Technical Documentation of SOPOView

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Abstract

This documentation summarizes the design of SOPOView in terms of the class hierarchy. It is not supposed to be a handbook for users of the program, but for the application developer to get an insight into the program structure and to be able to further develop or reuse the program. This document does not contain a low level description of the classes and its methods. For this purpose, please consult the source code comments.
Structure of SOPOView

SOPOView was developed to be included into AsbruView as an additional view, like the Topological View or the Temporal View. However, SOPOView provides two views: one for the left part - that is the plan structure, displayed as in the Temporal View - and one for the SOPO diagram.

All of SOPOView’s classes are in the package asgaard.asbruview.sopoview. The root class of SOPOView is the class SopoViewComponent, that essentially has the same functionality as the classes TopologyViewComponent and TemporalViewComponent. It is integrated into the AsbruView program within the AVFrame class.

SopoViewComponent consists of three components:
- **SopoStructure**, that implements the left part of SOPOView (the plan hierarchy taken from the Temporal View),
- **SopoViewDiagram**, that implements the SOPO diagram, and
- **SopoControl**, that provides a control bar for user interaction.

![Figure 1: Screenshot of SOPOView.](image)

![Figure 2: Structure of SOPOView's screen, provided by SopoViewComponent. The names denote the classes.](image)
**SopoStructure**

The *SopoStructure* class implements the left part of SOPOView, that is the display of the plan structure as in the Temporal View, as an additional view within the AsbruView program. For that reason, the necessary classes of the Temporal View were taken and reused in SOPOView. The following table shows the original classes in the Temporal View and the according classes in SOPOView:

<table>
<thead>
<tr>
<th>Classes in Temporal View</th>
<th>Classes in SOPOView</th>
</tr>
</thead>
<tbody>
<tr>
<td>TemporalViewRoot</td>
<td>SopoStructure</td>
</tr>
<tr>
<td>TemporalViewPlan</td>
<td>SopoViewPlan</td>
</tr>
<tr>
<td>Facet</td>
<td>SFacet</td>
</tr>
<tr>
<td>PlansFacet</td>
<td>SPlansFacet</td>
</tr>
<tr>
<td>SequentialPlan</td>
<td>SSequentialPlan</td>
</tr>
<tr>
<td>ParallelPlan</td>
<td>SParallelPlan</td>
</tr>
<tr>
<td>AnyOrderPlan</td>
<td>SAnyOrderPlan</td>
</tr>
<tr>
<td>CyclicalPlan</td>
<td>SCyclicalPlan</td>
</tr>
</tbody>
</table>

Table 1: Classes in the Temporal View and its according classes in SOPOView.

As the original classes of the Temporal View were only slightly edited, a description of those classes seems not be necessary here.

**SopoViewDiagram**

The class *SopoViewDiagram* implements the right part of SOPOView, that is the SOPO diagram. It is, like the left part, an additional view within the AsbruView program. The whole diagram is made up of several components, shown in Figure 3.

![Figure 3: Components of the SopoViewDiagram. The names denote the classes.](image)
In the following, SopoViewDiagram's elementary components, as well as the classes So-po and TAEdition, will be presented and described.

**Corner**

The class **Corner** implements the bottom left and upper right corner of the SOPO diagram. It paints part of the axes arrows and displays the current time scale. Any time the user changes the time scale in the control bar (see section SopoControl), instances of the class **Corner** will be notified.

**Filler**

The class **Filler** paints the other part of the axes arrow (see also **Corner**) and is used to fill the gap between the graphical output of the class **SopoDiagram** and the two scrollbars.

**Rule**

The class **Rule** implements the horizontal or vertical axis of the diagram. In case a SOPO is marked within the diagram, the **SopoDiagram** object notifies the **Rule** objects of the SOPO's bounds. Along the axes, a light-gray line indicates the location of the starting or ending interval. Furthermore, the values of the time annotation's parameters (ESS and LSS along the vertical axis; EFS and LFS along the horizontal axis) are displayed.

**SopoDiagram**

The class **SopoDiagram** provides the display area (a buffered image) for the SOPOs to be drawn on and all the user interaction possibilities (direct manipulation of SOPOs). The **paint**-method of this class calls the following three methods in order to draw all the necessary elements:

- **drawGrid(..)**, that draws the diagonal axis and, if selected by the user, a grid,
- **drawSopos(..)**, that draws all the plan's SOPOs in the plan hierarchy, and
- **drawClickedSopo(..)**, that draws the markings of the current (marked) SOPO.

The user interaction mechanisms are provided through the mouse and mouse motion listener methods. The **mousePressed**-method uses the following two methods:

- **findClickedSopo(..)**, that is used to check whether the mouse click occurred within a SOPO other than the current plan or within the background, and
- **getNextSopo(..)**, that is used when the mouse click occurred within the current SOPO to check whether there are overlapping SOPOs to switch to.

The **mouseDragged**-method is used to either drag a whole SOPO or to drag a SOPO's edges. In the first case, the method **updateDraggedSopo(..)** is used to update the dragged SOPO's position on the screen.

The **mouseMoved**-method is used to change the mouse cursor whenever a SOPO is marked and the user moves the cursor over the SOPO's edges or over the small circle in the lower right corner of the SOPO (to open or close that plan).


**Sopo**

The class Sopo extends the class VisiblePlan and implements the single SOPOs that are drawn within the SopoDiagram object. The essential methods of this class are:

- **getSopo(..)**, that is called out of the SopoDiagram object and returns the graphical representation of the plan's time annotation (that is, the SOPO) as a GeneralPath object. Within this method, the time annotation's parameters are verified in order to enable a proper representation.
- **getLines(..)**, that returns an array of Line2D.Float objects that represent the SOPO's edges. It also includes a verification of the ta's parameters.
- **setParameter(..)**, to set the plan's time annotation's parameters (this method is overloaded; there exist two instances of it).
- **getParameter(..)**, that returns the plan's time annotation's parameters as an array of float values.
- **setDefined(..)**, that sets the single ta's parameters to be defined or undefined.
- **getDefined(..)**, that returns an array of boolean values; used to check whether ta's parameters are defined or undefined.

**TAEditor**

The class TAEditor implements the time annotation editor and is called by the SopoDiagram object. It gets the current plan (class Sopo) as a parameter.

**SopoControl**

The class SopoControl implements the control bar at the bottom of the SOPOView screen. All changes made by the user (changes in the time scale, color of a plan, show grid, zoom in or out) are forwarded to the SopoViewDiagram object to be handled.