

# Basic Spring 4.0

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## Document Revision History

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Date	Revision No.	Author	Summary of Changes
Aug-2012	2.0	Mohan C	Lab book exercises are revamped
June-2013	3.0	Mohan C	Lab book exercises are revamped
June-2015	4.0	Rathnajothi.P	Upgraded from spring version 3 to 4
May-2016	5.0	Vinod Satpute	Revamped as per the integrated ELT TOC
June- 2016	6.0	Vinod Satpute Yukti Valecha Tanmaya Acharya	Modified as per Toc for ELTP

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## Getting Started

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### Overview

This lab book is a guided tour for learning Basic Spring 4.0. It comprises solved examples and 'To Do' assignments. Follow the steps provided in the solved examples and work out the 'To Do' assignments given.

### Setup Checklist for Spring Framework

Here is what is expected on your machine in order for the lab assignments to work.

#### Minimum System Requirements

- Intel Pentium IV or higher
- Microsoft Windows (NT 4.0/XP/2K)
- Memory: 256MB of RAM (512 recommended)
- 500MB hard disk space
- JDK version 1.8 + with help, Netscape or IE
- MS-Access/Connectivity to Oracle database
- Wildfly
- Eclipse Luna
- Spring4.0 API from <https://spring.io/docs>. Download spring-framework-4.0.3.RELEASE-with-docs.zip, which contains the documentation also and unzip it.

#### Creating the first Spring application:

- ✓ Ensure that Java 8 is installed and Eclipse Luna is available.
- ✓ You will need Wildfly server to work with.
- ✓ Unzip the spring-framework-4.0.3.RELEASE-with-docs.zip into any folder.
- ✓ Create a new project in eclipse and name it.

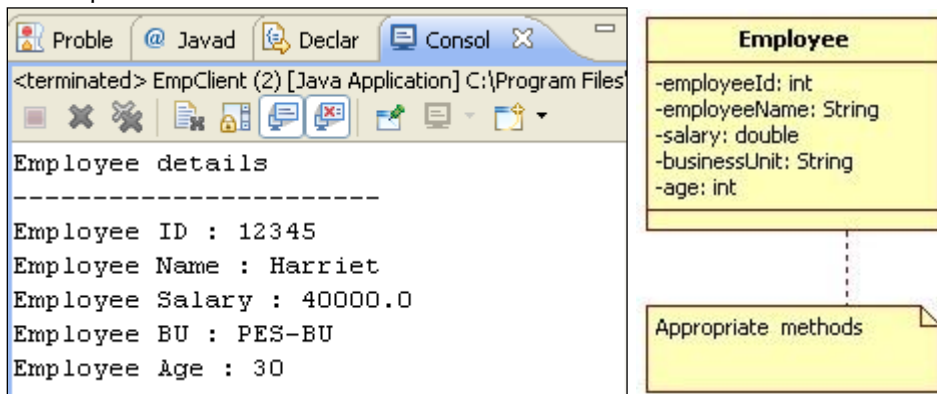
## Lab 1. Injecting dependencies into a Spring application

<b>Goals</b>	<ul style="list-style-type: none"> <li>Using IoC to integrate disparate systems in a loosely coupled manner.</li> </ul>
<b>Time</b>	180 minutes

### Problem statement-1.1: Injecting dependencies

Write an Employee bean. Inject values into bean using DI and display all values. Refer the class diagram below

The output would look as shown below:



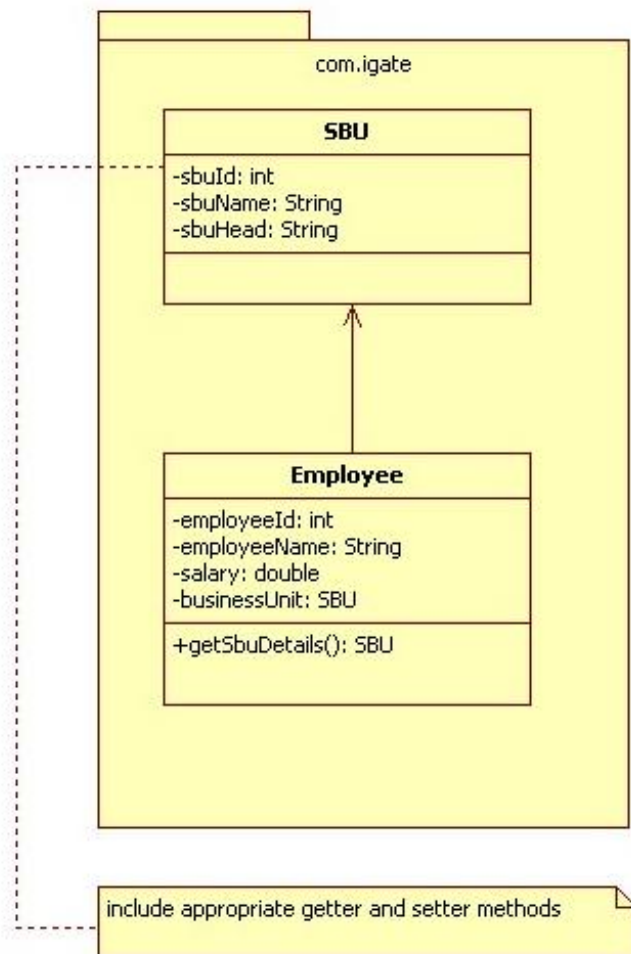
Class Diagram 1: Employee



Keep each of the lab solutions separate, preferably in different packages/source folders

### Problem statement-1.2: Injecting dependencies

Code SBU bean. Revisit the Employee bean and provide a method to retrieve SBU details (`getSBUDetails()`) for the employee. You will need to inject the SBU bean to the Employee bean as shown in the Class diagram below:



Class Diagram 2: SBU and Employee

The output would look as shown below:

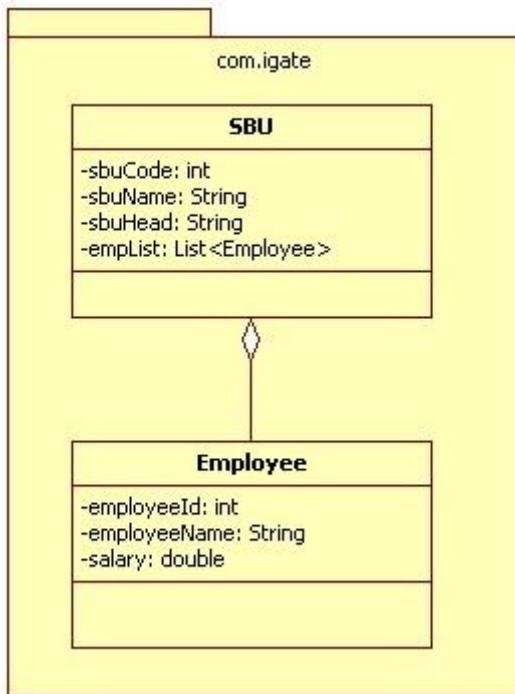
```

<terminated> EmpClient (3) [Java Application] C:\Program Files\Java\jre6\bin\javaw.exe (Feb 20, 2012 4:30:57 PM)
Employee details
-----
Employee [empAge=40, empId=12345, empName=Harriet, empSalary=40000.0
sbu details=SBU [sbuCode=PES-BU, sbuHead=Kiran Rao, sbuName=Product Engineering Services]]

```

### Problem statement-1.3: Injecting dependencies

Revisit the SBU bean. Create a new property called empList which will contain a list of all employees in the PES BU. Display the SBU details, followed by a list of all employees in that BU. To inject employee objects into the SBU bean, use “List” collection. Allocate two employees to PES. Refer Class diagram below



Class Diagram 3: SBU and Employee (Ver -2)

The output would look as shown below:

```

<terminated> EmpClient (4) [Java Application] C:\Program Files\Java\jre6\bin\javaw.exe (Feb 20, 2012 4:53:43 PM)
SBU details
-----
sbuCode=PES-BU, sbuHead=Kiran Rao, sbuName=Product Engineering Services
Employee details:-----
[Employee [empAge=30, empId=12345, empName=Harriet, empSalary=40000.0], Employee [empAge=30, empId=12346
  
```

### Problem statement-1.4: Injecting dependencies

Develop a console based spring application where main method of client class will retrieve employee information from Employee collection and displays info in the console as shown:

#### Input:

Employee ID : 100

#### Output:

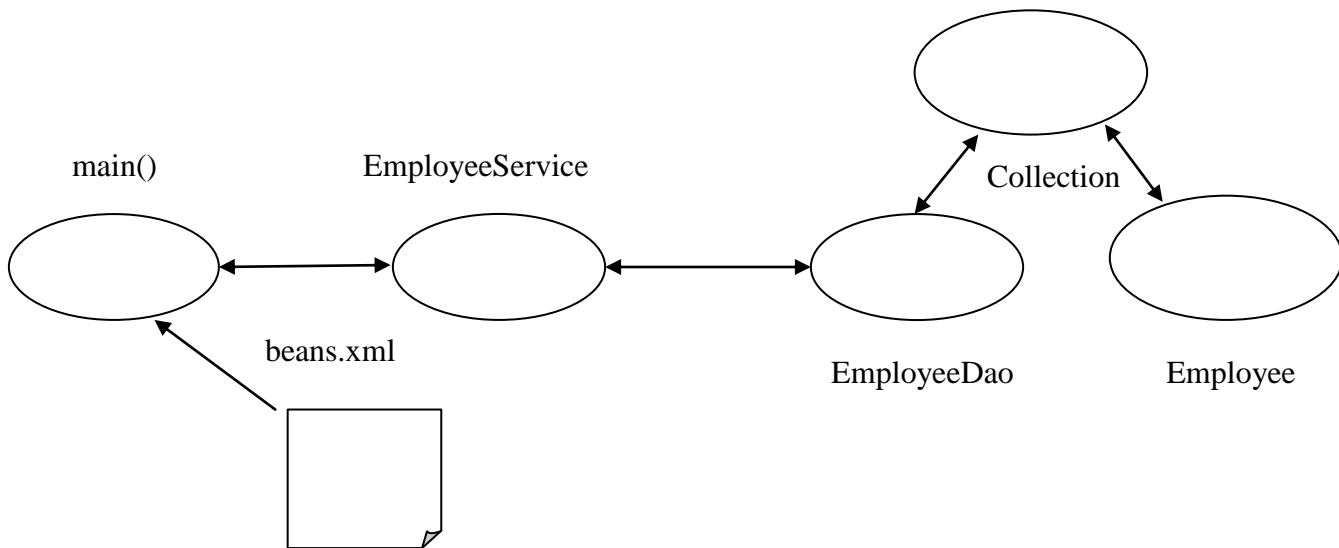
Employee Info:

Employee ID :100

Employee NAME :Rama

Employee SALARY :12345.67

Refer diagram below for implementation details:



Flow Diagram - 1

**Note:** implement above application using

- Setter Injection
- Constructor Injection (use index and type attribute with constructor arg tag)
- Use different bean wiring mechanism like..
  - By Name
  - By Type
  - Auto Wiring

**Change Request:** Now Change the application so that all components are autowired and components are automatically scanned. Use Spring boot API.

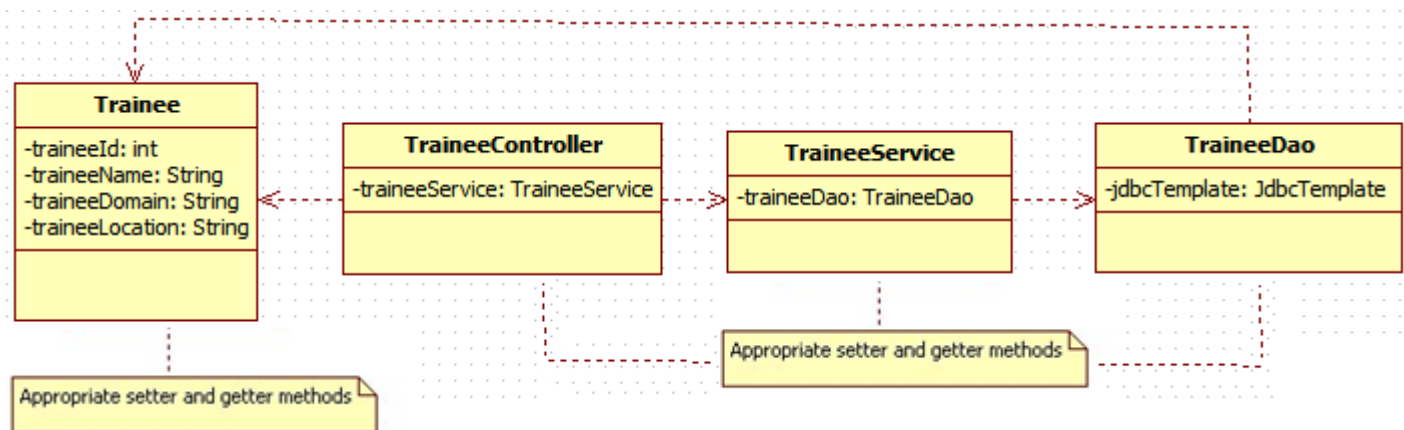


## Lab 2. Spring MVC and JPA

<b>Goals</b>	<ul style="list-style-type: none"> <li>• Demonstrate Spring's MVC framework</li> <li>• Integrate Spring and JPA</li> </ul>
<b>Time</b>	180 minutes

### Version -1:

Develop a Spring MVC based application to manage list of trainees by an admin. Refer the class diagram below to develop required classes.



Class Diagram 4: **Trainee related Classes**

Initially when the application is deployed login page should come up as shown below.

## Login Page

Username

Password

Login

Administrator will enter valid credentials to go to the page shown below.

# Trainee Management System

Pick your operation

[Add a Trainee](#)

[Delete a Trainee](#)

[Modify a Trainee](#)

[Retrieve a Trainee](#)

[Retrieve all Trainees](#)

Admin select add hyperlink to add a new trainee. The following page shows up.

## Enter trainee details

Trainee Id   
Trainee Name   
Trainee Location ☐ Chennai ☐ Bangalore ☐ Pune ☐ Mumbai  
Trainee Domain

After entering trainee details admin will submit, to insert trainee info into database.

If admin selects delete operation refer the following screen shots to design your application.

## Delete Operation

Please enter trainee ID

After entering trainee ID in the same page trainee info will be displayed as shown below

## Delete Operation

Please enter trainee ID

## Trainee Info

Trainee ID	Trainee Name	Trainee Location	Trainee Domain
100	Rama	Mumbai	JEE
<input type="text"/>			<input type="button" value="delete"/>

To implement modify operation on trainee info refer the following list of screen shots.

## Modify Operation

Please enter trainee ID

When admin enters trainee id, in the same page trainee info will be retrieved for modification as shown below in the screen shot

## Modify Operation

Please enter trainee ID

## Trainee Info

Trainee ID	<input type="text" value="100"/>
Trainee Name	<input type="text" value="Rama"/>
Trainee Location	<input type="text" value="Mumbai"/>
Trainee Domain	<input type="text" value="JEE"/>
<input type="button" value="update"/>	

After making appropriate entry admin will click update button to reflect changes in Trainee table.

To implement **retrieve** operation on trainee info, refer the following list of screen shots.

## Retrieve Operation

Please enter trainee ID

When admin enters trainee id, trainee info will be displayed in the same page as shown below in the screen shot.

## Retrieve Operation

Please enter trainee ID

## Trainee Info

Trainee ID	Trainee Name	Trainee Location	Trainee Domain
100	Rama	Mumbai	JEE

Admin selects 'retrieve all' link to retrieve all trainee info as shown below in the screen shot

## Trainees Details

Trainee ID	Trainee Name	Trainee Location	Trainee Domain
100	Rama	Mumbai	JEE
101	John	Mumbai	JEE
102	Aman	Pune	JEE
103	Rehan	Mumbai	.Net
104	Amith	Chennai	Mainframe

**Note:**

1. Perform appropriate validations on each field for all admin operations including login page
2. If any operation fails admin should be redirected to appropriate error page

## Lab 3. Injecting cross-cutting concerns

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Goals	<ul style="list-style-type: none"><li>• Using AOP</li></ul>
Time	30 minutes

### Using spring and AOP

Refer to Trainee Management System created in the previous lab, implement logging using spring AOP. Logging should take care recording all the admin operations with the timestamp.

Ex: If admin executes inserting new trainee record into database, the logging should log that info in a file called adminoperations.log as shown below:

2013-05-28 09:04:39 INFO Admin executed Add Trainee operation.

## Appendices

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