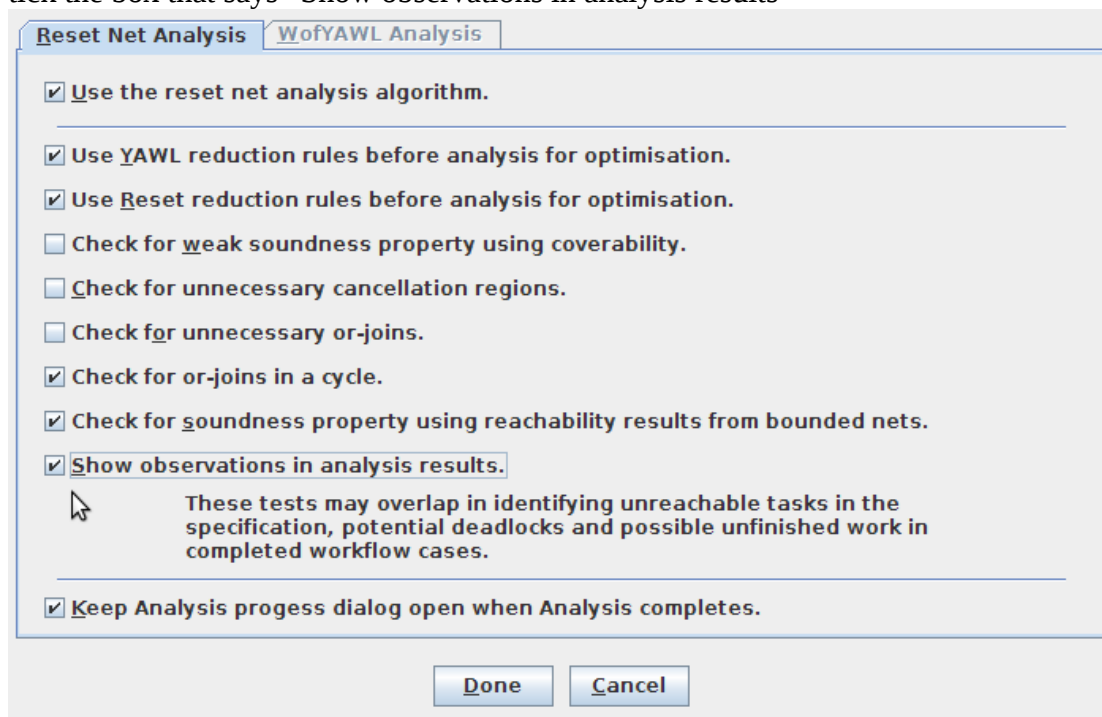


Computer Lab Exercises: YAWL Control Flow

Class 14

Exercise 1 (Editor Configuration):

- Start the YAWL editor
- Configure the YAWL editor. See the handout “Configuring YAWL”. You will need to configure (or at least check it) every time you use the YAWL editor!.
- Make sure the YAWL editor shows two green checkmarks at the bottom left.
- In the “Tools” menu, choose “Configure Specification Analysis ...”. In the following dialog box, tick the box that says “Show observations in analysis results”



Exercise 2 (Simple Process):

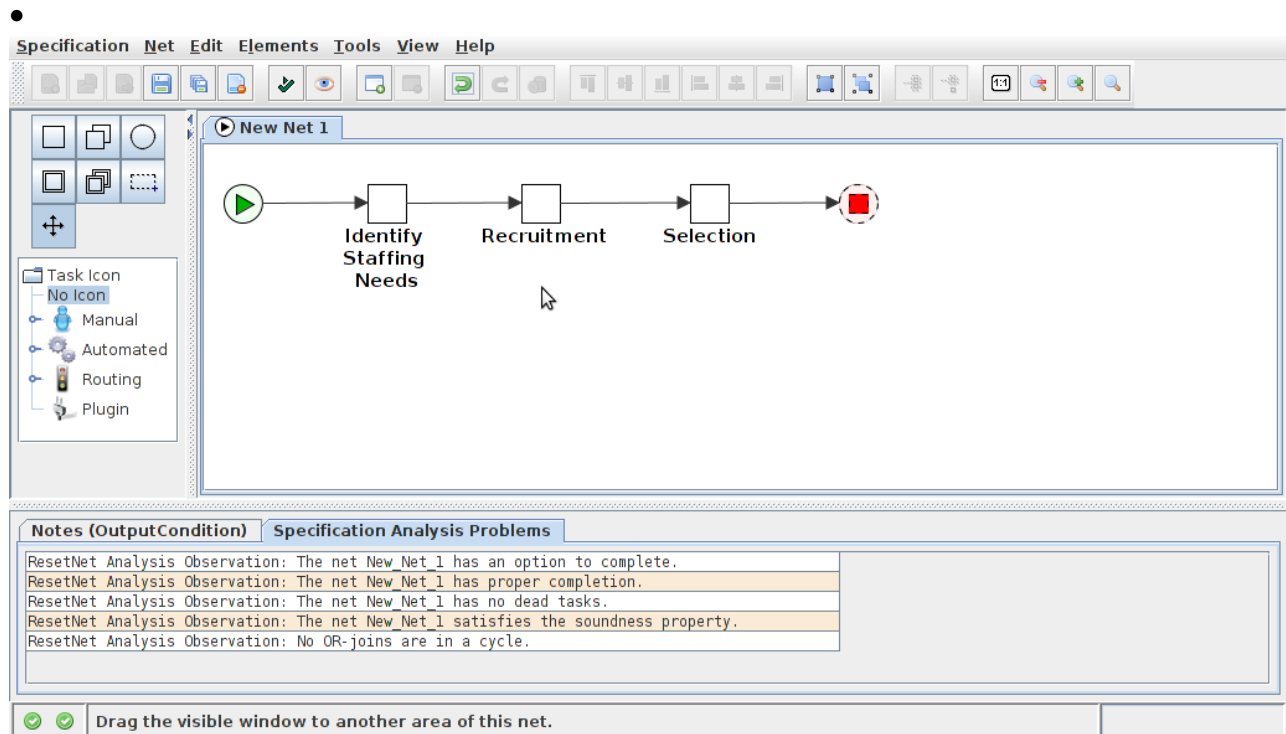
The hiring process in a company is divided into the following three steps:

- Identification of staffing needs
- Recruitment
- Selection

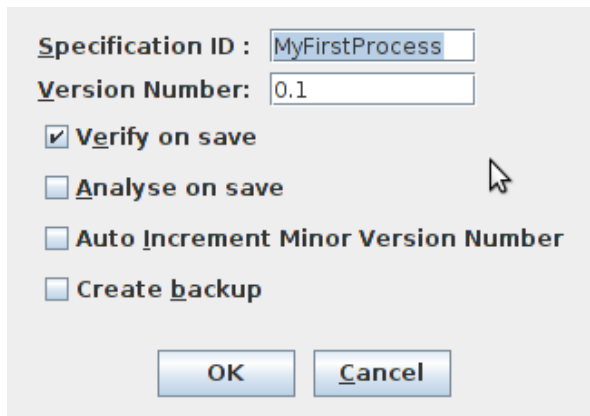
The process starts with the identification of staffing needs, where job descriptions can be created, classification, internal or external candidacy and part-time or full-time status is also determined. Following this is the recruitment step, where job advertisements are created and applications are solicited. Once this step is complete, the selection step begins to identify the most suitable candidate and fill the position.

Model this brief process description in YAWL by following these steps:

- Create a new specification, either by using the toolbar button in the top toolbar or choosing “Specification” -> “Create Specification” in the menu.
- Select the simple task icon in the tool palette on the left and add three simple tasks
- For each task, right-click on the task, choose “Set Label ...”. In the dialog box, enter an appropriate label for the task.
- Connect the tasks with each other, and the input and output place of the YAWL net. Do this by dragging from the edge of one shape to the center of another shape. The resulting model should look like this:



- In the top toolbar, click on the button to “Validate this specification” (looks like a green checkmark). At the bottom of the editor you will see the results in the tab “Specification Validation Problems”. Make sure there are no errors. **Validation makes sure that the process is a proper YAWL model (i.e. it is syntactically correct)**
- In the top toolbar, click on the button to “Analyze this specification” (looks like an eye). At the bottom of the editor you will see the results of the analysis in the tab “Specification Analysis Problems”. Make sure there are no errors. **Analysis makes sure that the process is a sound YAWL net (i.e. it is semantically correct).**
- Save your specification, either by using the save toolbar button in the top toolbar or choosing “Specification” -> “Save” in the menu.
 - You will be asked to enter a specification ID. This can be different than the name of the file you specify later. This specification ID will be displayed and used by the workflow engine.



Specification ID : MyFirstProcess

Version Number: 0.1

☒ Verify on save

☐ Analyse on save

☐ Auto Increment Minor Version Number

☐ Create backup

OK Cancel

Exercise 3 (Branching):

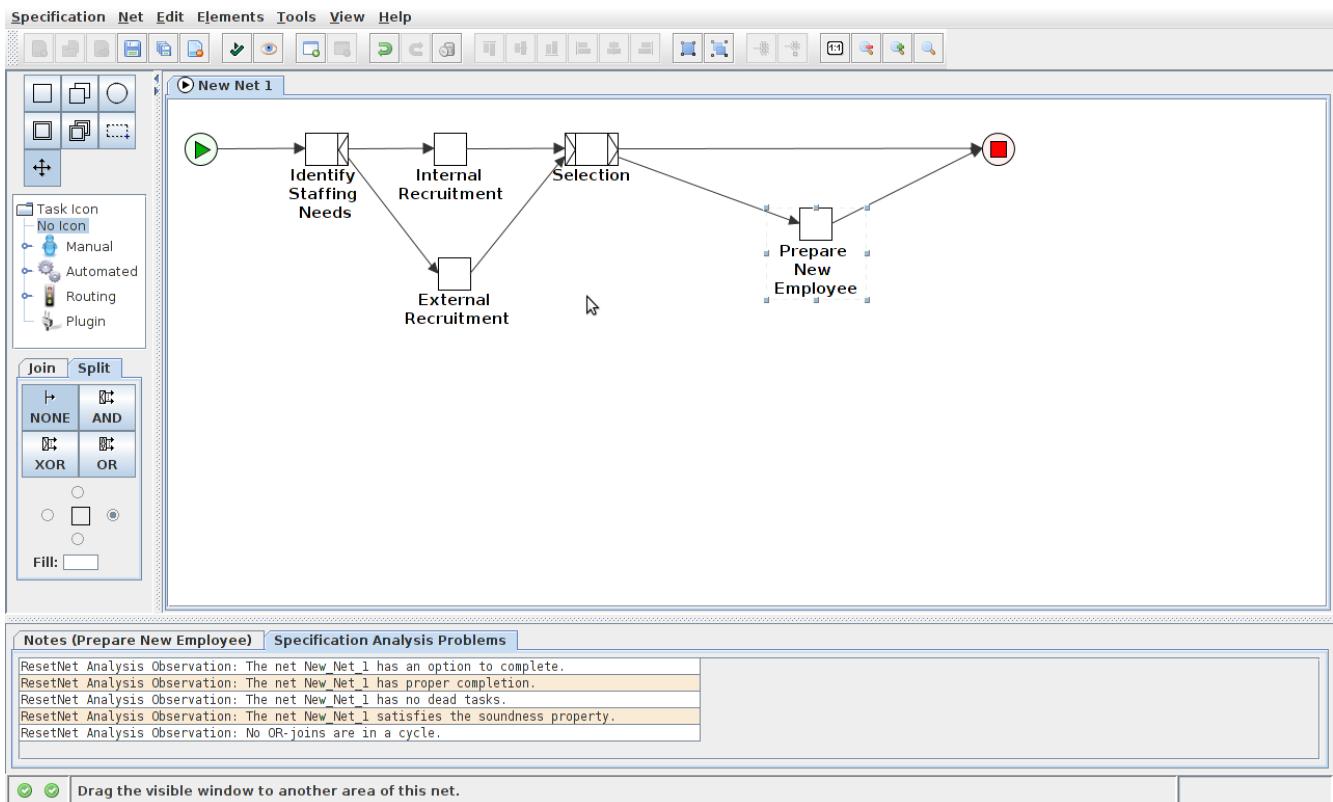
For this exercise, the hiring process is a little bit more detailed:

- Identification of staffing needs
- After identification of staffing needs, both internal and external recruitment tasks take place.
- The Selection task begins, when both internal and external recruitment tasks are completed.
- After the selection task is complete, the process either ends with no selection made (if no suitable candidate could be hired), or continues on to the “Prepare New Employee” task.
- After the prepare new employee task is completed, the process ends.

For this process, you will need to use an “AND split” and an “AND join”, as well as an “XOR” split. Select the task that should have the join or split and then select the appropriate join or split from the tool palette on the left of the editor.

- In the top toolbar, click on the button to “Validate this specification” (looks like a green checkmark). At the bottom of the editor you will see the results in the tab “Specification Validation Problems”. Make sure there are no errors. **Validation makes sure that the process is a proper YAWL model (i.e. it is syntactically correct)**
- In the top toolbar, click on the button to “Analyze this specification” (looks like an eye). At the bottom of the editor you will see the results of the analysis in the tab “Specification Analysis Problems”. Make sure there are no errors. **Analysis makes sure that the process is a sound YAWL net (i.e. it is semantically correct).**
- Save your specification, either by using the save toolbar button in the top toolbar or choosing “Specification” -> “Save As” in the menu.
 - You will be asked to enter a specification ID. This can be different than the name of the file you specify later. This specification ID will be displayed and used by the workflow engine.

Your process should look similar to this



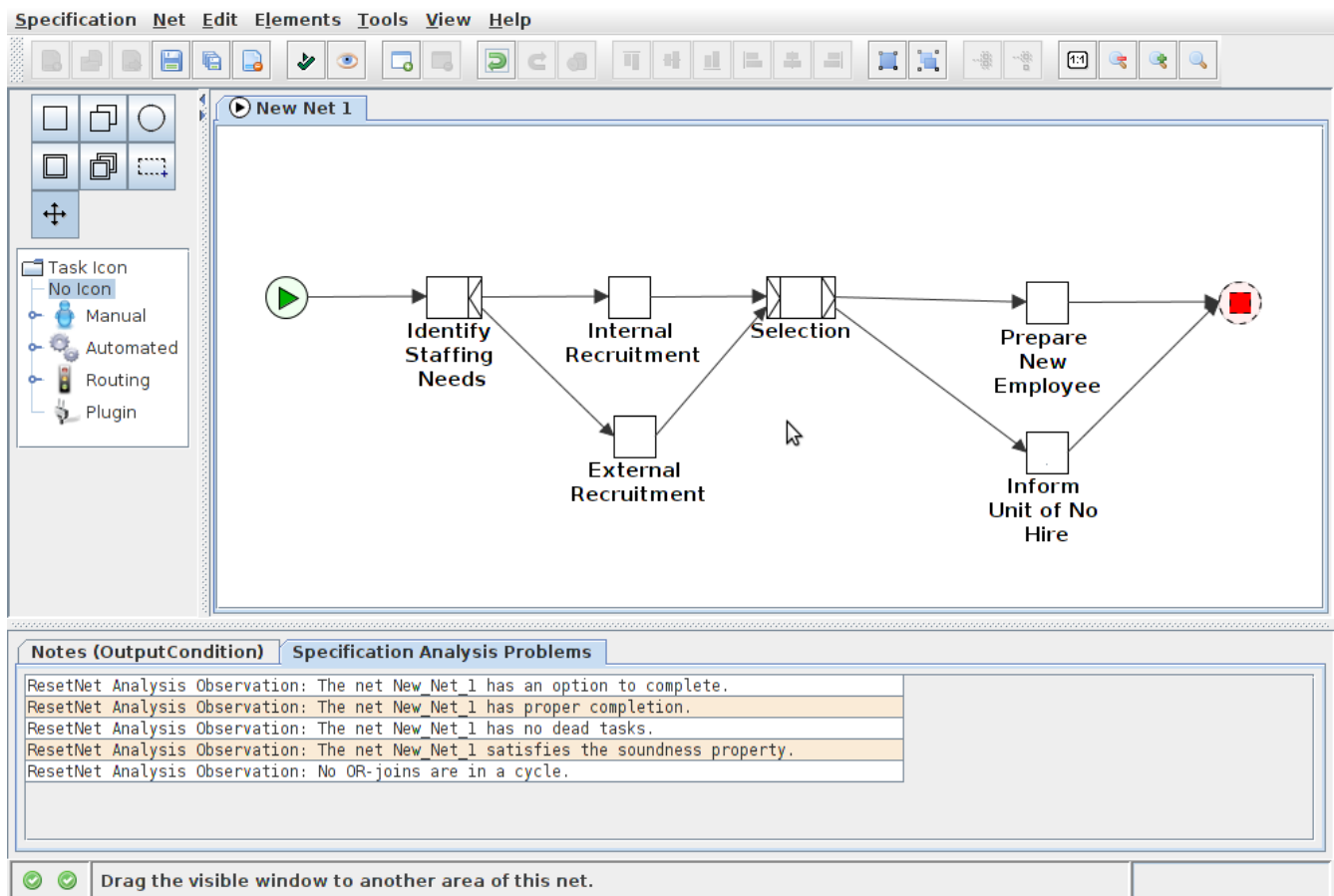
Exercise 5 (Choice):

The process now includes a task “Inform Unit of No Hire” when the selection task does not produce a suitable candidate. You should modify your process of Exercise 3 so that after “Selection” is complete, either the task “Prepare New Employee” or the task “Inform Unit of No Hire” is carried out. After either of those are complete, the process ends.

You should use an “XOR split” on the “Selection” task to accomplish this.

- In the top toolbar, click on the button to “Validate this specification” (looks like a green checkmark). At the bottom of the editor you will see the results in the tab “Specification Validation Problems”. Make sure there are no errors. **Validation makes sure that the process is a proper YAWL model (i.e. it is syntactically correct)**
- In the top toolbar, click on the button to “Analyze this specification” (looks like an eye). At the bottom of the editor you will see the results of the analysis in the tab “Specification Analysis Problems”. Make sure there are no errors. **Analysis makes sure that the process is a sound YAWL net (i.e. it is semantically correct).**
- Save your specification, either by using the save toolbar button in the top toolbar or choosing “Specification” -> “Save As” in the menu.
 - You will be asked to enter a specification ID. This can be different than the name of the file you specify later. This specification ID will be displayed and used by the workflow engine.

Your completed process should look like this:



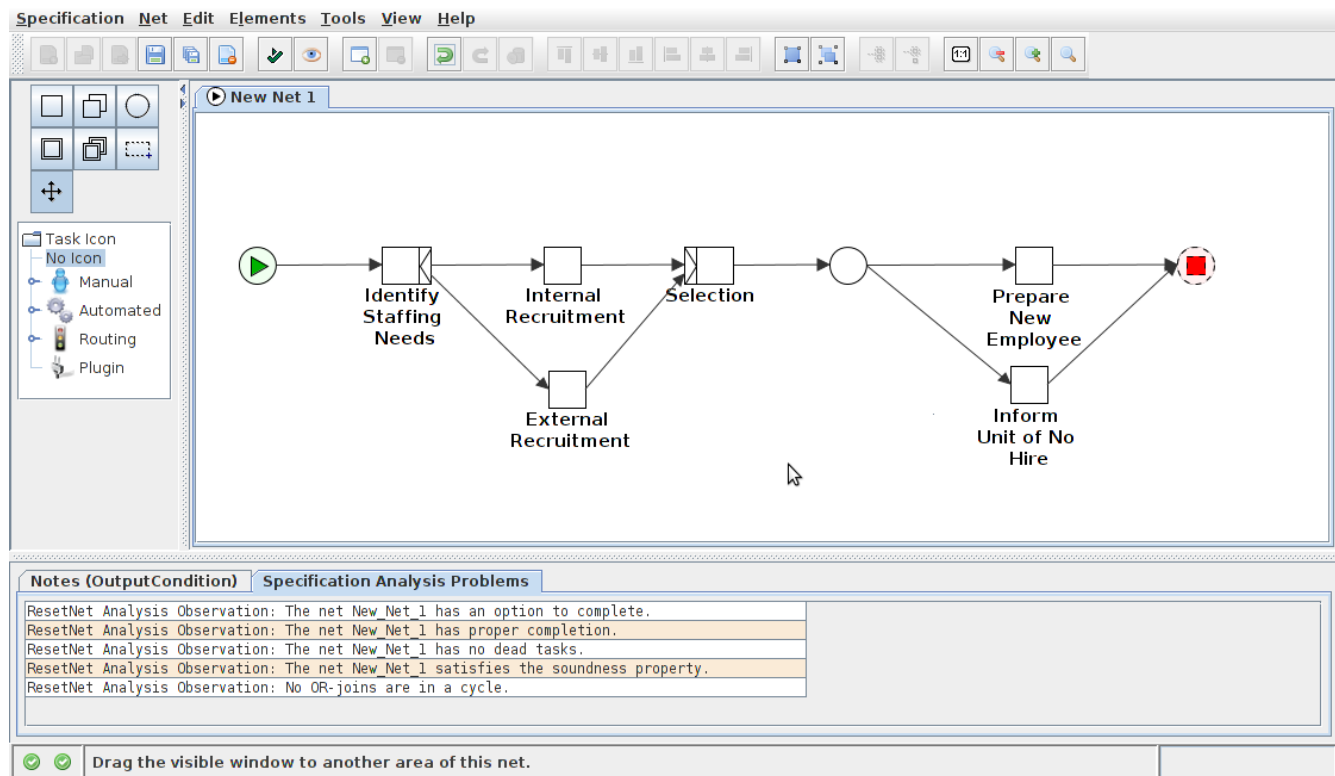
Exercise 5 (Deferred Choice):

In exercise 4, the choice of whether to prepare a new employee or to inform the unit of no hiring is determined by the workflow system (we will see in a later class how to specify that). For this exercise, the process is slightly different, in that the choice is to be determined by the users by whichever task is begun first. This is the “deferred choice” branching pattern.

Instead of an “XOR split” on the “Selection” task, you will need to model a place after the “Selection” task and connect that to the two tasks “Prepare New Employee” and “Inform Unit of No Hire”.

- In the top toolbar, click on the button to “Validate this specification” (looks like a green checkmark). At the bottom of the editor you will see the results in the tab “Specification Validation Problems”. Make sure there are no errors. **Validation makes sure that the process is a proper YAWL model (i.e. it is syntactically correct)**
- In the top toolbar, click on the button to “Analyze this specification” (looks like an eye). At the bottom of the editor you will see the results of the analysis in the tab “Specification Analysis Problems”. Make sure there are no errors. **Analysis makes sure that the process is a sound YAWL net (i.e. it is semantically correct).**
- Save your specification, either by using the save toolbar button in the top toolbar or choosing “Specification” -> “Save As” in the menu.
 - You will be asked to enter a specification ID. This can be different than the name of the file you specify later. This specification ID will be displayed and used by the workflow engine.

Your process should look like this, make sure you understand the difference to exercise 4.



Exercise 6 (Cancellation):

The hiring process now is slightly different. There is a separate “Selection” task for internal and for external recruitment. The first of these selection tasks to complete, cancels the other selection tasks. For example, if the selection task for external recruitment is completed (i.e. an external candidate has been selected), the internal recruitment and selection is cancelled (and vice versa).

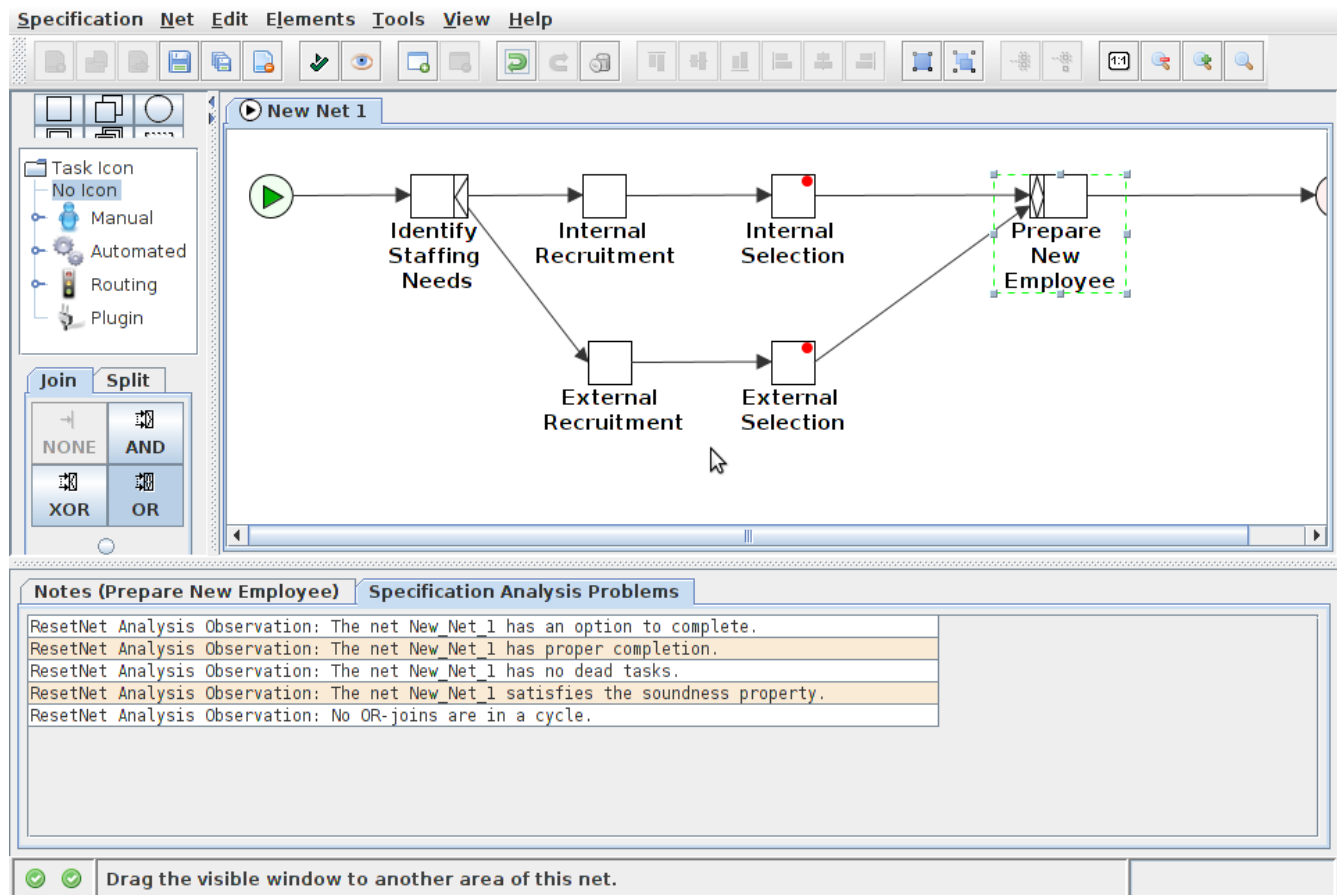
For this model, you will need to work with cancellation regions. Right-click on any task and check “View Cancellation Region”. The task will now be shown as grayed out. This allows you to add and remove other tasks from the tasks cancellation region. Tasks in the cancellation region are drawn in red. Select a task you wish to add to the cancellation region and click the “add selected items to visible cancellation region” button in the top toolbar. You can also remove tasks from the cancellation region, by using the button “remove selected items from cancellation region” in the top toolbar. Tasks that have a cancellation region are shown with a red dot.

Finally, the join to bring both external and internal recruitment together should really be an XOR join, because either one or the other branch completes. However, when you perform the analysis of the process, you will notice that YAWL cannot properly identify the mutual cancellation issue. Thus, use an “OR” join, instead of an “XOR” join.

- In the top toolbar, click on the button to “Validate this specification” (looks like a green checkmark). At the bottom of the editor you will see the results in the tab “Specification Validation Problems”. Make sure there are no errors. **Validation makes sure that the process is a proper YAWL model (i.e. it is syntactically correct)**

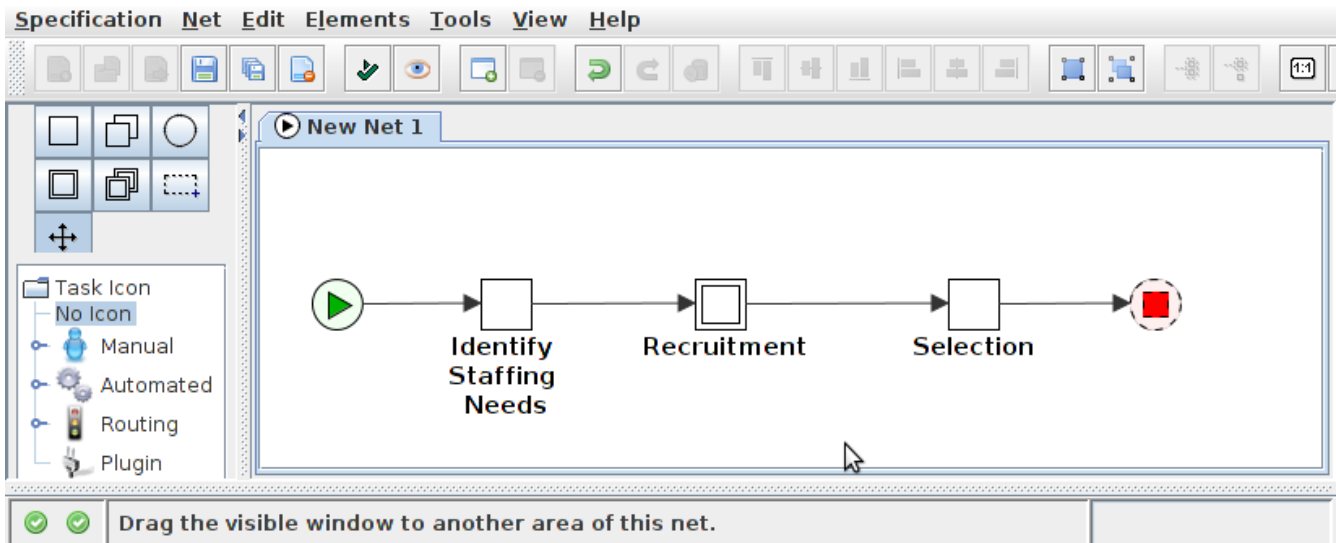
- In the top toolbar, click on the button to “Analyze this specification” (looks like an eye). At the bottom of the editor you will see the results of the analysis in the tab “Specification Analysis Problems”. Make sure there are no errors. **Analysis makes sure that the process is a sound YAWL net (i.e. it is semantically correct).**
- Save your specification, either by using the save toolbar button in the top toolbar or choosing “Specification” -> “Save As” in the menu.
 - You will be asked to enter a specification ID. This can be different than the name of the file you specify later. This specification ID will be displayed and used by the workflow engine.

Your process should look like this:

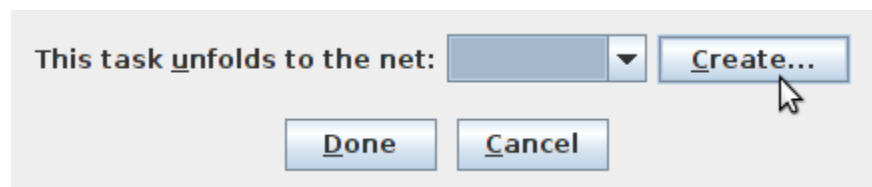


Exercise 7 (Composite Tasks):

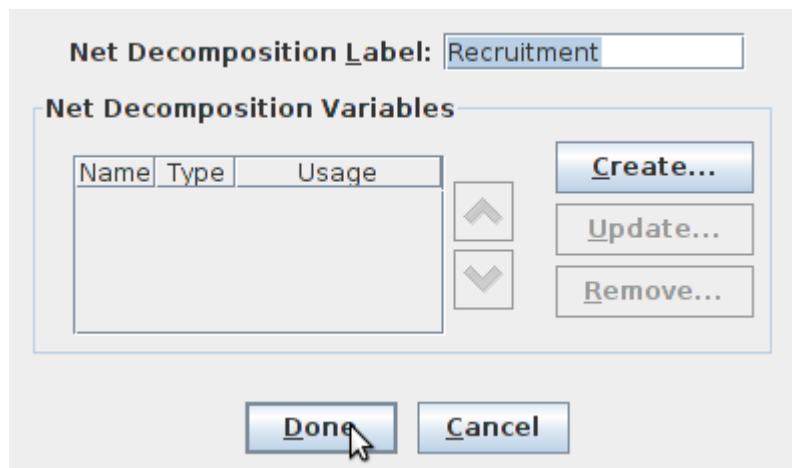
Model the simple process of exercise 2, but instead of an Atomic Task symbol for the “Recruitment” task, use a Composite Task symbol (double lines rectangle) from the toolbar on the left. Your process should look like this:



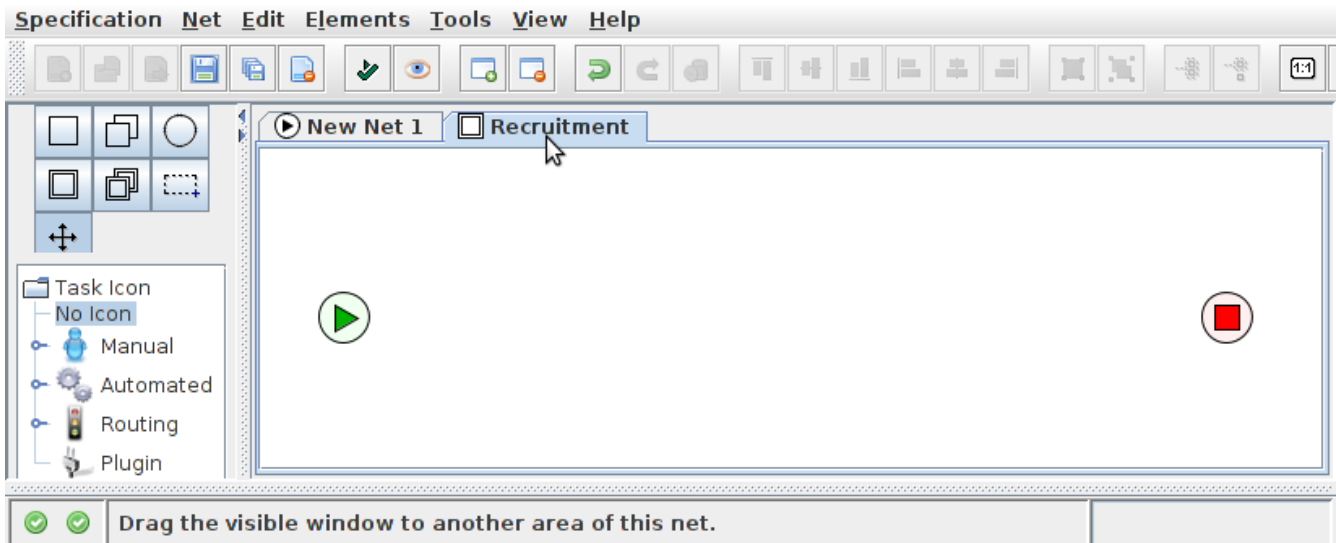
Right-click on the task “Recruitment” and select “Unfold to Net ...” from the context menu. In the dialog box, select “Create” to create a new YAWL net.



In the following dialog box, enter a label for this new YAWL net and click “Done”. Do not worry about decomposition variables.



In your editor, you should now see a new tab for drawing the sub-process for recruitment.



- In the top toolbar, click on the button to “Validate this specification” (looks like a green checkmark). At the bottom of the editor you will see the results in the tab “Specification Validation Problems”. Make sure there are no errors. **Validation makes sure that the process is a proper YAWL model (i.e. it is syntactically correct)**
- In the top toolbar, click on the button to “Analyze this specification” (looks like an eye). At the bottom of the editor you will see the results of the analysis in the tab “Specification Analysis Problems”. Make sure there are no errors. **Analysis makes sure that the process is a sound YAWL net (i.e. it is semantically correct).**
- Save your specification, either by using the save toolbar button in the top toolbar or choosing “Specification” -> “Save As” in the menu.
 - You will be asked to enter a specification ID. This can be different than the name of the file you specify later. This specification ID will be displayed and used by the workflow engine.

After you analyze the specification, you will notice that the editor shows analysis for both YAWL nets in this process specification.

Specification Net Edit Elements Tools View Help

Task Icon
No Icon
Manual
Automated
Routing
Plugin

New Net 1 Recruitment

```
graph LR; Start(( )) --> Internal[Internal Recruitment]; Start --> External[External Recruitment]; Internal --> End(((Red Square))); External --> End
```

Notes Specification Analysis Problems

ResetNet Analysis Observation: The net New Net 1 has an option to complete.
ResetNet Analysis Observation: The net New_Net_1 has proper completion.
ResetNet Analysis Observation: The net New_Net_1 has no dead tasks.
ResetNet Analysis Observation: The net New_Net_1 satisfies the soundness property.
ResetNet Analysis Observation: No OR-joins are in a cycle.
ResetNet Analysis Observation: The net Recruitment has an option to complete.
ResetNet Analysis Observation: The net Recruitment has proper completion.
ResetNet Analysis Observation: The net Recruitment has no dead tasks.
ResetNet Analysis Observation: The net Recruitment satisfies the soundness property.
ResetNet Analysis Observation: No OR-joins are in a cycle.

Left-click on the selected net to create a new atomic task.