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life can develop the spring upon in 3 approaches
                a) Using sociatives etgs (outstated)
                b) using and committee differently:
c) thing some code differently. (See approach)

 b) using xml +annotation driven digs.

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                         instructions to ICC container
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We can develop the spring apps in 3 approaches a) Using xml driven cfgs (outdated) b) using xml +annotation driven cfgs c) Using 100% code driven cfgs (Best approach) b) using xml +annotation driven cfgs => In this approach, we use both xml and annotation cfgs to give inputs and instructions to IOC container Thumb Rule to remember while developing the application in this approach ======== a) Configure user-defined classes as the spring bean using @Component annotation and link them to IOC container by specifying the respective packages in spring bean cfg file using <context:component-scan base-packages=".. sample code ========= package com.nt.sbeans; ."/> @Component("wing">bean id user-defined java class public class Wish MessageGenerator{ @Autowired //field Injection private LocalTime time; as the spring bean class cfg public String showWish Messagge(String user){ //b.logic } applicationContext.xml <br/>
<br/>
deans.....> <context: component-scan base-packages="com.nt.sbeans"/> other entries </beans> b) Configure pre-defined classes the spring beans using <bean> tags in spring bean cfg file applicationContext.xml

<br/>
<br/>
beans..... >

```
// enable the component scanning
<br/><bean id="Itime" class="java.time.LocalTime" factory-method="now"/> </beans>
pre-defined java
class as the spring bean cfg
c) use @Autowired annotation to inject Dependent spring Bean class obj to target spring bean class obj's
HAS-A property
In WishMessageGenerator.java
@Autowired //field Injection private LocalTime time;
d) Create IOC container in the main class either using by giving spring bean cfg file as the input value
eg1:: FileSystemXmlApplicationContext ctx=
note:: =>if @Autowired is placed on the top of filed then it is called Field Injection
=>if @Autowired is placed on the top of setter method then it is called setter Injection
constructor
=>if @Autowired is placed on the top of parameterized then it is called Constructor Injection
FileSystemXmlApplicationContext or ClassPathXmlApplicationContext class
new FileSystemXmlApplicationContext("...../applicationContext.xml");
Example App
IOCProj04-Season FinderApp-DependencyInjection-xml+annotation driven cfgs
JRE System Library [JavaSE-21]
src
com.nt.cfgs
applicationContext.xml
#com.nt.main
> DependencyInjection Test.java #com.nt.sbean$7) finds only
> SeasonFinder.java one class
> Referenced Libraries annotated with
@Component(-) that is
//SeasonFinder.java (target spring bean class)
package com.nt.sbeans;
import java.time.LocalDate;
import org.springframework.beans.factory.annotation.Autowired; import
org.springframework.stereotype.Component;
@Component("sf")
public class SeasonFinder {
com.nt.sbeans.Season Finder
```

```
private LocalDate date; //HAS-A property
public SeasonFinder() {
}
System.out.println("Season Finder:: O-param constructor");
//setter method for setter Injection (alt+shift+s,r)
@Autowired
public void setDate(LocalDate date) {
System.out.println("SeasonFinder.setDate()");
this.date=date:
//b.method (19)
public String findSeason() {
//get current month of the year
int month=date.getMonthValue(); //give 1 to 12
// find the season name
if(month>=3 && month<=6)
return "Summer Season";
else if(month>=7 && month<=11)
return "Rainy Season";
else
return "winter Season"; (20)
applicationContext.xml (5) Checks for <context:Component-scan ..."/> availability. Yes it is available
<?xml version="1.0" encoding="UTF-8"?>
(8) IOC container checks are there any spring beans cfgs
<beans xmIns="http://www.springframework.org/schema/beans"</pre>
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:context="http://www.springframework.org/schema/context"
xsi:schemaLocation="http://www.springframework.org/schema/beans
http://www.springframework.org/schema/beans/spring-beans.xsd
http://www.springframework.org/schema/context
in xml file and finds only one spring bean that is java.time.LocalTime
http://www.springframework.org/schema/context/spring-context.xsd">
(6)
(9)IOC container performs pre-instantation of singleton scope spring beans (default scope) .. In that process
two spring beans are instantiated
```

i)com.nt.sbeans.SeasonFinder

ii) java.time.LocalDate

Collects the package to scan its current package and sub packages for @Component annotation classes

<!-- Configure user-defined class as the Spring bean --> <bean id="Idate" class="java.time.LocalDate" factory-method="now"/>

</beans>

Main class or Client App

\_\_\_\_\_

\_\_\_\_

//DependencyInjectionTest.java

package com.nt.main;

import org.springframework.context.support.FileSystemXmlApplicationContext;

import com.nt.sbeans.SeasonFinder;

public class DependencyInjection Test {

(2)

public static void main(String[] args) {

completion of

//create IOC container

- (1) run the app
- (3) IOC container

**IOC** container

ontainer

creation

(14) FileSystemXmlApplicationContext ctx= creation

(17)

**IOC** container

LocalDate class obj(Idate)

SesonFinder class obj (sf) date:

(#9)

(#9)

JRE/JVM

- (10) The Code related to <context:component-scan package="....."/> activates the code of @Autowired annotation and searches for @Autowired annotation in all the spring beans and finds only for 1 time in Season Finder class on the top of setDate(-) method
- (11) Takes the parameter type of setDate(-) method that is LocalDate and searches for spring bean whose name is LocalDate, since available it takes that object and injects to "date" property SeasonFinder class obj by calling sf.setDate(-) having LocalDate class obj(ldate) as the arg value sf.setDate(ldate); //setter Injection

ctrl+shift+I: Short cut key to get List of Short cut keys

(4) Loading of xml file, checking well-form ness, valid ness and read xml file to prepare InMemory meta of

xml file in the memory where xml file is running // get Target spring bean class obj ref SeasonFinder finder-ctx.getBean("sf",Season Finder.class); //invoke the b.method (18)(21) String result=finder.findSeason(); System.out.println("Seaons name ::"+result); // close the IOC container ctx.close(); (22) In this process }//main }//class (end of the app) **Output Window** ======== all spring bean class objs will destroyed <terminated> DependencyInjection Test (2) [Java Application] D:\Software\eclipse\plugins\orc SeasonFinder:: O-param constructor Restore SeasonFinder.setDate() Seaons name ::winter Season &(13) (12) IOC container keeps the the spring bean class obj refs in the internal cache of the IOC container Internal cache of IOC container (16?) SeasonFinder class obj ref sf **Idate** LocalDate class obj ref bean ids

spring bean class obj refs