**Middleware Architectures**

**Lab 4 – Enterprise Java Beans**

**You may download the Netbeans installation file from the link on the VLE.**

1. Set up the NewsApp J2EE application on Netbeans. This application is based on the following tutorial.

<https://netbeans.org/kb/docs/javaee/javaee-entapp-ejb.html>

1. You may download the attached zip file and extract and open it with Netbeans. Run the application (if the browser does not open automatically, copy and paste the browser link from the output windows in the browser windows).

3. Add a new callback *@PostConstruct* method to the NewsEntityFacacde Stateless session bean and add code to print some code inside that method. Run the JEE application to see whether the line is printed. When is this method called? Who is calling this method?

4. Now create a new entity bean called *NewsEntity2* and copy the contents of *NewsEntity* class. You may have to rename the constructor name and any other place where the old class name is used.

5. Add a *java.util.Date* property to the *NewsEntity2* entity bean to store the date. Add get and set methods for this new property.

Note: Make sure to put the annotation *@Temporal(TemporalType.TIMESTAMP)* on top of the date field. You may have to import the following classes to this new entity bean. Your session bean may now access the new entity bean.

*import javax.persistence.Temporal;*

*import javax.persistence.TemporalType;*

6. Create a new session bean called *NewsEntityFacade2* and copy the contents of *NewsEntityFacade* bean into it. You may have to rename the constructor and any other place where the old class name is used.

7. Change the *ListNews* servlet to show the updated date in the news list. You may now use NewsEntity2 instead of *NewsEntity* in this servlet.

8. Change the *PostMessage* servlet to set the current date to the message sent to the message queue to save a new news item. You may now use *NewsEntity2* instead of *NewsEntity* in this servlet.

9. Build the enterprise application again. Deploy again and run it. Now you should see the news items with the date. When you add a new news item, the date should be displayed.

Now we’ll do some modifications to the session bean. We’ll add a method to sort the news items in the descending order based on time.

10. Add a new method called *findAllSortedDesc* to sort news items in the descending order (newest items first) and modify the original *findAll* method to sort the NewsEntity2 objects in the descending order.

Hint: You may need to implement the *Comparator* interface and override the *compareTo* and *compare* methods to sort a particular object in Java. You may need an additional class that implements the *Comparator* interface.

Refer: <https://www.geeksforgeeks.org/comparator-interface-java/>

11. Change the *ListNews* servlet to call the *findAllSortedDesc* method. Now when you run the application the news items should appear in the descending order based on time (newest item first).

**Submission:**

Zip the modified code and the answer to the task 3 in a readme file as a single zip file and upload to the VLE link. The name of the zip file should be your index number.