Topic 7: Intro to Spring

Part b: Spring boot

Tomcat

- Tomcat is a servlet container that can handle HTTP requests
- It can be seen as a web server for Java technology including java servlet, Java Server Pages, Java Unified Expression Language, and WebSocket
- A **servlet**, at its core, is a Java class, which is precompiled, and executed by the Java virtual machine per request.

Spring and Spring Boot

What is Spring?

- A java framework that provides infrastructure to create enterprise level applications
- Typically enterprise level application include:
  - An interface
  - Business logic
  - Database
- Spring provides the common code that is common to all such applications so that we can focus on the business logic
- It provides built in dependency injection

What is Spring?

Some definitions

- **POJO** – plain old Java Object – An object that has both attributes and general behaviors. POJO do not:
  - Extend super-classes
  - Implement Interfaces
  - Contain prespecified annotations
- **JavaBean** – POJO with only getters and setters
- **Design Pattern** - a repeatable solution to a commonly occurring problem in software design,
  - it is not a solution, it is the essence of the solution (a general solution)
  - i.e. Factory Pattern, Model-View-Controller Pattern

Spring Framework

Dependency Injection

- **Dependency Injection** – decouples the dependencies as much as possible.
- Consider the RetailItem program:
  - The Main class is tightly coupled with the classes that it must instantiate

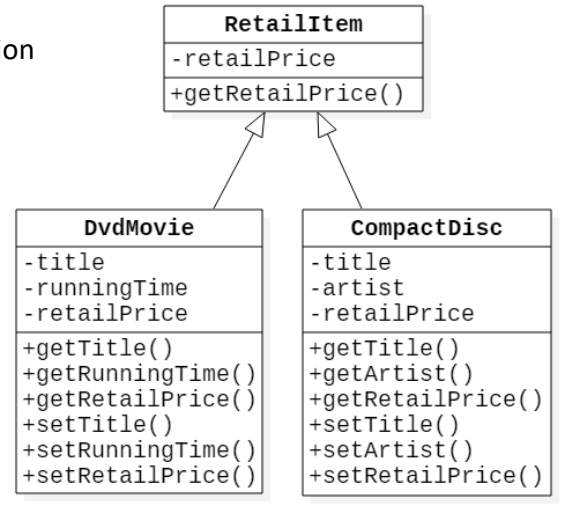
Main class:

```
CompactDisc cd = new CompactDisc();
System.out.print(cd.getRetailPrice());
DvdMovie movie = new DvdMovie();
System.out.print(movie.getRetailPrice());
```

Spring Framework

Dependency Injection

- Using polymorphism
  - Better, but the Main class is still tightly coupled with the classes that it must instantiate



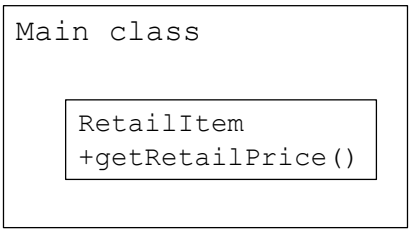
Main class:

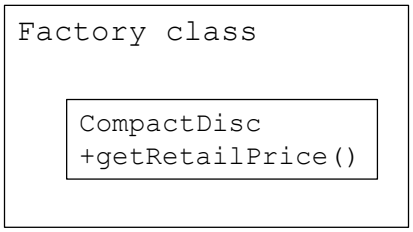
```
ReatilItem cd = new CompactDisc();
showPrice(cd);
ReatilItem movie = new DvdMovie();
showPrice(movie);
```


Spring Framework

Dependency Injection

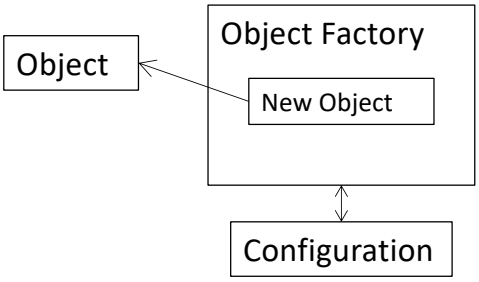
- The dependency of the `RetailItem` class is injected by another class whose job is to instantiate the Object





Spring Framework

- Spring is a container of beans
  - Manages the object creation, destruction, etc.
  - Uses a factory pattern
  - The configuration file for spring is in XML format



What is Spring Boot

- Spring Boot is designed to get you up and running as quickly as possible, with minimal upfront configuration of Spring. Spring Boot takes an opinionated view of building production-ready applications.
- It comes from the term “Spring Bootstrap”
- It helps us skip the configuration part of setting up Spring and allows us to just concentrate on the business logic and not the configurations and dependencies
  - It will give you a production ready application that you can already put onto a server
  - You can add features as you go
  - `application.properties` – allows you to overwrite the Spring XML with your own configuration

MVC Pattern for Web Framework

- MVC – Model View Controller
  - MVC: Server builds full web pages to send to client
  - transmits HTML pages
- RESTful API: Client queries server endpoints for data.
  - transmits JSON objects