# Lab 4.1 – Using JPA
Part 1

- From your Lab setup directory for this lab
  - Replace the Student class in your project with the JPA annotated class of Student that you will find there. It has the mapping annotations there already to map to the student table in our database
  - Copy the resources.xml file under your WEB-INF directory. This defines the Datasource Tomee style
  - Copy the persistence.xml file AND persistence_2.0.xsd in the setup directory under your WebContent/META-INF directory. These are JPA specific files used to create the EntityManagerFactory, point to the dataSource defined in resources.xml and list our Entities are i.e. Student
  - We also have a new home.jsp we page for you as well. Replace the one in your project with this
  - We also have to place the derbyClient jar under the WEB-INF/lib directory of your project.
  - You get this from the StudentWork/setup/Derby/lib directory

Update Project Structure
Your project Should now look like this
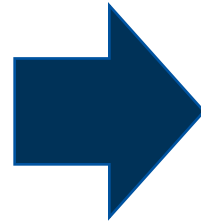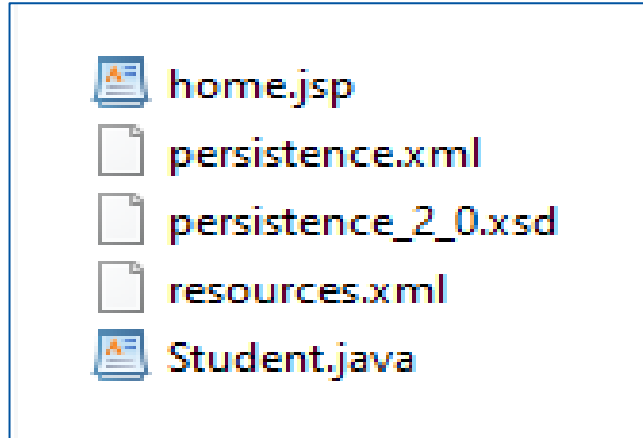
- JPA requires the file persistence.xml, we have also provided the schema (xsd) for that file

- The file persistence.xml references a DataSource defined in resources.xml

- Our Student class is now a JPA Entity, listed in persistence.xml
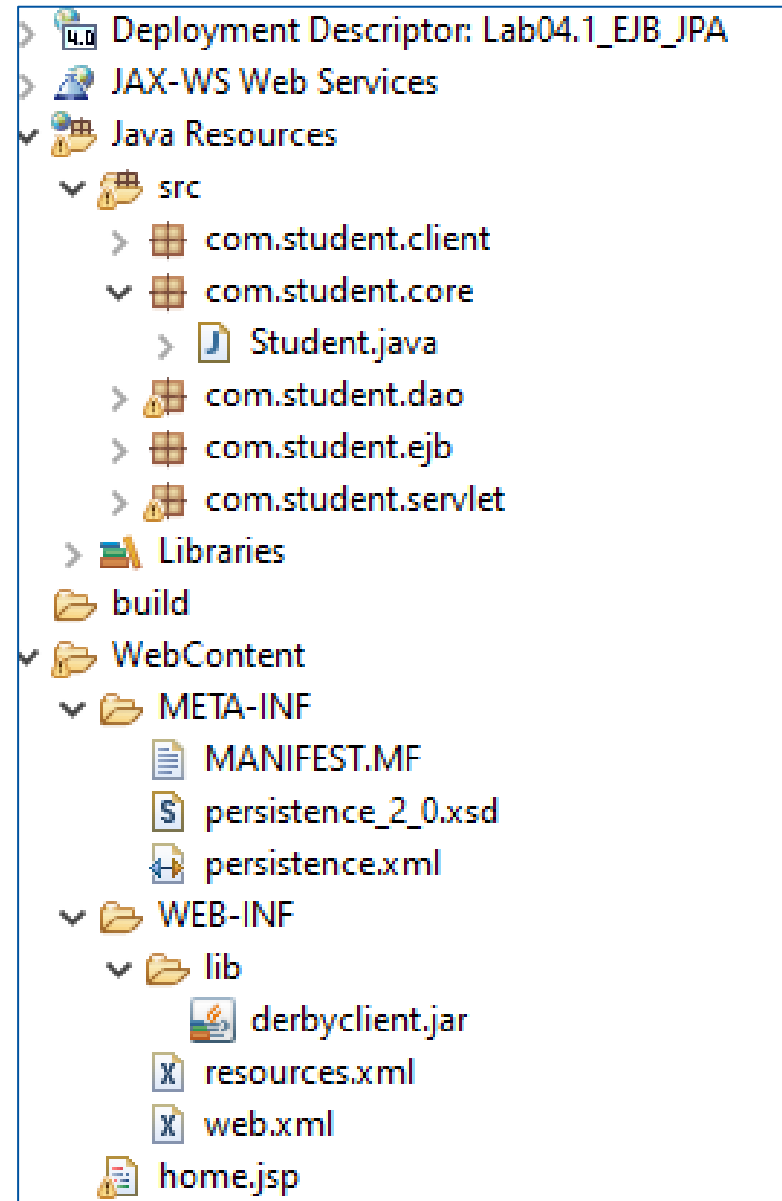
Delegate to the EntityManager
Part 2

- In StudentDaoBean we are to comment out the map of students and replace the methods that interact with it with new implementations

- Inject in the EntityManager configured via persistence.xml and resource.xml. The unit name is from persistence.xml

```
@PersistenceContext(unitName = "student")
private EntityManager em;
```

- In each of the beans business methods you must now use the injected EntityManager to retrieve a single student, getAll Students or add Students
  - Get one Student -> return em.find(Student.class, id);
  - Get all Students -> return em.createQuery("SELECT s FROM Student s").getResultList();
  - Add a Student ->
    - ❑ student.setFees(100.00);
    - ❑ em.persist(student);
    - ❑ This method generates a key from the IDENTITY Column of the students Id property, meaning that the derby database will take care of this

Time to Test

- Restart your server

- Launch your project by selecting the root node of the project->right click->Run on server and a browser will open to home.jsp

- Make sure your derby server is RUNNING, Select a student, this is now going through your StudentDaoBean to the EntityManager and the Database

Student Search

Enter Student Id: [1 v]
[Get Student]

[Get All Students]

Add New Student To Admissions WaitList

FirstName: [_____]

LastName: [_____]

Department: [_____]

[Add]
Empty WaitList

Student Search

Enter Student Id: [1 v]
[Get Student]
5:Ester Freeman
Department: French
Fees: $135.5

Get All Students from the database

- Now test get all the students

- Again, this is using the EntityManager to interact with your DataBase
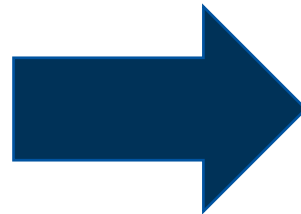
- Add a Student to the sessionScope StudentWaitListBean

Student Search

Enter Student Id: [1 ▾]
[Get Student]

[Get All Students]

1	Eric	Colbert	Chemistry	$150.0
2	Stephen	Cheadle	Physiscs	$150.0
3	Anne	Mouvier	Chemistry	$150.0
4	Amy	Hilbert	French	$135.5
5	Ester	Freeman	French	$135.5
6	Paul	Cruthers	Biology	$145.0
7	Brian	Duvall	Physics	$150.0
8	Charles	Simpson	English	$125.0
9	Susan	Dee	Spanish	$100.0
10	Fred	Flintstonde	Construction	$100.0

Add New Student To Admissions WaitList

FirstName: `Barney`

LastName: `Rubble`

Department: `Engineering`

[Add]
Empty WaitList

Add New Student To Admissions WaitList

FirstName: [   ]

LastName: [   ]

Department: [   ]

[Add]

Barney	Rubble	Engineering

Empty WaitList

Is the Waitlist really session scoped?

- Empty the Waitlist

- Now get All Students. Your new Student is there, because the add method in StudentDaoBean used the EntityMamnager to add the Student to the Database

- Add another student to the waitlist

- The Waitlist only has the new Student on it. Why?

- Because it is SessionScoped and we are now using a new instance of StudentWaitListDaoBean tied to a new HttpSession

Get All Students				
1	Eric	Colbert	Chemistry	$150.0
2	Stephen	Cheadle	Physiscs	$150.0
3	Anne	Mouvier	Chemistry	$150.0
4	Amy	Hilbert	French	$135.5
5	Ester	Freeman	French	$135.5
6	Paul	Cruthers	Biology	$145.0
7	Brian	Duvall	Physics	$150.0
8	Charles	Simpson	English	$125.0
9	Susan	Dee	Spanish	$100.0
10	Fred	Flintstonde	Construction	$100.0
11	Barney	Rubble	Engineering	$100.0

Add New Student To Admissions WaitList

FirstName:

LastName:

Department:

Add
Empty WaitList

Add New Student To Admissions WaitList

FirstName:

LastName:

Department:

Add

Fred	Flintstone	Engineering

Empty WaitList