

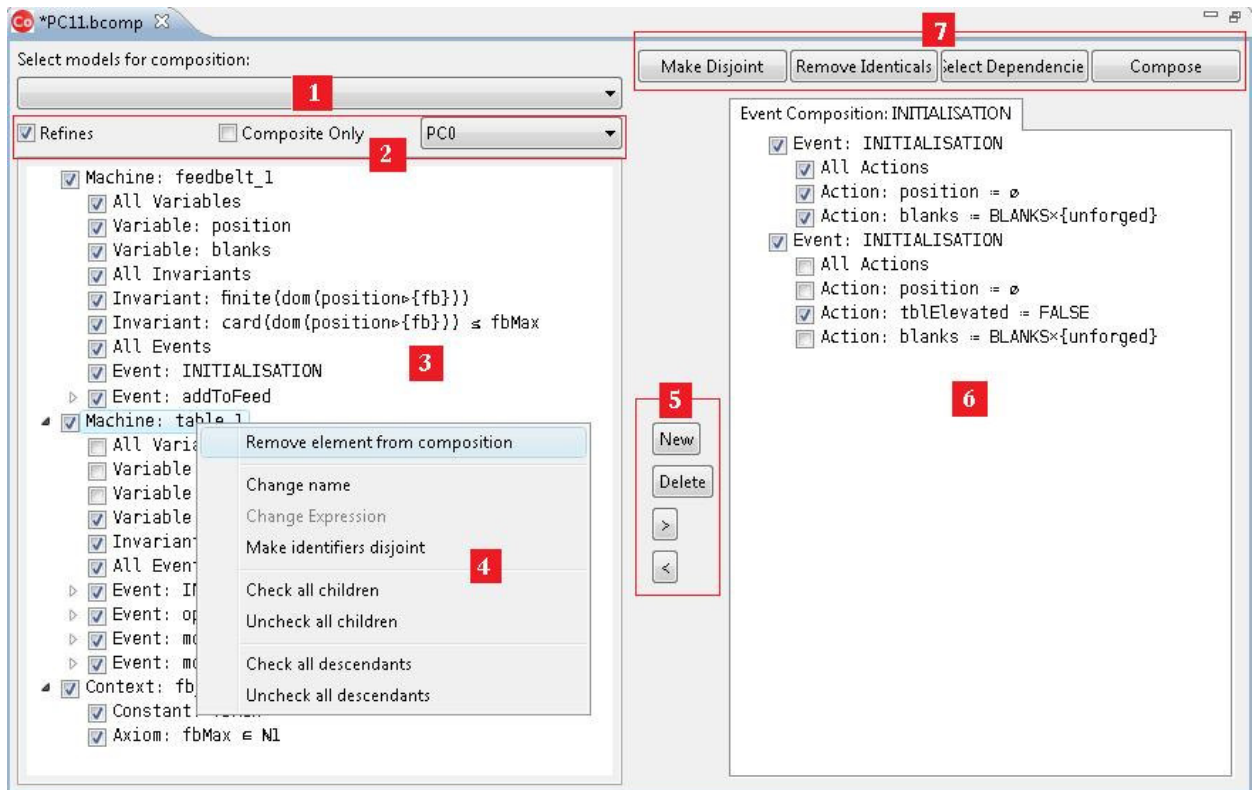
## **Feature Composition Tool -- User Manual**

Once you have installed the Feature Composition Plug-in, you can start composing Event-B features (machines/contexts).

First of all you'll have to create a composition file by clicking: File->New->Other->Event-B->Event-B Composition

Select the container project containing the features that you want to compose and enter the file name with extension *.bcomp* (e.g. foo.bcomp). Click 'Finish' and it will be opened in the Composition Editor. You can also find it inside the container with in the Event-B explorer

The main parts of the Composition Editor are numbered on the snapshot and explained below.



1. You can select machines and contexts from the drop down list to be added to the composition model, which are then shown below.
2. Check 'Refines' if this composition is a refinement of another machine and select the abstract machine from the drop down list next to it. You can filter the drop down list to show only the composite machines (generated using this editor) by checking the 'Composite Only' checkbox.
3. This is the composition model with the machines and contexts selected for composition. Only the checked items will be present in the produced composite model. You can check all variables, all events or one by one as required.

4. You'll see this menu by right clicking any machine or context. Its options are:
  - Remove the selected item from the composition model
  - Rename
  - Change expression (e.g. invariant )
  - Make the identifiers (e.g. variables, events) disjoint through renaming, if there are any conflicts (conflicts are highlighted in red colour)
  - Select/deselect all children
  - Select/deselect all descendants (including grand children)
5. In order to merge two or more events, you'll have to create a new event by clicking the 'New' button and entering the name for this new event. You can then select the events from LHS (3) by clicking ">" to be added to RHS (6). You can also remove any events from RHS or delete this newly created event.
6. This is a sub-editor for event fusion. All the newly created events will be shown in the tabs. You can select multiple events from the LHS (3) to be included for event fusion. Any selection/deselection will be reflected on the LHS (3) as its part of it.
7. These buttons respectively:
  - Make the machines/context disjoint by renaming the conflicting elements such as variables and events.
  - Uncheck/remove any conflicting elements with the same name in different models (e.g. if a variable v1 exists in machines M1 and M2, this will uncheck v1 from M2 so the output composite model will have only one declaration of v1)
  - You can select the dependencies for an element (e.g. if you click this on a selected event, it will automatically select any variables used in the event along with the invariants)
  - Finally, pressing the 'Compose' button which will generate a machine and a context based on this composition model. Each time you press this button, it will overwrite the existing composite machine if it exists. It is therefore assumed that the users will not make changes to the generated machine/context rather make change the input models and composition model and regenerate the composite machine/context. Also make sure that the generated machine is closed before pressing the 'Compose' button again.

The composition model can also be saved and reloaded in order to change or redo the composition

**Known Issue:**

When you open a composition file from the Event-B explorer, you need to click anywhere outside the Event-B explorer to open another file. (This will be fixed in the next release)