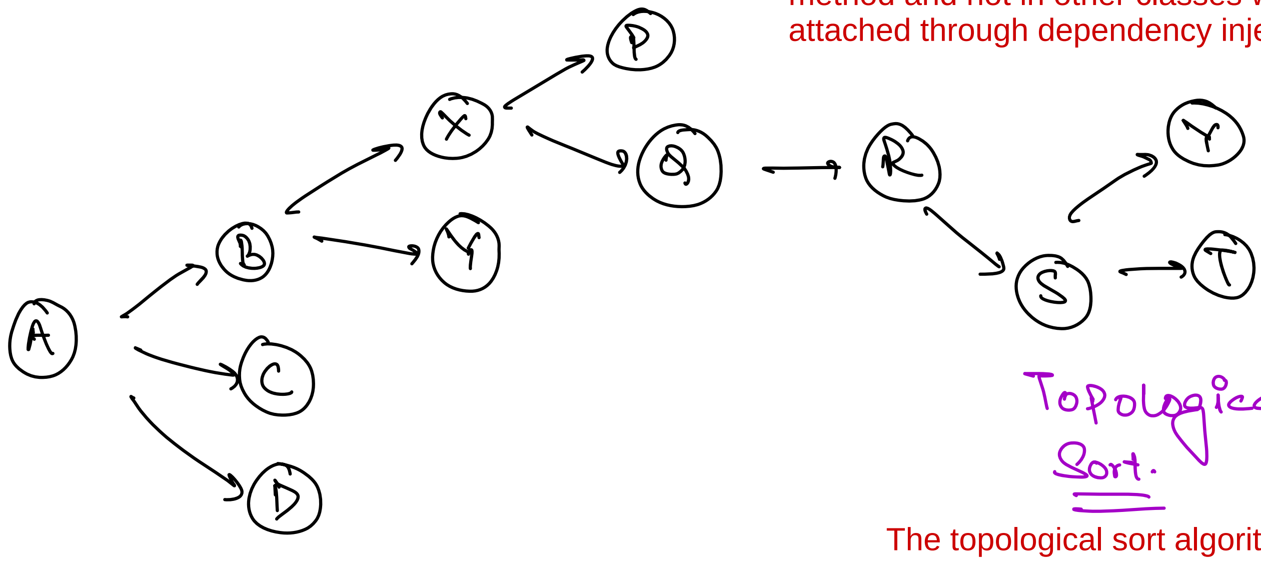
US us = new US(db);

PS ps = new PS(db);

}

loosely coupled

This is a loosely coupled code where we change the implementation only in main() method and not in other classes who are attached through dependency injection



Topological Sort.

The topological sort algorithm takes a directed graph and returns an array of the nodes where each node appears before all the nodes it points to.

Spring : Dependency Injection.

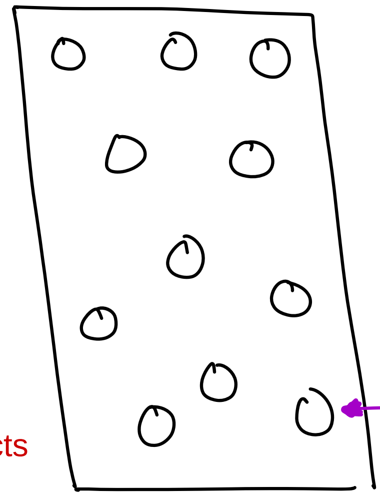
Inversion Of Control

Framework does the dependency Injection on our Behalf.

⇒

Spring Container | Application Context

In this spring stores all the objects/beans. Spring calls the objects as bean



Equivalent to objects

Bean = Object

↳ Objects managed by spring and used automaticaly whenever required

⇒ An object that spring creates, manages & uses whenever required is called as Bean.

1) Start the App"

2) Spring creates all the beans.

3) Spring stores all the beans inside a Container | Application context.

⇒ Earlier if we want to use any addon with Spring, lot of configurations (XML) were required.

⇒ SpringBoot : Package on top Spring framework that allows easy usage of Addons.

↳ framework based on Spring that provides us easy usage of Addon.