



UML Diagrams

Objectives

After completing this lab, you will be able to:

- ▶ Import a UML model
- ▶ Draw an activity diagram
- ▶ Draw a sequence diagram
- ▶ Populate a class diagram

Given

The following lab artifact can be found in the `RSALabs` folder:


- ▶ Payroll application design and use-case models (`ACMEPayrollModel.zip`)

Scenario

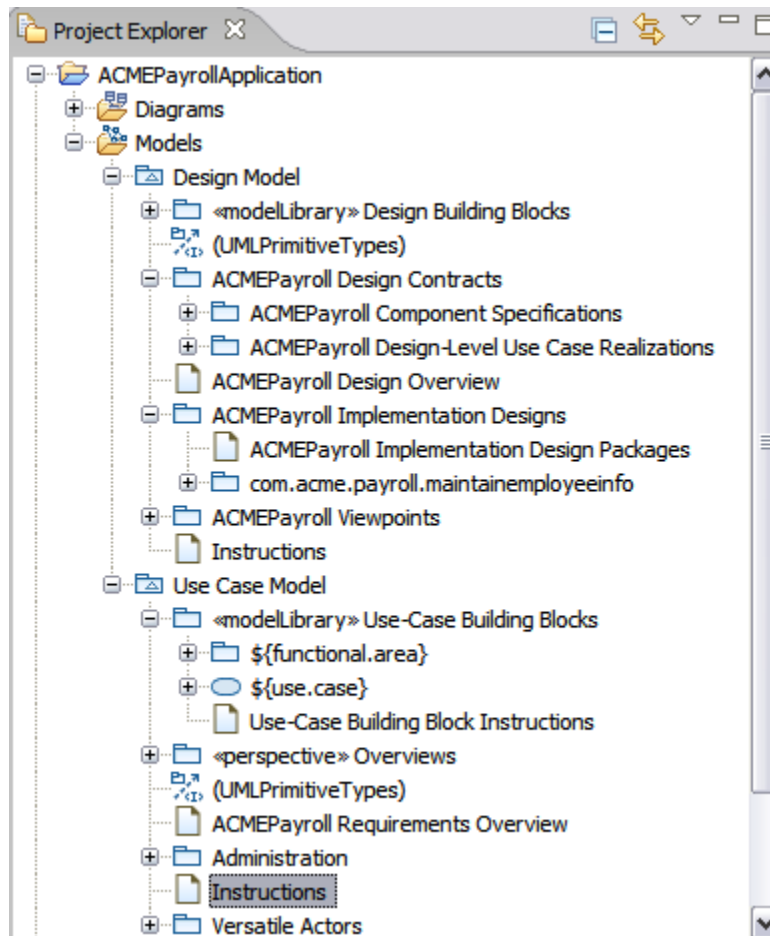
In this lab, you will create various diagrams in the Payroll application use-case and design models.

Task 1: Import the Payroll Application Project

In this task, you will import the payroll application project saved in Project Interchange format. The Project Interchange feature provides import and export wizards for sharing a set of projects easily in one step.


1. Ensure you are in the **Modeling** perspective
2. On the **File** menu, select **Import...**
3. In the list box, select **Other->Project Interchange**  **Project Interchange** as the import source and then click **Next**
4. Beside the **From zip file:** field, click the **Browse...** button and find `ACMEPayrollModel.zip` in the `RSALabs` folder. Select the file and click **Open**
5. Checkmark **ACMEPayrollApplication** in the list

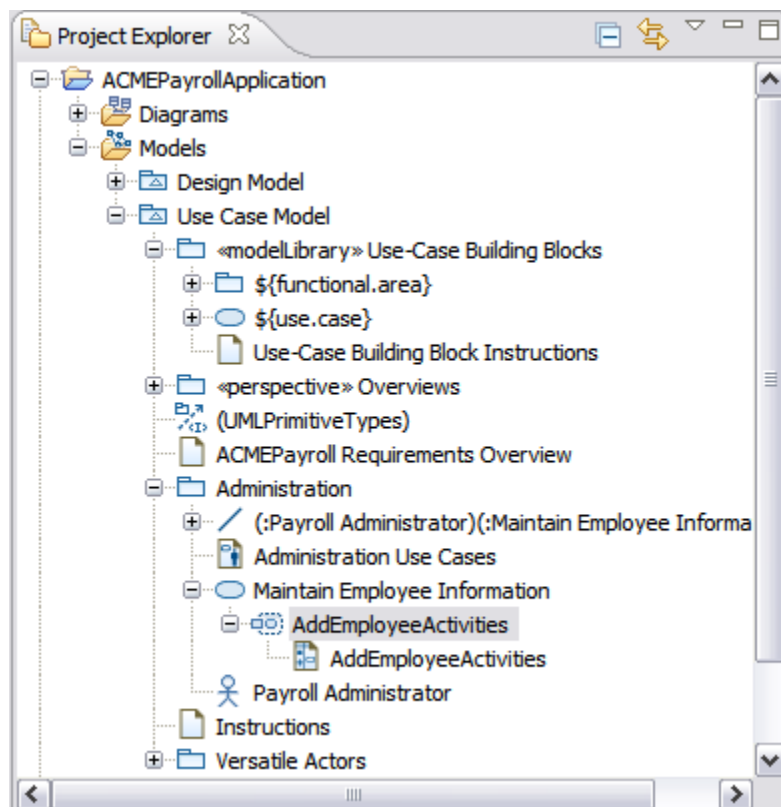
6. Click **Finish**
7. Under the **Models** folder, double-click both **Design Model** and **Use Case Model** and explore the imported project in the **Project Explorer** view



Task 2: Create an Activity Diagram

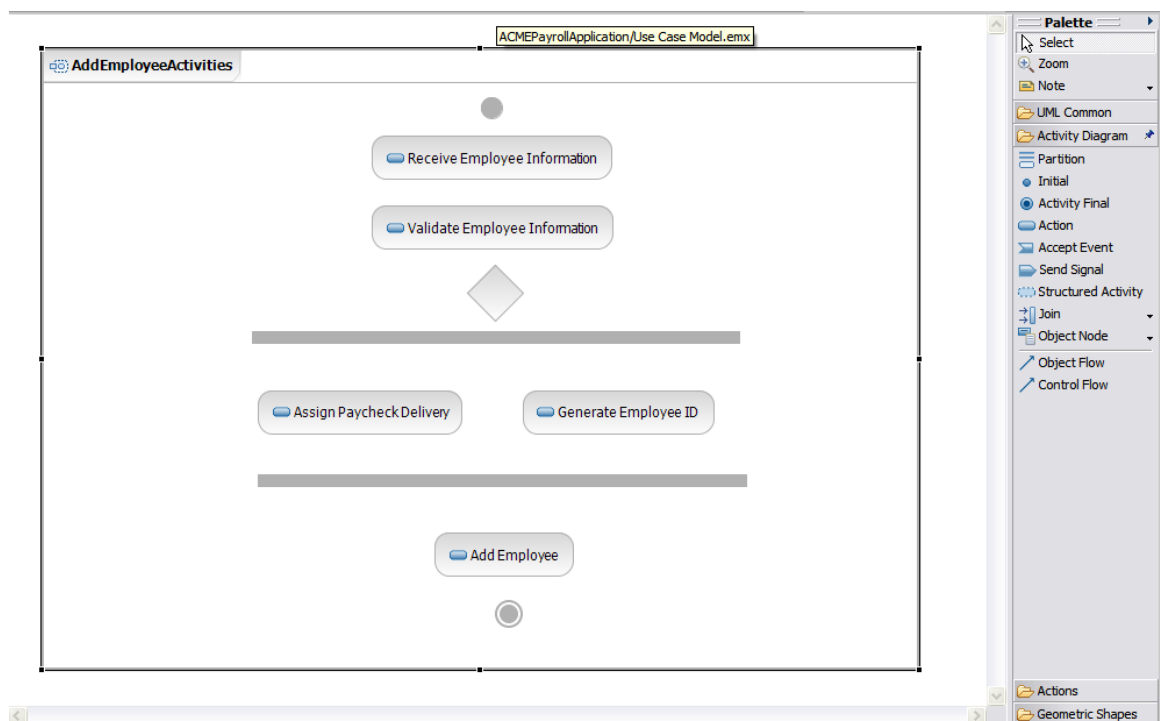
In this task, you will create an activity diagram in the ACMEPayrollApplication project to illustrate the flow in a use case.

1. In the **Project Explorer** view, expand the **Administration** package in the **Use Case Model**
2. Right-click the  **Maintain Employee Information** use-case and select **Add Diagram > Activity Diagram**
3. Name both the activity and the diagram `AddEmployeeActivities`

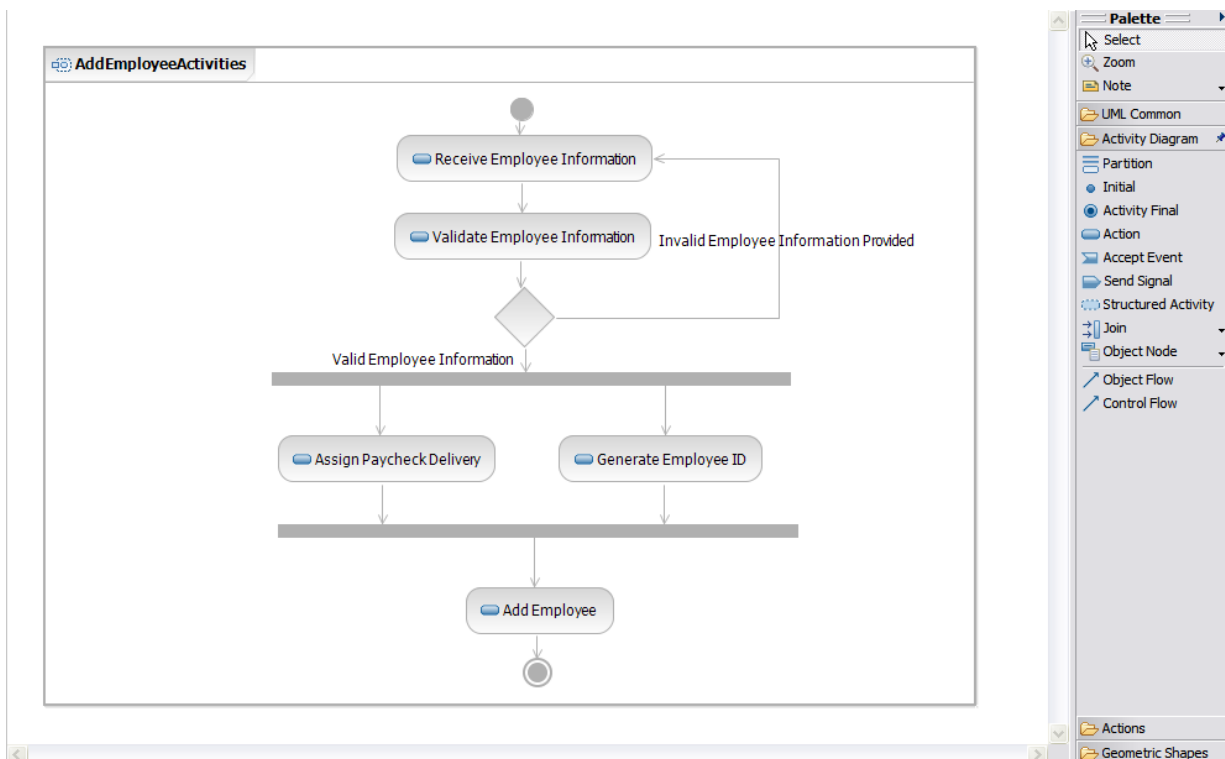


4. The activity diagram will be open in the Diagram editor
5. Use the **Palette** (right of the editor) to add the following nodes from top to bottom down the diagram:

- a. An **Initial** node with no name
 - b. An **Action** node named `Receive Employee Information`
 - c. An **Action** node named `Validate Employee Information`
 - d. A **Decision** node (which is a type of **Control** node) with no name
 - e. A **Fork** node (also a type of **Control** node) (size appropriately) with no name
 - f. An **Action** node named `Assign Paycheck Delivery`
 - g. An **Action** node named `Generate Employee ID`
 - h. A **Join** node (size appropriately) with no name
 - i. An **Action** node named `Add Employee`
 - j. An **Activity Final** node with no name
6. Arrange the nodes as shown below:

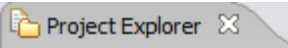


7. Use the **Palette** view to add the following flow relationships; only provide names where indicated:
- k. A **Control Flow** from the **Initial** node to the **Receive Employee Information** action
 - l. A **Control Flow** from the **Receive Employee Information** action to the **Validate Employee Information** action
 - m. A **Control Flow** from the **Validate Employee Information** action to the **Decision** node
 - n. A **Control Flow** from the **Decision** node to the **Receive Employee Information** action named `Invalid Information Provided` (you will need to adjust the line to route around the **Validate Employee Information** action)
 - o. A **Control Flow** from the **Decision** node to the **Fork** node named `Valid Employee Information`
 - p. A **Control Flow** from the **Fork** node to the **Assign Paycheck Delivery** action
 - q. A **Control Flow** from the **Fork** node to the **Generate Employee ID** action
 - r. A **Control Flow** from the **Assign Paycheck Delivery** action to the **Join** node
 - s. A **Control Flow** from the **Generate Employee ID** action to the **Join** node
 - t. A **Control Flow** from the **Join** node to the **Add Employee** action
 - u. A **Control Flow** from the **Add Employee** action to the **Activity Final** node
 - v. Ensure your diagram looks similar to this one:

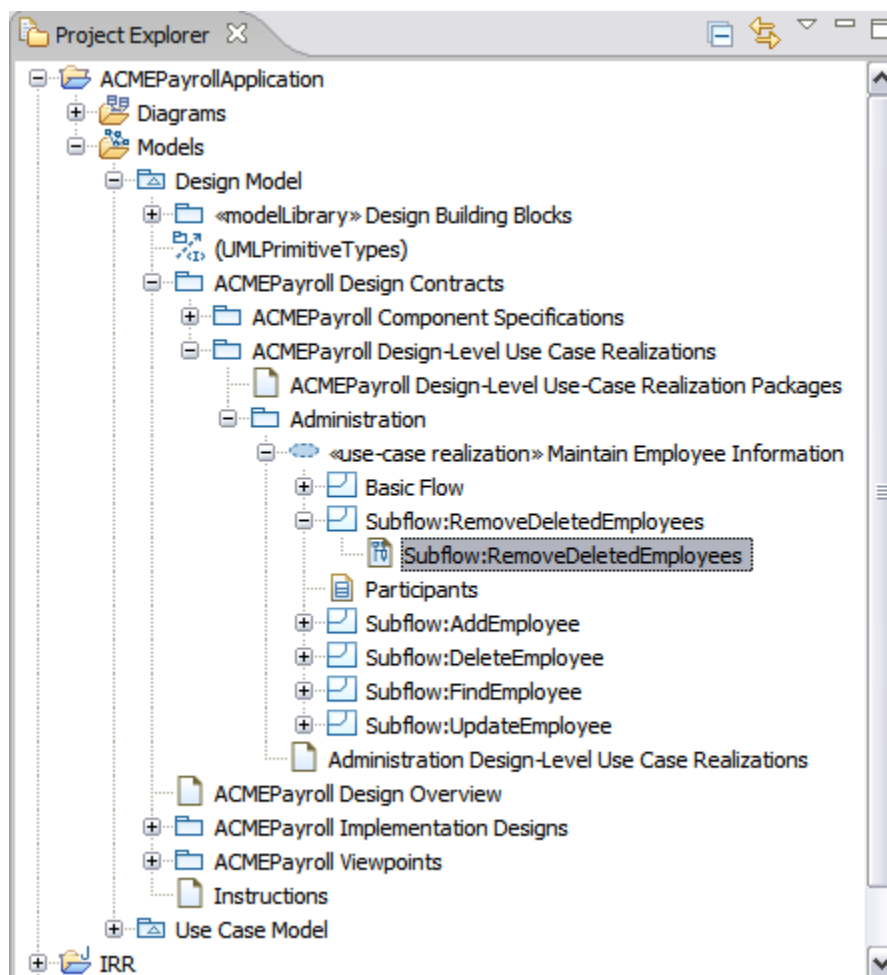


Task 3: Create a Sequence Diagram

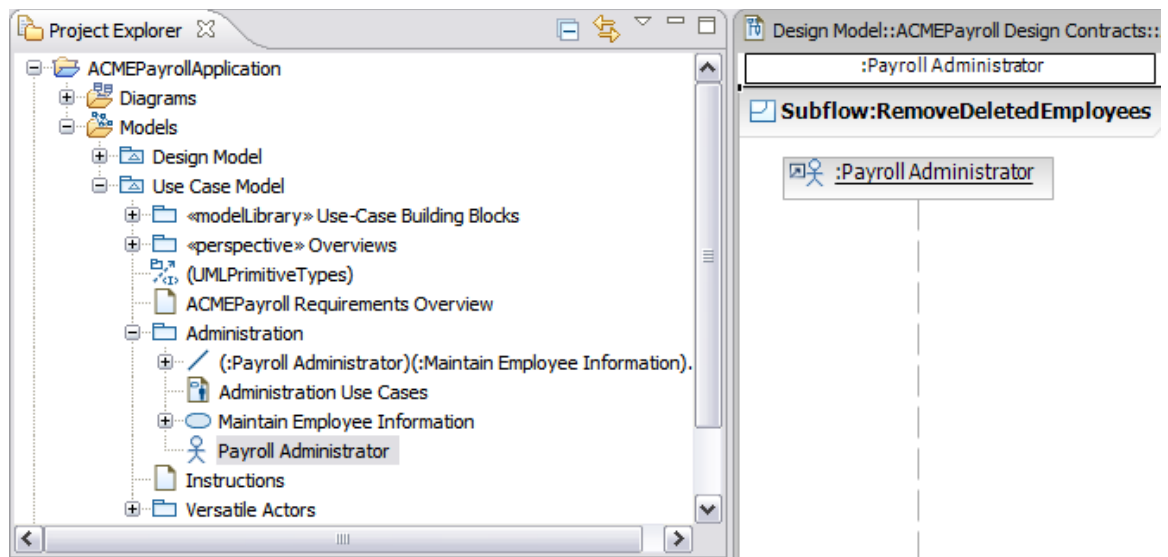
In this task, you will draw a sequence diagram for the RemoveDeletedEmployees flow as part of the Maintain Employee Information use-case realization.

1. In the **Project Explorer**  view, expand **Models->Design Model > ACMEPayroll Design Contracts > ACMEPayroll Design-Level Use Case Realizations > Administration**
2. Right-click **<<use-case realization>> Maintain Employee Information** and select **Add Diagram > Sequence Diagram**

3. Name both the interaction and the diagram `Subflow:RemoveDeletedEmployees`

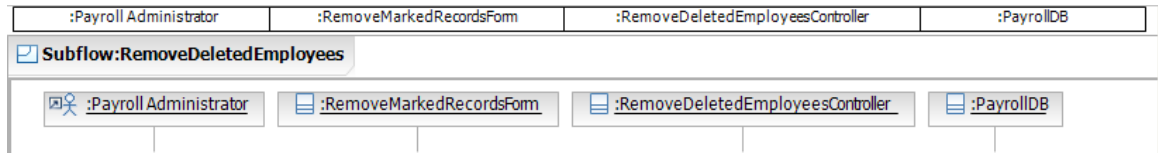


4. In the **Use Case Model**, navigate to the **Administration** package, drag the **Payroll Administrator** actor, and drop it on the sequence diagram. Press **F2**, then **Delete**, then **Enter** to remove the auto-assigned name of `payrolladminstrator`.

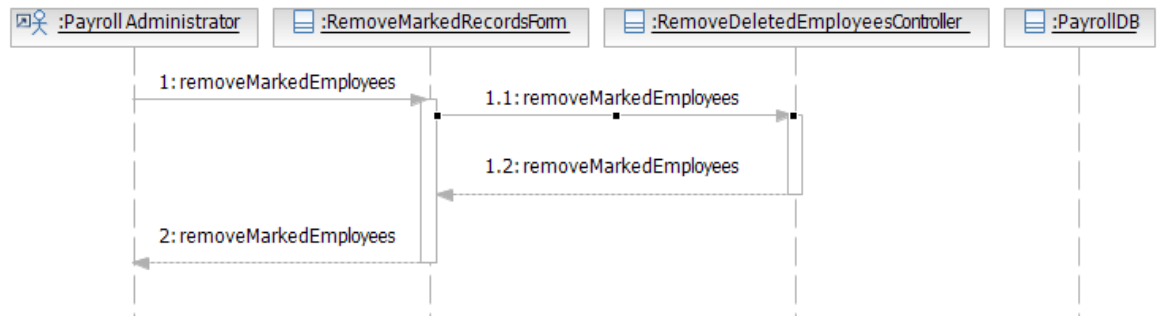


5. On the **Palette**, select the **Sequence Diagram** drawer, select the **Lifeline** tool, and click on the diagram. Select **Create New Class**. Enter `RemoveMarkedRecordsForm` for the new class and click **OK**. When prompted for a name for the element, press **Delete** and then **Enter**.
6. Follow the above procedure to add two additional unnamed classes to the diagram:
 - a. `RemoveDeletedEmployeesController`
 - b. `PayrollDB`

7. You should now see this:

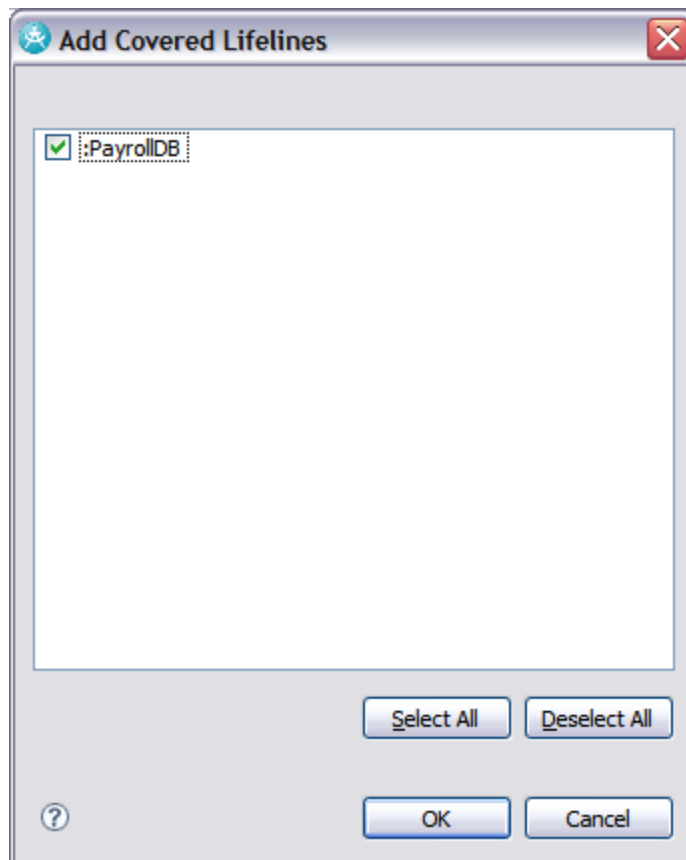


8. In the **Sequence Diagram** drawer, select the **Synchronous Message** tool, click on the **Payroll Administrator** lifeline and drag it to the **RemoveMarkedRecordsForm** lifeline and release. Name the operation `removeMarkedEmployees` and click **OK**.
9. Repeat the steps to create the `removeMarkedEmployees` message from the **RemoveMarkedRecordsForm** lifeline to the **RemoveDeletedEmployeesController** object. Ensure that the message starts from the current execution occurrence on the **RemoveMarkedRecordsForm** lifeline

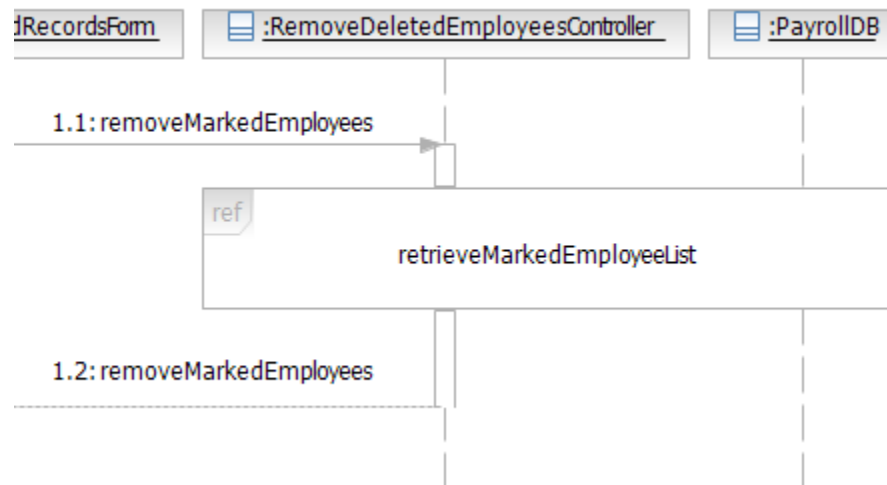


10. From the Palette, click **Interaction Occurrence**
11. Click on the execution occurrence on the **RemoveDeletedEmployeesController** lifeline
12. Select **Create New Interaction** and name it `retrieveMarkedEmployeeList`

13. Resize the Interaction Occurrence box to span the **PayrollIDB** lifeline; select **:PayrollIDB** in the **Add Covered Lifelines** dialog and click **OK**.

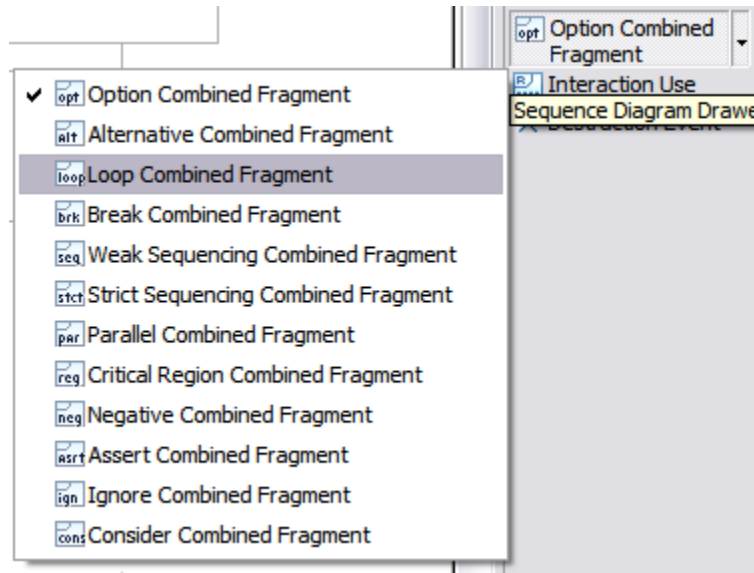


14. The retrieveMarkedEmployeeList interaction occurrence will look like this:



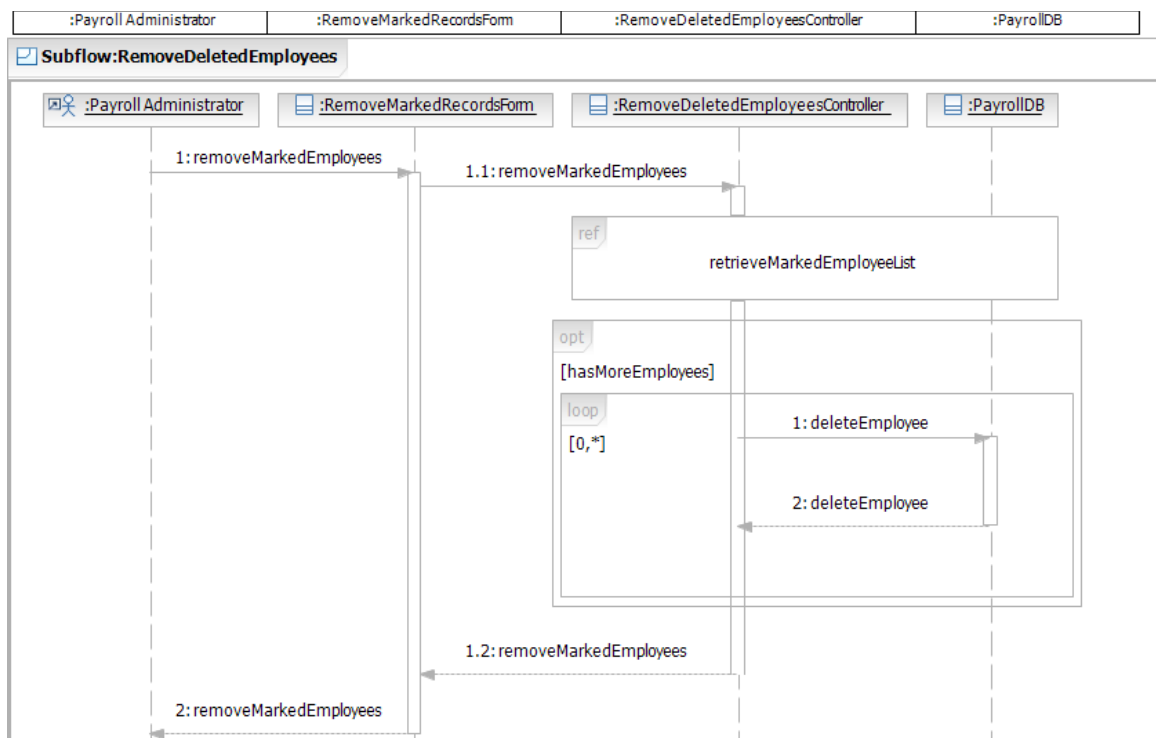
15. From the **Palette**, select **Option Combined Fragment**
16. Click on the execution occurrence on the **RemoveDeletedEmployeesController** lifeline just below the interaction occurrence that was placed previously
17. Type `hasMoreEmployees` as the guard condition
18. Resize the Option Combined Fragment box to span the **PayrollIDB** lifeline; select **:PayrollIDB** in the **Add Covered Lifelines** dialog and click **OK**.

19. From the **Palette**, click the arrow beside the **Option Combined Fragment** tool and select **Loop Combined Fragment**



20. Click on the execution occurrence for `RemoveDeletedEmployeeController` within the area of the Option Combined Fragment placed previously
21. Click **Enter** to accept the default parameters of `0,*`
22. Resize the Loop Combined Fragment box to span the **PayrollIDB** lifeline; select **:PayrollIDB** in the **Add Covered Lifelines** dialog and click **OK**.
23. Within the Loop Combined Fragment, create the `deleteEmployee` synchronous message from **RemoveDeletedEmployeesController** lifeline to the **PayrollIDB** lifeline

24. Whew! After all of that, your sequence diagram should look like this:

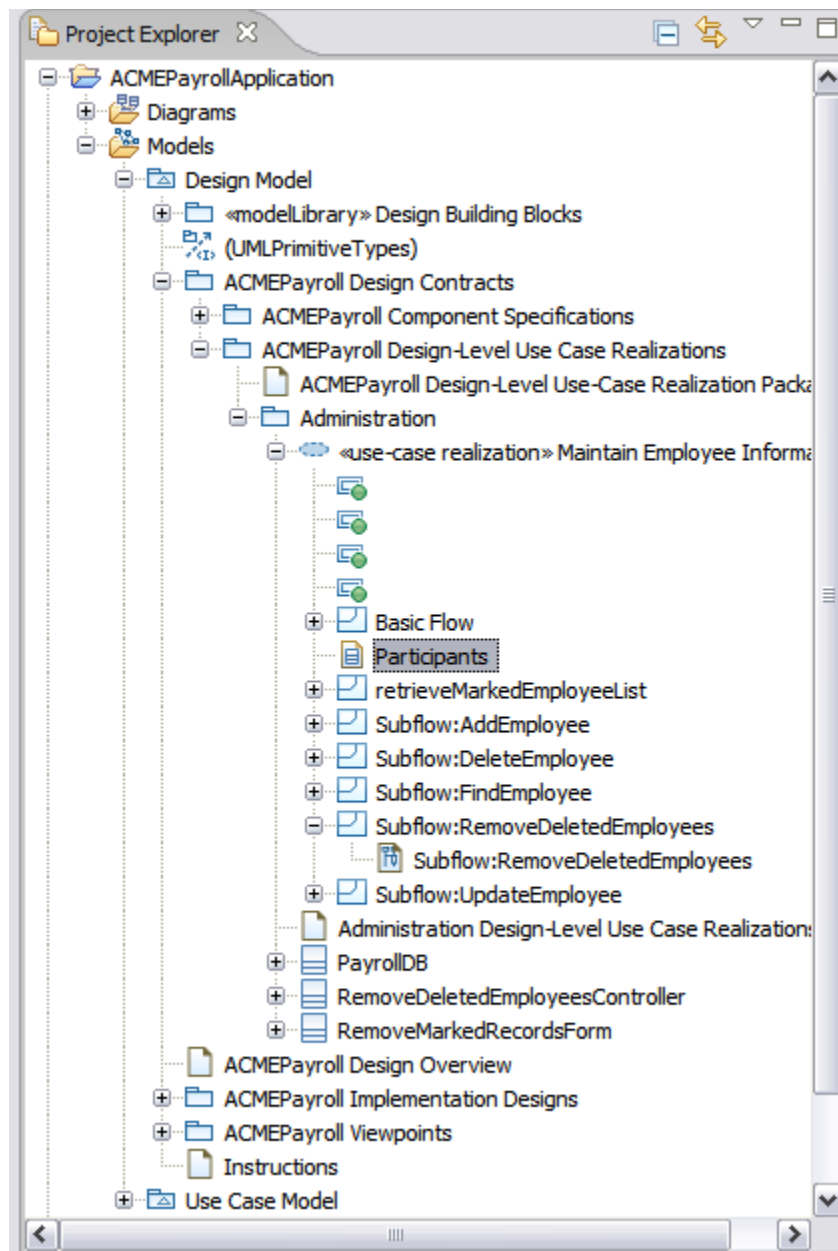


Task 4: Populate a Class Diagram

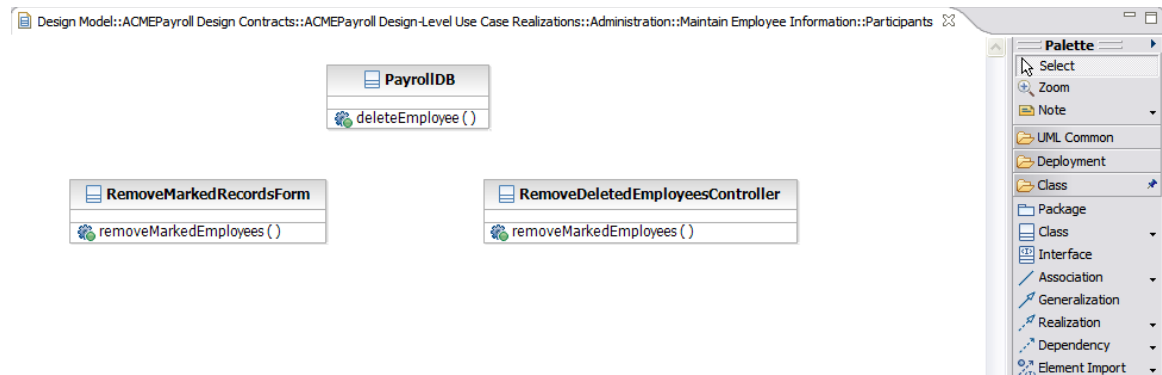
In this task, you will create a class diagram that shows the classes that participate in the use-case realization.

1. Open the **Participants** diagram found under the **Models->Design Model->ACMEPayroll Design Contracts->ACMEPayroll Design-Level Use Case Realizations->Administration-><<use-case realization>> Maintain Employee**

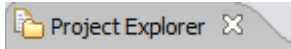
Information node by double-clicking on it



- From the **Project Explorer** view, drag the following classes onto the diagram:
 - PayrollIDB
 - RemoveMarkedRecordsForm
 - RemoveDeletedEmployeesController
- The diagram should look like this:



Task 5: Close the Project

1. From the main menu, select **File > Save All**
2. From the main menu, select **File > Close All**
3. Right-click on the **ACMEPayrollApplication** project in the  **Project Explorer** view and select **Close Project**

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