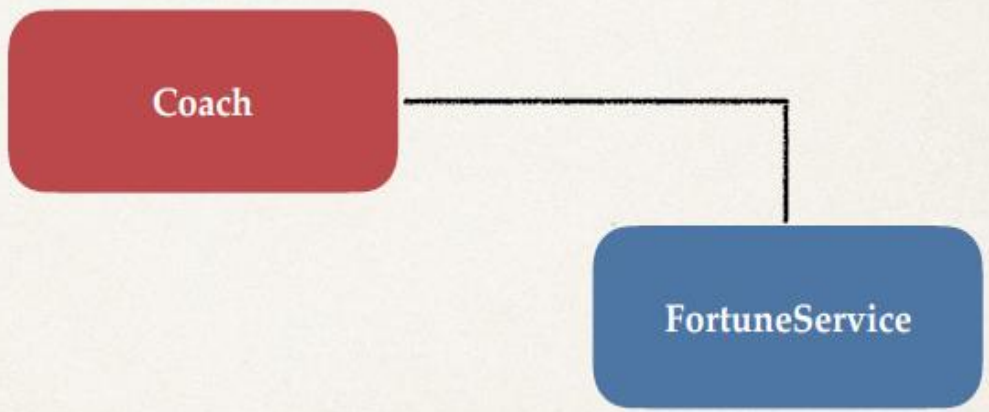
Spring Dependency Injection with Annotations and Autowiring

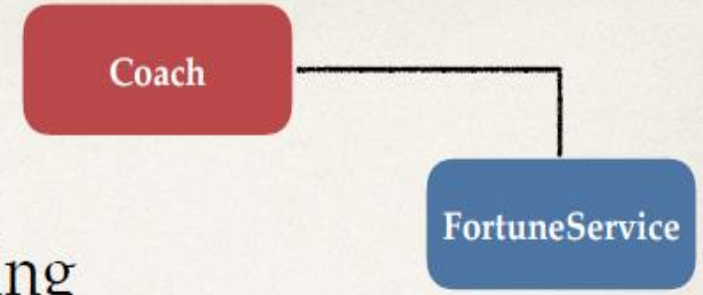
Demo Example

- Our **Coach** already provides daily workouts

- Now will also provide daily fortunes
  - New helper: **FortuneService**
  - This is a *dependency*

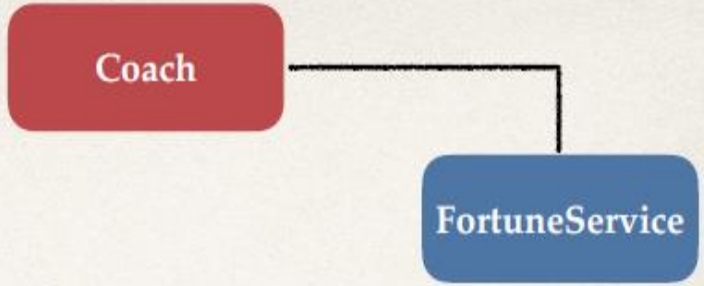


What is Spring AutoWiring?



- For dependency injection, Spring can use auto wiring
- Spring will look for a class that *matches* the property
  - *matches by type*: class or interface
- Spring will inject it automatically … hence it is autowired

Autowiring Example



- Injecting FortuneService into a Coach implementation
- Spring will scan @Components
- Any one implements FortuneService interface???
- If so, let's inject them. For example: *HappyFortuneService*

Autowiring Injection Types

- Constructor Injection
- Setter Injection
- Field Injections

Development Process - Constructor Injection

1. Define the dependency interface and class

2. Create a constructor in your class for injections

3. Configure the dependency injection with **@Autowired** Annotation

Step 1: Define the dependency interface and class

File: FortuneService.java

```
public interface FortuneService {

   public String getFortune();

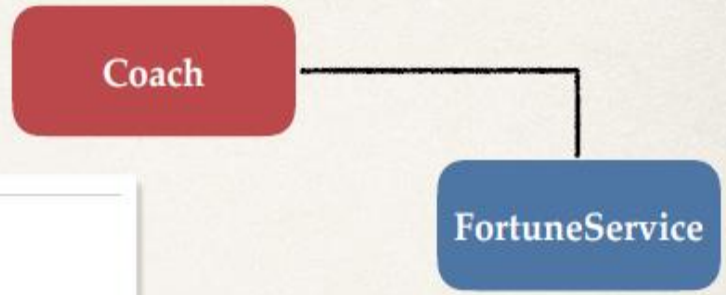
}
```

File: HappyFortuneService.java

```
@Component
public class HappyFortuneService implements FortuneService {

   public String getFortune() {
      return "Today is your lucky day!";
   }
}
```

Step 2: Create a constructor in your class for injections



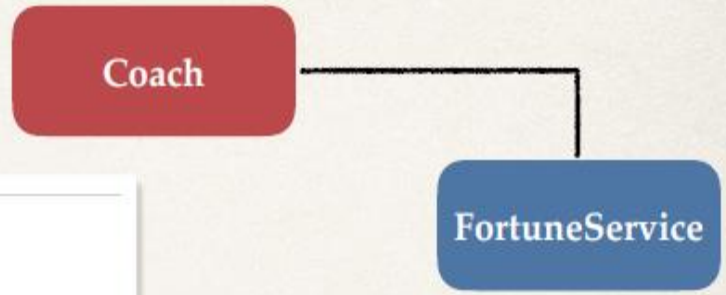
File: TennisCoach.java

```
@Component
public class TennisCoach implements Coach {

   private FortuneService fortuneService;

   public TennisCoach(FortuneService theFortuneService) {
      fortuneService = theFortuneService;
   }
  ...
}
```

Step 2: Create a constructor in your class for injections



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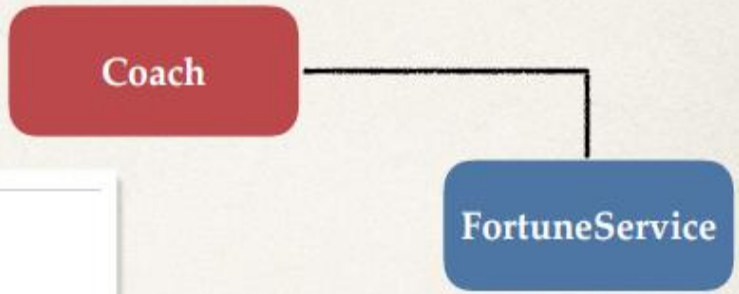
```

Step 3: Configure the dependency injection @Autowired annotation



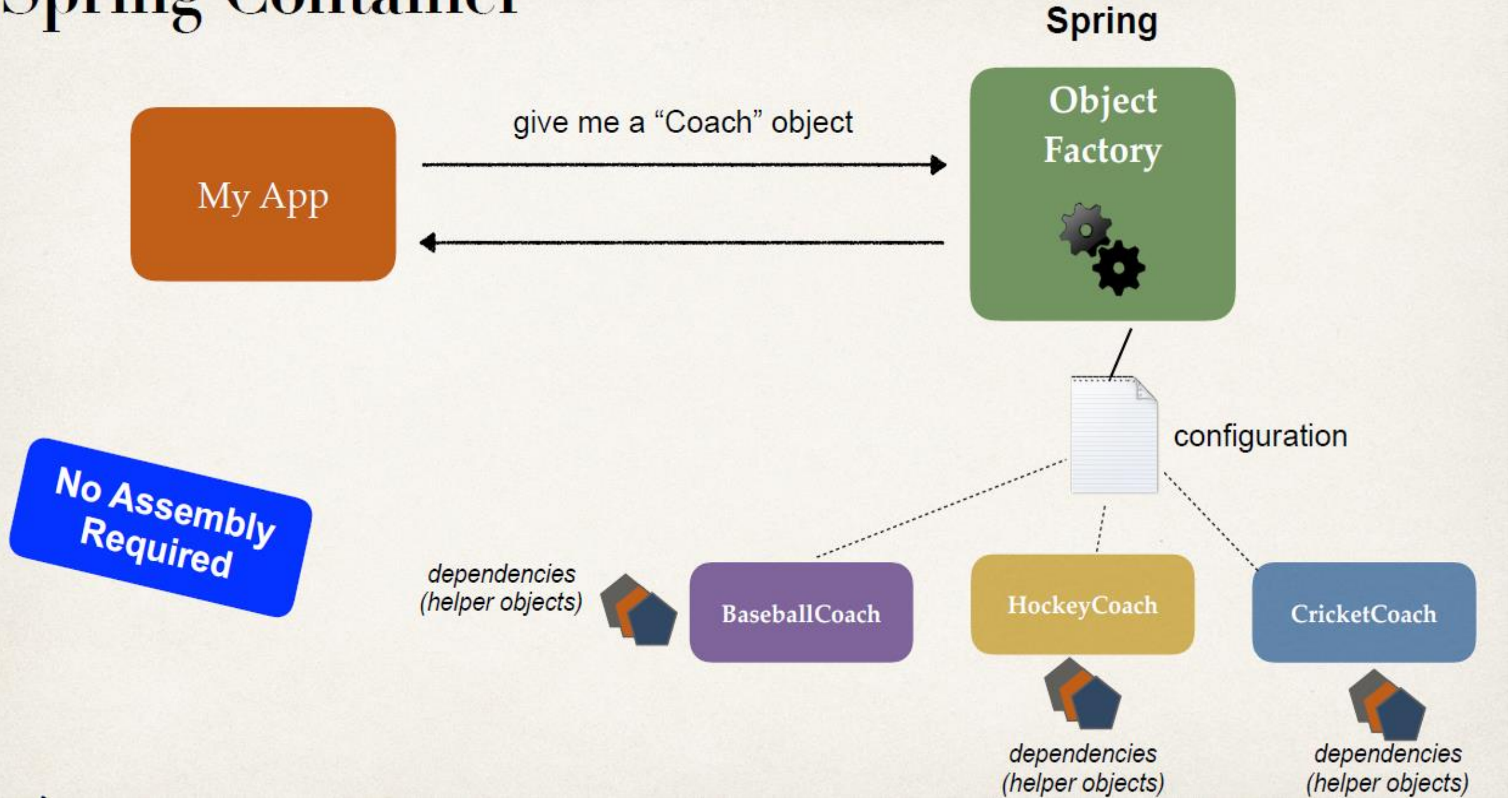
File: TennisCoach.java

```
@Component
public class TennisCoach implements Coach {

   private FortuneService fortuneService;

   @Autowired
  public TennisCoach(FortuneService theFortuneService) {
      fortuneService = theFortuneService;
   }
  ...
}
```

Spring Container



Setter Injection with Annotations and Autowiring

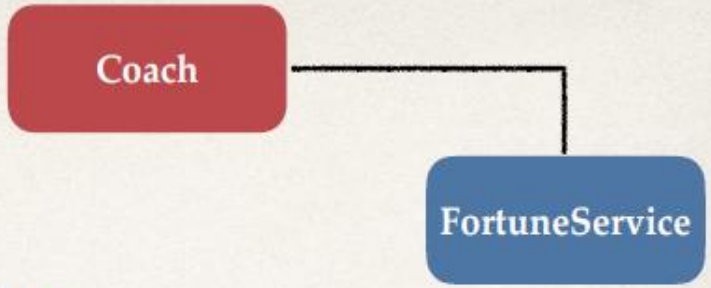
Spring Injection Types

- Constructor Injection
- Setter Injection
- Field Injection

Inject dependencies by calling

setter method(s) on your class

Autowiring Example



- Injecting FortuneService into a Coach implementation
- Spring will scan @Components
- Any one implements FortuneService interface???
- If so, let's inject them. For example: *HappyFortuneService*

Development Process - Setter Injection

1. Create setter method(s) in your class for injections

2. Configure the dependency injection with **@Autowired** Annotation

Setter Injection with Annotations and Autowiring

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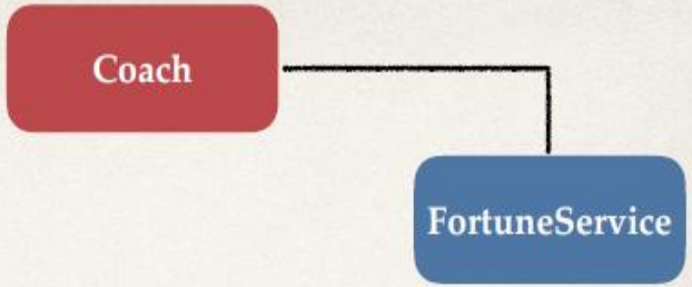
Autowiring Example



- Injecting FortuneService into a Coach implementation
- Spring will scan @Components
- Any one implements FortuneService interface???
- If so, let's inject them. For example: *HappyFortuneService*

Development Process - Setter Injection

1. Create setter method(s) in your class for injections

2. Configure the dependency injection with **@Autowired** Annotation

Step1: Create setter method(s) in your class for injections

File: TennisCoach.java

```
@Component
public class TennisCoach implements Coach {

   private FortuneService fortuneService;

   public TennisCoach() {
   }

   public void setFortuneService(FortuneService fortuneService) {
      this.fortuneService = fortuneService;
   }
  ...
}
```

Step 2: Configure the dependency injection with Autowired Annotation

File: TennisCoach.java

```
@Component
public class TennisCoach implements Coach {

   private FortuneService fortuneService;

   public TennisCoach() {
   }

   @Autowired
   public void setFortuneService(FortuneService fortuneService) {
      this.fortuneService = fortuneService;
   }
  ...
}
```

Step 2: Configure the dependency injection with Autowired Annotation

File: TennisCoach.java

```
@Component
public class TennisCoach implements Coach {

   private FortuneService fortuneService;

   public TennisCoach() {
   }

   @Autowired
   public void setFortuneService(FortuneService fortuneService) {
      this.fortuneService = fortuneService;
   }
  ...
}
```

Inject dependencies by calling

ANY method on your class

Simply give: @Autowired

Step 2: Configure the dependency injection with Autowired Annotation

File: TennisCoach.java

```
@Component
public class TennisCoach implements Coach {

  private FortuneService fortuneService;

  public TennisCoach() {
  }

  @Autowired
  public void doSomeCrazyStuff(FortuneService fortuneService) {
    this.fortuneService = fortuneService;
  }
 ...
}
```

Field Injection with Annotations and Autowiring

Spring Injection Types

- Constructor Injection
- Setter Injection
- Field Injection

Inject dependencies by setting field values on your class directly

(even private fields)

Accomplished by using Java Reflection

Development Process - Field Injection

1. Configure the dependency injection with Autowired Annotation
   - Applied directly to the field
   - No need for setter methods

Step 1: Configure the dependency injection with Autowired Annotation

File: TennisCoach.java

```
public class TennisCoach implements Coach {

   @Autowired
   private FortuneService fortuneService;

   public TennisCoach() {
   }

   // no need for setter methods
  ...
}
```

Spring Injection Types

- Constructor Injection
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Spring Injection Types

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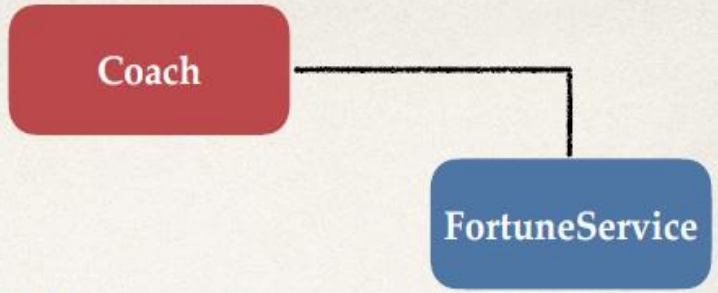
Choose a style

Stay consistent in your project

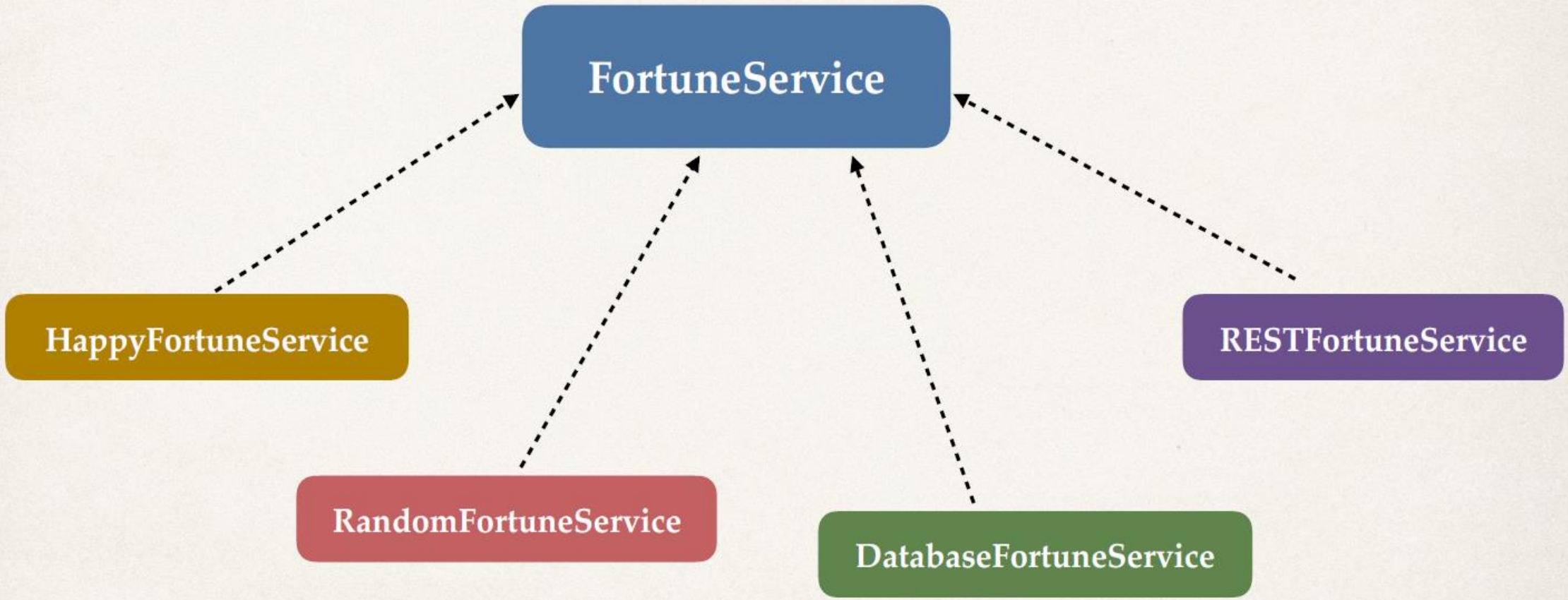
Annotation Autowiring and Qualifiers

Autowiring



- Injecting FortuneService into a Coach implementation
- Spring will scan @Components
- Any one implements FortuneService interface???
- If so, let's inject them … ***oops which one?***

Multiple FortuneService Implementations



Umm, we have a little problem ....

Solution: Be specific! - @Qualifier

```
@Component
public class TennisCoach implements Coach {

  @Autowired
  @Qualifier("happyFortuneService")
  private FortuneService fortuneService;

 ...

}
```

Solution: Be specific! - @Qualifier

```
@Component
public class TennisCoach implements Coach {

  @Autowired
  @Qualifier("happyFortuneService")
  private FortuneService fortuneService;

 ...

}
```

Injection Types

- Can apply **@Qualifier** annotation to
  - Constructor injection
  - Setter injection methods
  - Field injection