

Allplan 2013 SmartParts

Steps to Success

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Contents

Welcome!	1
Basics	2
Definition of terms.....	2
Where to find SmartParts	3
The SmartParts module's user interface	4
Tools for creating SmartParts	4
Getting Ready	5
Creating a project	5
Basic settings.....	8
Steps to take	9
Step 1: SmartPart Freeform Solid	10
Getting to know SmartParts.....	10
Step 2: Additional SmartParts	16
Inserting additional SmartParts	16
Modifying additional SmartParts.....	19
Inserting and modifying another SmartPart.....	24

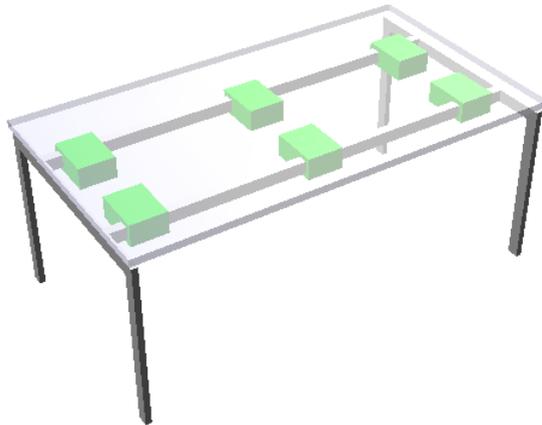
Step 3: Understanding Scripts.....	25
Additional tools for SmartParts	25
Reading scripts.....	29
Allplan SmartPart Editor.....	30
Basic tools.....	31
Parameters.....	33
Master script	35
Parameter script.....	37
Dialog script.....	38
2D script.....	39
3D script.....	40
Resources.....	41
Step 4: Creating Your Own SmartPart.....	42
Objective	42
Creating the tabletop	45
Creating table legs.....	53
Creating cross braces.....	61
Creating bars	66
Creating connectors.....	72
Creating a box and importing it as a resource	73
Using the resource	75
The IF - THEN condition	80
Parameter script.....	84
Saving the intermediate result.....	88
Parametric surfaces.....	89
Integrating parameters into the script.....	94

Plan view.....	99
Defining your own dialog box using scripts.....	104
Some special notes.....	111
Saving the SmartPart.....	116
Digression.....	120
Table with round legs - Flexi 02.....	121
Digression - summary of parameters	126
Digression - summary of parameter script.....	127
Digression - summary of dialog script.....	128
Digression - summary of 2D script.....	129
Digression - summary of 3D script.....	130
Digression - summary of resources.....	132
Step 5: Analysis	133
Objective.....	133
Completing the drawing file	135
Analysis using a report.....	138
Labeling the SmartPart	141
Index.....	145

Welcome!

This guide provides an overview of the **SmartParts** module.

You will learn all you need to know about SmartParts in five steps. In particular, you will find out about the essentials of SmartParts and the modification options provided for SmartParts in the module. What's more, you will learn how to load and use additional SmartParts as well as create your own SmartParts. Finally, you will analyze SmartParts in a report.



Each step is described in detail so that you can follow quickly and easily.

We wish you much fun and every success!

Basics

Definition of terms

Allplan SmartPart

A SmartPart is a parametric Allplan CAD object that reacts intelligently to changes or other actions done by the user, provided its parameters and settings are defined accordingly.

SmartParts can be edited using dialog boxes or handles. Both options are described in detail in "Step 1: SmartPart Freeform Solid (on page 10)".

SmartParts are based on a script that contains 2D and/or 3D information on the relevant SmartPart. SmartParts can be saved as files ending in *.smt.

Allplan SmartPart script

The Allplan SmartPart script is used to program SmartParts. This programming language, which is similar to BASIC, can be learned quickly and easily. The script is part of each SmartPart.

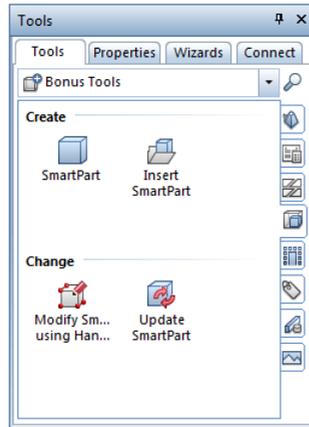
You will familiarize yourself with Allplan SmartPart Script in "Step 3: Understanding Scripts (on page 25)". In "Step 4: Creating Your Own SmartPart (on page 42)", you will learn how to create your own SmartPart using **Allplan SmartPart Script**.

Where to find SmartParts

- Use one of the Allplan SmartPart basic shapes (SmartParts module, Create area).
- Use  SmartPart and  Insert SmartPart (SmartParts module, Create area) or  Get from Library (Default toolbar, SmartPart). Select a SmartPart and place it in the workspace as you would place a symbol or smart symbol.
- Download SmartParts from Allplan Connect's Content area.
- Create your own SmartParts or modify existing SmartParts. This guide shows how you can create and change your own SmartParts in just a few steps
- SmartParts can also represent customer-specific content. A SmartPart consultant, who has in-depth knowledge of SmartParts and a lot of experience in this field, can help you create your own SmartPart catalogs. Your local sales partner would be glad to provide you with more information. Visit the Allplan Homepage (<http://www.allplan.com>) for a list of all sales partners.

The SmartParts module's user interface

You can find the **SmartParts** module in the **Bonus Tools** family.



The **Create** area provides the  **SmartPart** and  **Insert SmartPart** tools. You can use the  **SmartPart** tool to open the SmartPart content palette, where you can select a SmartPart and place it in the workspace.

The **Change** area of the Tools palette provides the  **Modify SmartPart using Handles** and  **Update SmartPart** tools.

Tools for creating SmartParts

You can find additional tools such as the SmartPart editor, which helps you program SmartParts, in the **Customize: Default** dialog box. To open it, click **Customize...** on the Tools menu. On the **Customize** tab, click the **Categories** button and choose **Additional tools with icons**.

You will familiarize yourself with these tools in "Step 3: Understanding Scripts (on page 25)".

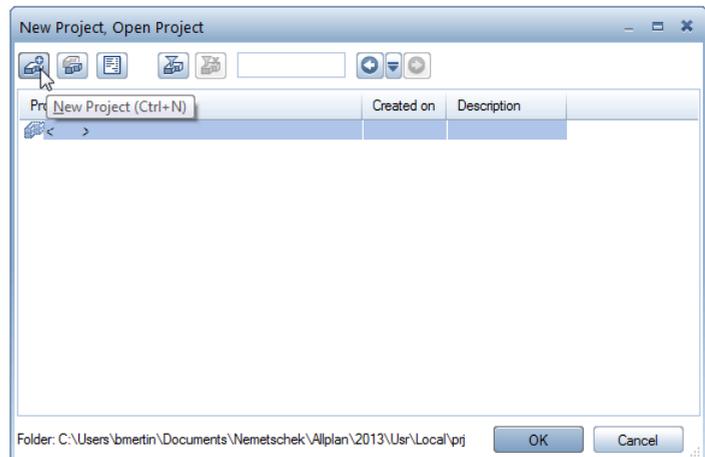
Getting Ready

Creating a project

Start by creating a new project in Allplan 2013 so that you can follow the steps described in this guide.

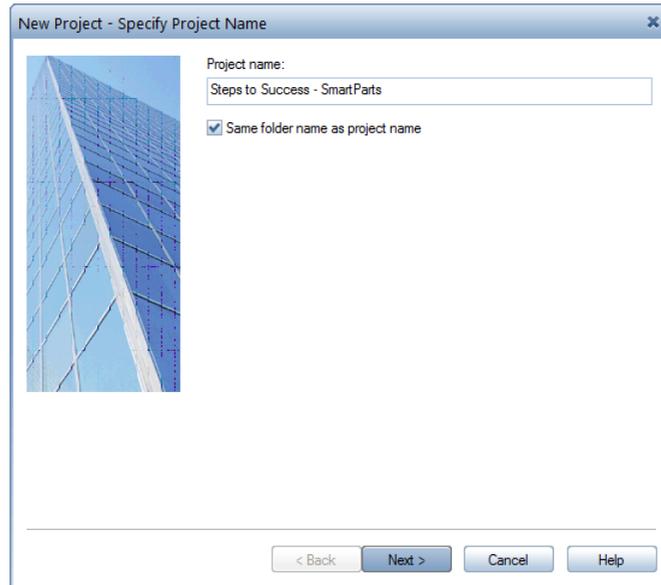
To create a new project

- ➔ Allplan is running.
- 1 On the File menu, click  New Project, Open Project.
- 2 In the Open Project dialog box, click  New Project, Open Project....



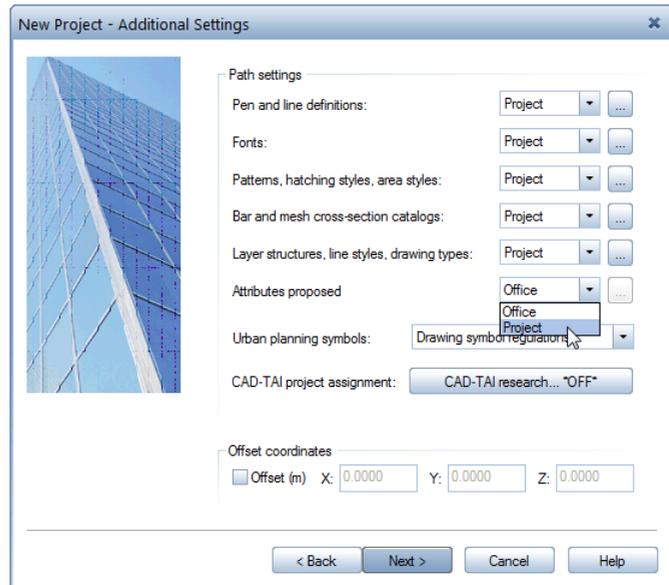
3 *New Project – Specify Project Name*

Enter **Steps to Success – SmartParts** for the project name and select the **Same folder name as project name** option. Click **Next >**.



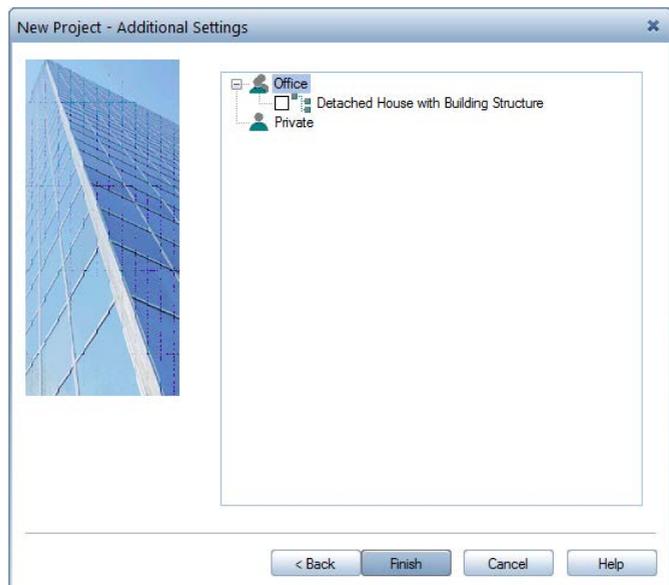
4 In the next dialog box, set all the paths to **Project** and click **Next >**.

Note: The example in this guide uses the project standard. The project standard, which is a copy of the office standard, only applies to the current project. The advantage is that any changes in the definitions of pens or line types do not affect the office standard but apply to your project only. Consequently, you can customize all the settings for your needs without changing the office standard.



5 *New Project – Additional Settings*

Click **Finish** to confirm the last dialog box.



You are back in Allplan. The **Steps to Success - SmartParts** project is open and drawing file 1 is current.

Note: You can also create a new project using  **ProjectPilot - Admin...** (**File** menu).

Basic settings

Check the settings in the status bar: **Length (m)**, **Scale (1:100)** and **Angle (deg)**.

Click  **Show/Hide** on the **View** menu and make sure that the **Smart symbol foil A to C** options are selected. Deactivate **Color stands for pen**, if necessary. Leave all the other settings as they are.

On the **Format** toolbar, the **Pen** is set to **0.25**, the **Line type** to **1**, the **Color** to **1** and the **Layer** to **DEFAULT**.

Steps to take

Step 1 – SmartPart Freeform Solid

- Placing a SmartPart Freeform Solid in the workspace
- Open the shortcut menu
- Selecting modification tools

Step 2 – Additional SmartParts

- Inserting and modifying additional SmartParts

Step 3 – Understanding Scripts

- Getting to know additional SmartPart tools
- Reading scripts
- Using Allplan's SmartPart Editor

Step 4 – Creating Your Own SmartPart

- Creating the tabletop, table legs, cross braces and bars
- Saving the intermediate result
- Creating a connector in Allplan
- Inserting the connector as a resource in the SmartPart Editor
- Defining parameters using scripts
- Parametric surfaces
- Plan view
- Defining your own dialog box using scripts
- Saving the SmartPart

Digression - creating a table with round legs using scripts

Step 5 – Analyzing and Labeling

- Adding more SmartParts to the drawing file
- Analyzing the contents of the drawing file in a list
- Labeling the SmartPart

Step 1: SmartPart Freeform Solid

Getting to know SmartParts

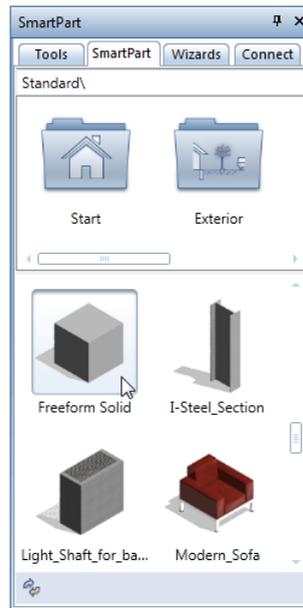
In the first exercise, you will place a **SmartPart Freeform Solid** in the workspace and familiarize yourself with the tools on its shortcut menu.

To get to know a SmartPart

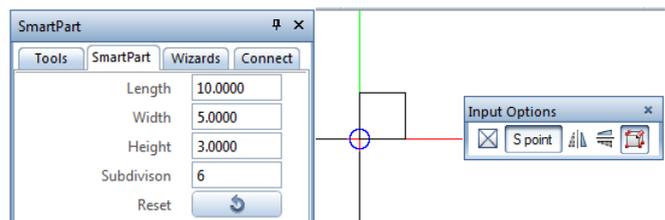
- ➔ Allplan is open and drawing file 1 is current.
- 1 In the **Tools** palette, open the **SmartParts** module (**Bonus Tools** family).
- 2 Click  **SmartPart** in the **Create** area of the **SmartParts** module.

This tool opens the SmartPart content palette.

- 3 In the **SmartPart** palette, scroll down to the  **SmartPart Freeform Solid**. Click this SmartPart with the left mouse button and drag it into the workspace.



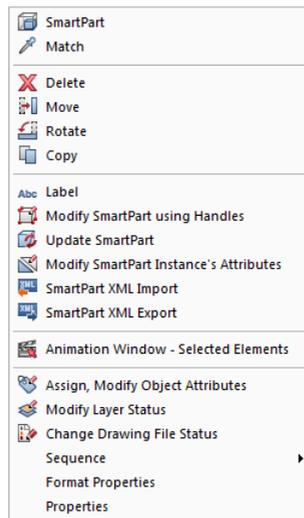
The SmartPart is attached to the crosshairs.



- 4 Check the values in the **SmartPart** palette. If these values do not match those shown above, correct them and click **Reset** to undo any changes you may have made using the handles.
- 5 Place the SmartPart in the workspace.

Note: Check the dialog line.

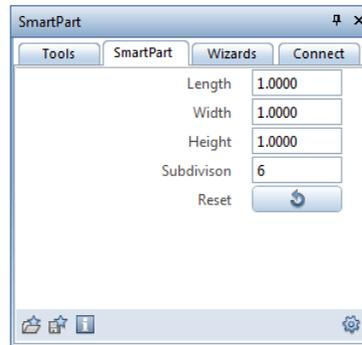
- 6 The SmartPart you have placed is displayed with handles. As you do not want to use the handles to modify the SmartPart right now, press ESC.
- 7 Another SmartPart is attached to the crosshairs. As you do not want to place another SmartPart, press ESC again.
- 8 Now you can select additional SmartParts in the content palette. As you do not want to select another SmartPart right now, press ESC again.
- 9 So that you can see better what you are doing, click  **2+1 Animation Window** on the **Window** menu and select a suitable isometric view in the border of the viewport at bottom left: for example,  **Front Left, Southwest Isometric View**.
- 10 Click the SmartPart with the right mouse button to open its shortcut menu.



In addition to the general tools, the shortcut menu provides specific SmartPart tools you can use to modify the SmartPart.

- 11 To familiarize yourself with these tools, click **Properties** first.

The SmartPart is displayed with handles and the Freeform Solid palette opens:



You can check and, if necessary, change the values of the SmartPart's parameters. The entries you can see for the SmartPart in the Freeform Solid palette were created in the SmartPart script. To find out how to create your own dialog boxes for SmartParts, see the section entitled "Defining your own dialog box using scripts (on page 103)".

12 Change the dimensions:

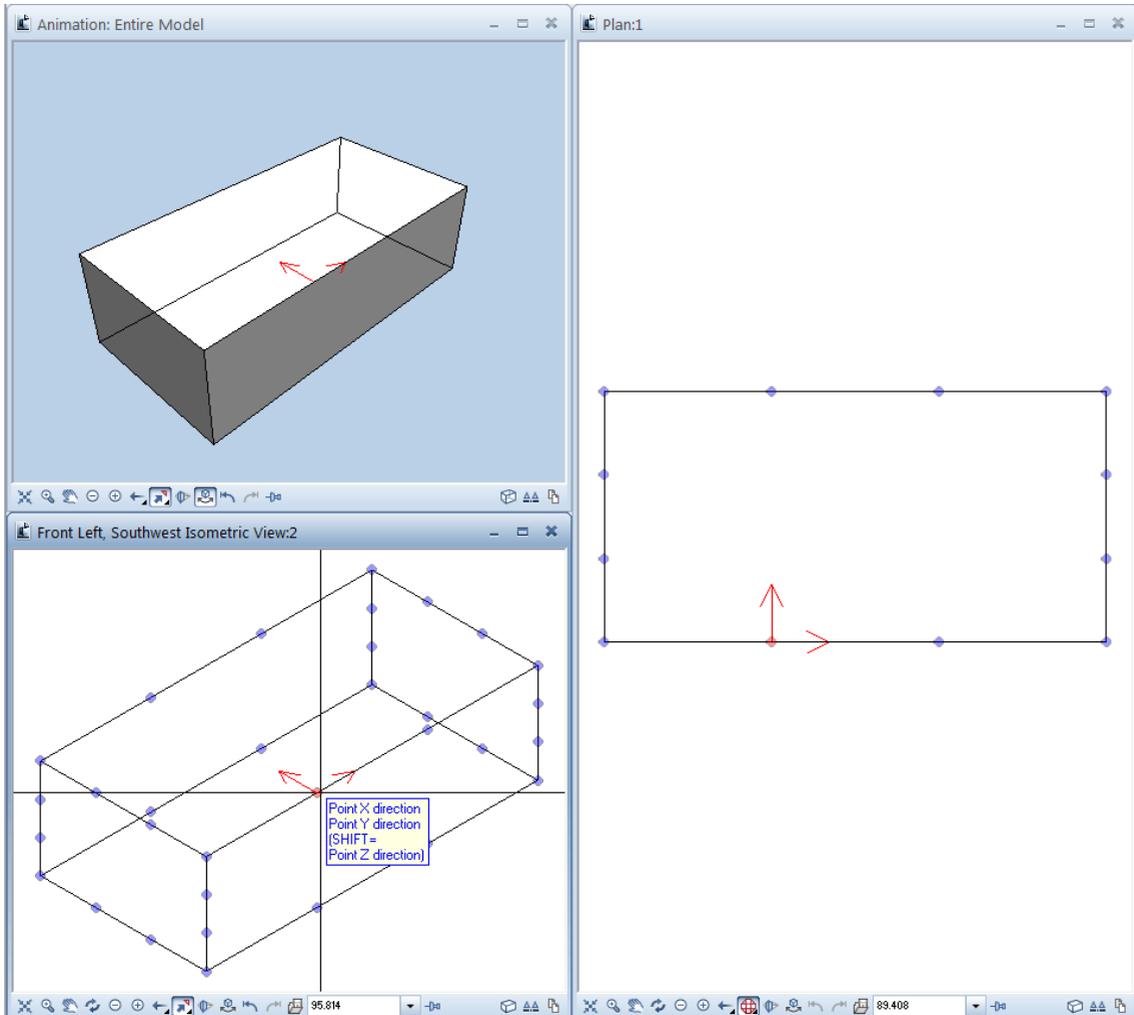
- Length: 10
- Width: 5
- Height: 3
- Division: 6

13 After you have pressed ESC, you can immediately see the effects of your changes on screen.

14 Open the shortcut menu of the SmartPart again and select  **Modify SmartPart using Handles.**

Using the handles, you can modify SmartParts graphically. Handles are temporary markers on elements, which you can use to resize SmartParts. The ToolTip of the selected handle shows the directions in which you can modify the SmartPart in question. Here, you can modify the SmartPart in the x, y and z directions. Press the SHIFT key for modifications in the z direction. Handles are defined in the script of the SmartPart. You will learn

how to do this in the section entitled "Creating the tabletop (on page 45)".

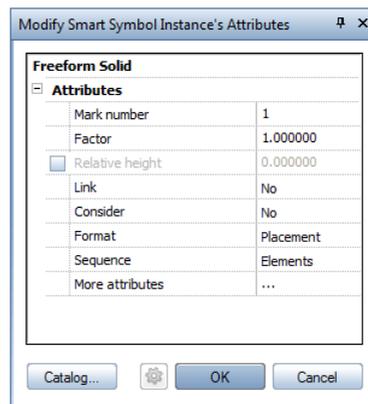


- 15 Select a handle by clicking it with the left mouse button.
- 16 Move the mouse in the desired direction.
- 17 Click the left mouse button to finish modifying the SmartPart.
- 18 You can continue to modify the SmartPart graphically by clicking another handle.

19 Quit the  **Modify SmartPart using Handles** tool by clicking ESC.

Note: You can also find the  **Modify SmartParts using Handles** tool in the **Change** area of the **SmartParts** module.

20 To get to know the third modification tool for SmartParts, open the shortcut menu of the SmartPart again and click  **Modify SmartPart Instance's Attributes**.



21 These attributes assigned to the SmartPart behave like attributes of a smart symbol. For example, you can define a height setup for the SmartPart.

22 As you do not want to make any further modifications, close the dialog box by clicking **Cancel**.

Tip: Double-clicking the SmartPart with the left mouse button opens the dialog box as well as shows the handles for modifications. To copy the SmartPart, double-click it with the right mouse button.

Step 2: Additional SmartParts

Inserting additional SmartParts

Allplan comes with additional SmartParts. You will use two of these SmartParts in this exercise.

To insert an additional SmartPart into Allplan

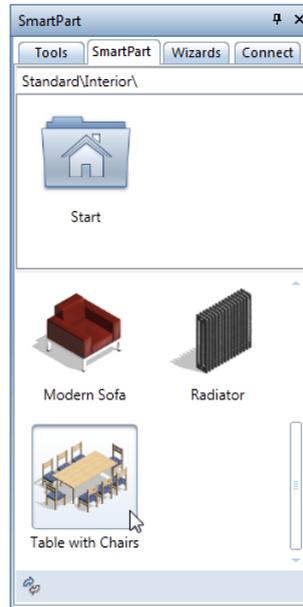
- Allplan is open and drawing file 1 is current.
- 1 Open a new drawing file by clicking  **Open on a Project-Specific Basis** on the **Default** toolbar.
- 2 Select the **Fileset structure** tab. Make drawing file 2 current and close drawing file 1.
- 3 Click  **SmartPart** in the **Create** area of the **SmartParts** module.

The SmartPart content palette opens.

Note: You can use the area at the top to navigate through various folders:

- Click **Start** to select between **Standard** and **Office**.
 - To open a folder, click it with the left mouse button.
 - Clicking a folder with the right mouse button opens its superordinate folder. Clicking **Start** takes you back to the top-level SmartPart folder.
- 4 Select the **Interior** folder in the top part of the **SmartPart** palette.

- 5 Select the Table with chairs SmartPart.

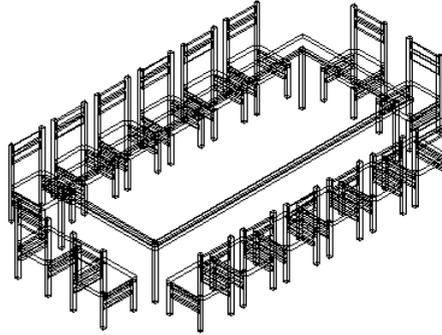


- 6 Place the table and the chairs in the workspace and press ESC three times to quit the tool.

The format properties (pen, line, color) and the layer set on the **Format** toolbar were used to place this SmartPart.



Tip: You can also modify the format properties for this SmartPart later.



Modifying additional SmartParts

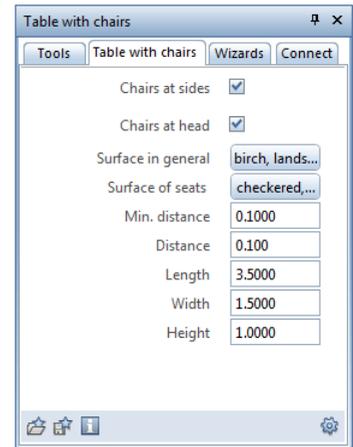
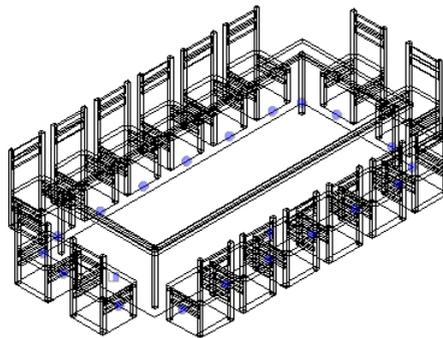
After having placed the additional SmartPart in Allplan, you can now modify it.

To modify the SmartPart you have placed

➤ Allplan is open and drawing file 2 is current.

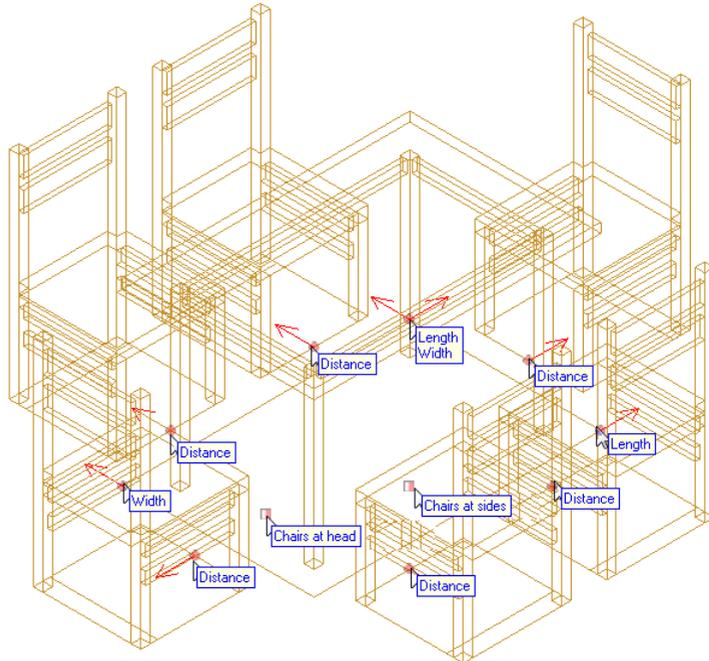
- 1 Double-click the SmartPart with the left mouse button.

Both modification options - dialog box and handles - are presented.



- 2 Clear the **Chairs at head** check box in the dialog box and change the **Surfaces**. To check the result of the modification, press ESC to close the dialog box. Look at the result in the animation window. Experiment with the surfaces until you find what works best for you.
- 3 Next, use the handles to modify the SmartPart graphically. Double-click the SmartPart with the left mouse button again.

- Click one of the handles. The ToolTip of the selected handle shows what can be modified and indicates the possible directions of the modification.



- Try out the various handles and check the effects.

The **Distance** handles modify the distance between the chairs and the table in 10cm increments. The minimum distance to the table is -30 cm; the maximum is 90 cm.

You can use the **Width** and **Length** handles to change the width and length of the table in 10 cm increments.

The **Length/Width** handle differs from all the other handles in that two directions are presented for modification.

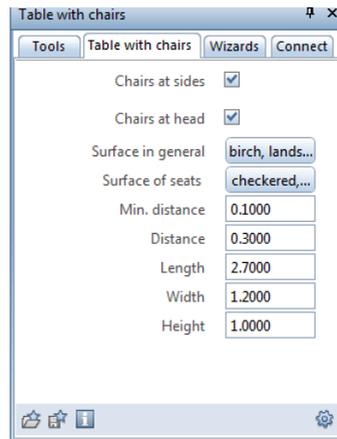
The **Chairs at head** and **Chairs at sides** handles control whether chairs are displayed.

Modifying the width and/or length of the table also changes the number of chairs, which is adjusted automatically.

When you change the length graphically, the values displayed in the dialog box update accordingly.

Note: In addition to using handles, you can also modify SmartParts graphically by entering the corresponding coordinates (dx, dy) in the dialog line.

- 6 Change the settings and dimensions of the table and the chairs as shown in the dialog box:



Note: You can find the **Maple 1, portrait** surface in the `\Std\Design\Default\Building\Finishes\Wood` folder.

- 7 Press ESC to finish entering.
- 8 Switch to plan view.
- 9 Move the mouse over the SmartPart. As soon as it is displayed in the selection color, double-click the right mouse button.

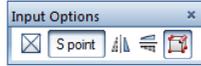
The SmartPart is copied and you can place it in the workspace.

- 10 Place the SmartPart to the right of the existing one.
- 11 As you do not want to use the handles to modify the SmartPart, press ESC.

Another SmartPart is attached to the crosshairs.

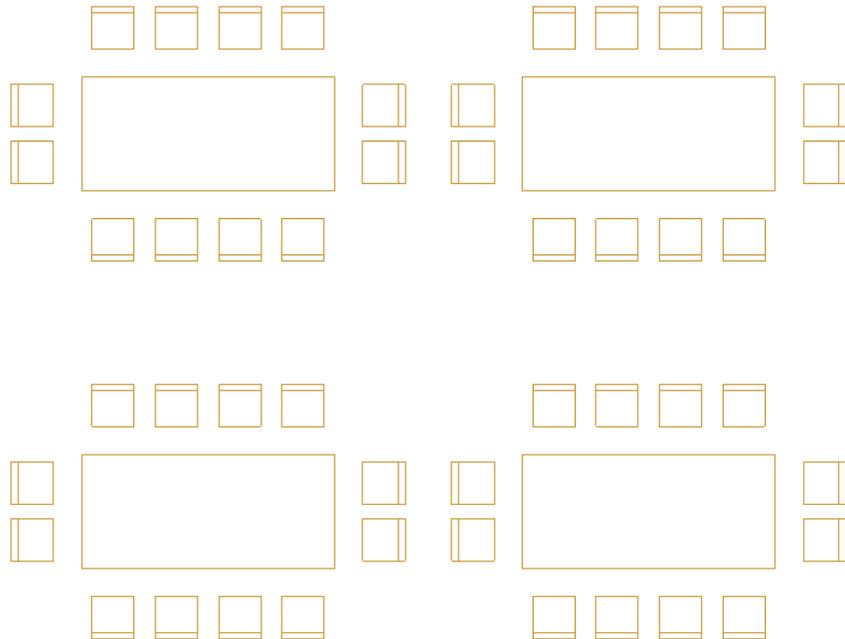
Place it as well as another copy of the SmartPart and press ESC twice to finish.

Note: The **Input Options** toolbar appears when you place the SmartPart. You can specify a new drop-in point for the SmartPart. In addition, you can mirror the SmartPart in the x and y directions and switch the **Modify SmartPart using Handles** tool on and off.



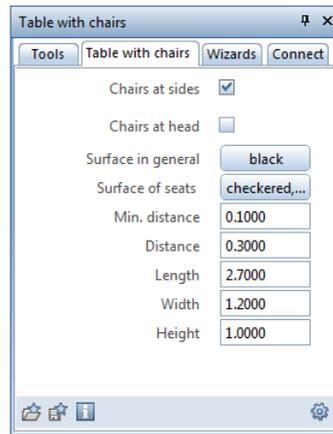
Note: Before placing the SmartPart, you can change the angle of rotation in the dialog line.

The result might look like this:

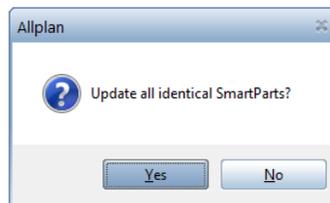


12 Open the shortcut menu of one SmartPart and select **Properties**.

- 13 Change the **Surface** and clear the **Chairs at head** check box, for example.



- 14 Press ESC to finish making changes.
- 15 The following prompt appears:
When you click Yes, all identical SmartParts in the drawing file change.
When you click No, only the selected SmartPart changes.



- 16 Click Yes.
- 17 Open an animation window to look at the result.
-

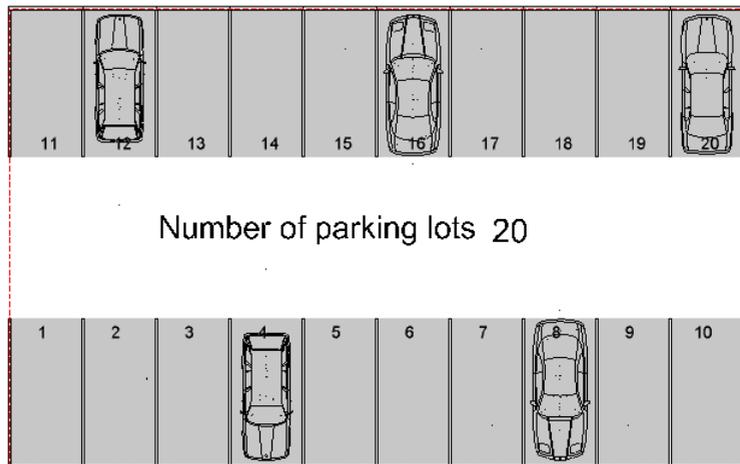
Inserting and modifying another SmartPart

In the second part of this exercise you will place and modify another SmartPart in Allplan. Now it's your turn.

The following section should serve as a guideline and does not consist of detailed descriptions of the individual steps.

- Make drawing file 3 current and close drawing file 2 ( **Open on a Project-Specific Basis...**).
- Select  **SmartPart** and insert the **Parking Lot SmartPart** (Exterior folder).
- Use  **Modify SmartPart using Handles** (shortcut menu) to change the number of parking lots.
- Use **Properties** (shortcut menu) to modify the SmartPart as follows:
 - Enter **Number of parking lots** for the text.
 - Place a car in every fourth lot.
 - Reduce the text height for lot numbering.
- Use  **Modify SmartPart using Handles** (shortcut menu) to adjust the position of the **Number of parking lots XX** text.

The result might look like this:



Step 3: Understanding Scripts

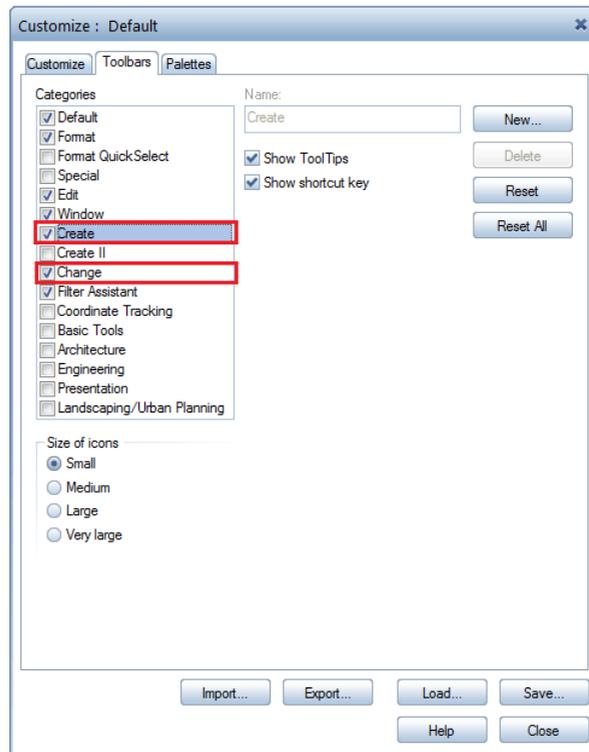
Additional tools for SmartParts

In the previous step you placed and modified a SmartPart in Allplan. The next step is to open and read the script of this SmartPart. First you need to integrate additional modification tools for SmartParts into the **Create** and **Change** toolbars.

To add tools to the toolbars

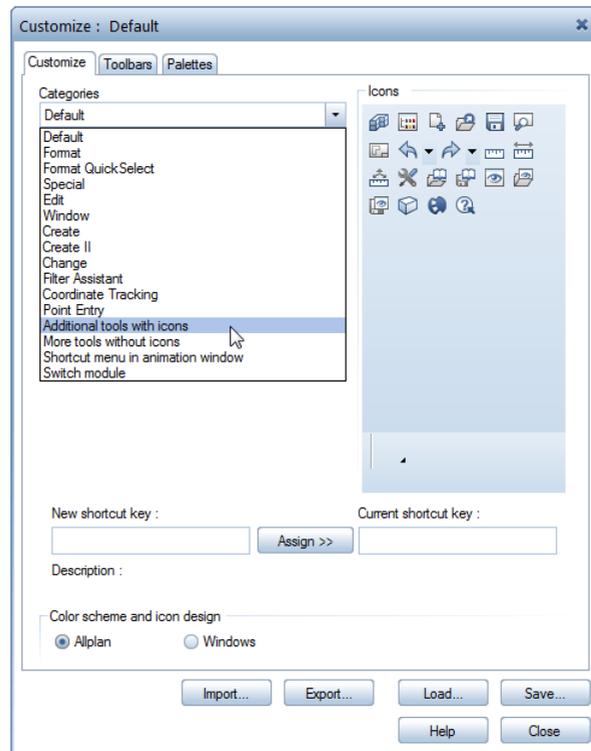
- Allplan is open and drawing file 3 is current.
- 1 On the **Tools** menu, click **Customize...**
The **Customize** dialog box opens.
- 2 Switch to the **Toolbars** tab.

3 Select the Create and Change tabs.



4 The toolbars are displayed in the workspace.

- 5 On the Customize tab, select the **Additional tools with icons** category.



- 6 Scroll down in the **Buttons** area.
- 7 Click  **Create SmartPart** and drag the icon with the left mouse button pressed down to the **Create** toolbar.
- 8 Add the icons of the  **Modify SmartPart using Script** and  **Modify SmartPart Instance's Attributes** tools to the **Change** toolbar.

The **Create** and **Change** toolbars should now look like this:



Now the toolbars and the **Create** and **Change** areas of the **Tools** palette of the **SmartParts** module provide all the tools relevant to SmartParts.

9 Close the **Customize: Default** dialog box.

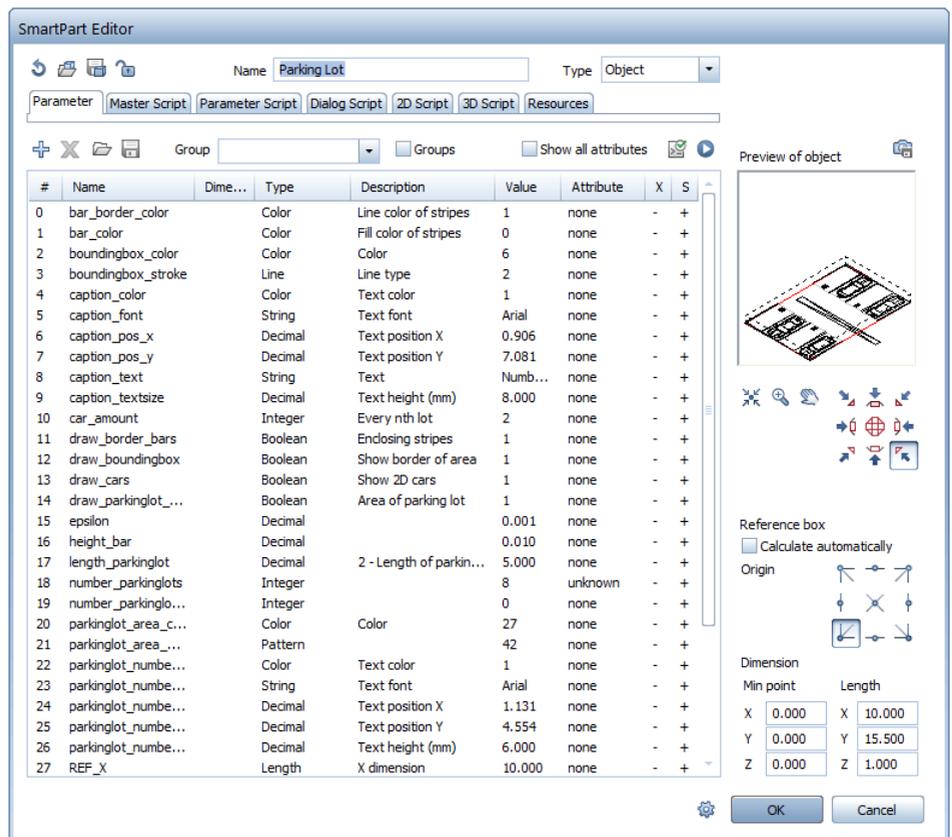
10 You can close the **Create** and **Change** toolbars again.

Reading scripts

You will use the  **Modify SmartPart using Script** tool to read the script of the SmartPart.

To open the script

- 1 Click  **Modify SmartPart using Script** in the Change area of the Tools palette.
- 2 *Which SmartPart would you like to modify?*
Click the parking lot.



The Allplan SmartPart Editor opens.

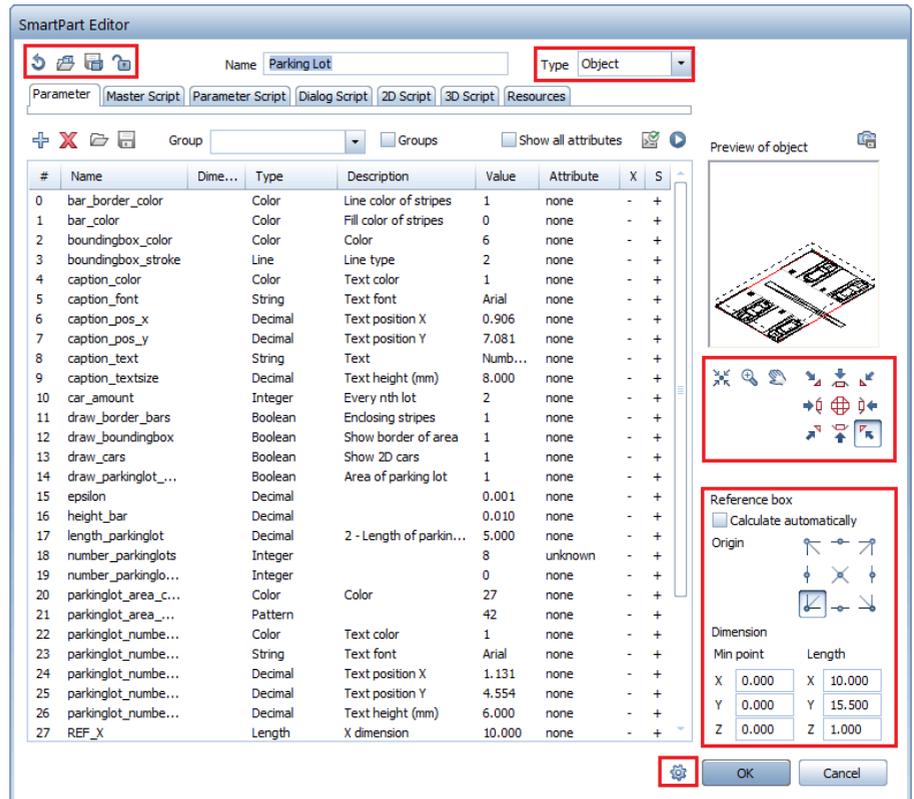
Allplan SmartPart Editor

The integrated SmartPart Editor has eight different tabs: **Parameters**, **Master Script**, **Parameter Script**, **Dialog Script**, **2D Script**, **3D Script** and **Resources**.

These tabs are briefly introduced in the following section.

Basic tools

The tools and options highlighted in red in the following illustration are available in all tabs:



The top part of the SmartPart Editor dialog box provides the following four tools:

-  **Reset:** you can reset all the entries for an object, which means that the object is reset to an empty default object.
-  **Open SmartPart:** you can open SmartPart files (*.smt files).
-  **Save SmartPart:** you can save the current SmartPart as a file (*.smt file).
-  **Lock SmartPart:** you can specify a password to protect the script of your own SmartPart object from unauthorized changes.

Using the **Type** selection menu, you can assign a type (e.g., beam, foundation, column) to the SmartPart. This attribute is analyzed in reports, for example.

The right-hand part of the **SmartPart Editor** dialog box contains tools you can use to define how the object is displayed in the **Preview** area. You can zoom in on the preview, pan or refresh the object displayed. You can also set different views.

At bottom right in the **SmartPart Editor** dialog box, you can move the **origin of the reference box** by clicking one of the options provided or by manually entering the corresponding values in the boxes below. In addition, you can define the size of the reference box. These values correspond to the global variables REF_X, REF_Y and REF_Z.

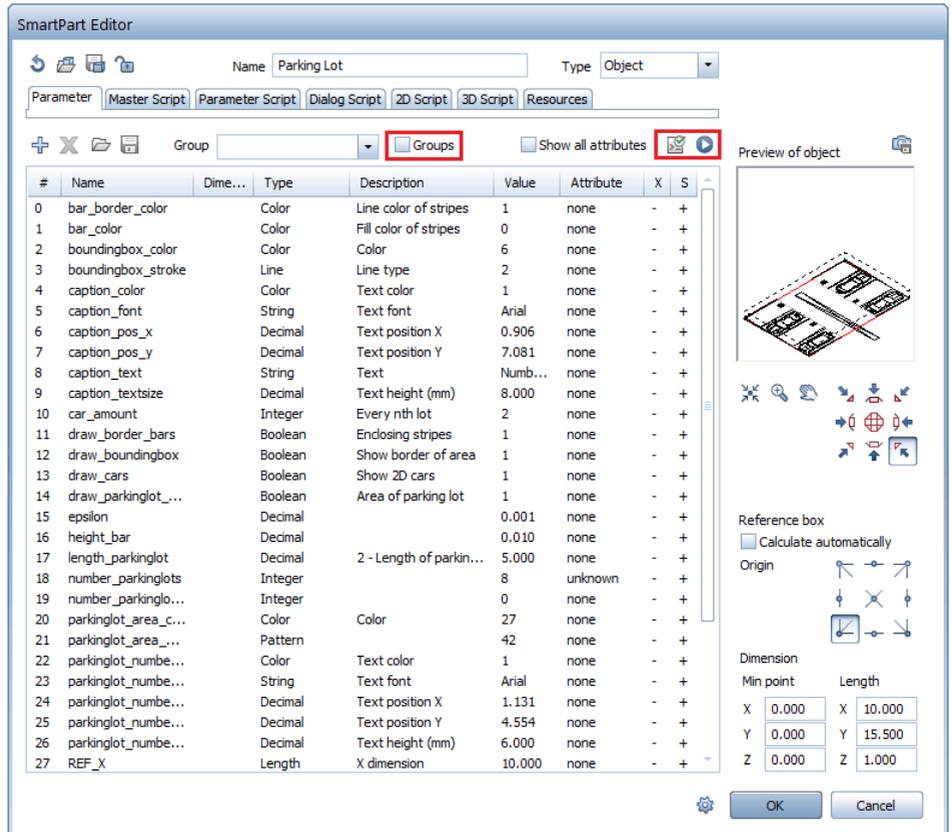
By default, the origin of the reference box is $X=Y=Z=0$, which means that the origin is at bottom left in the box.

You can find the  **SmartPart Settings** tool near the bottom of the **SmartPart Editor** dialog box. Clicking it opens the **Settings** dialog box, where you can check and change the SmartPart's settings. You can find more detail on this in Allplan's online Help. Please refer to the chapter "SmartPart Editor, Settings".

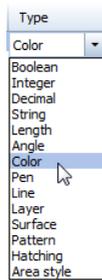
Parameters

You can add, edit and delete parameters. In addition, you can combine them in **groups** and display them accordingly (**Groups** option).

The **name** of a parameter must be unique in the SmartPart object and cannot be changed afterwards.



You can choose from the following types of parameters:

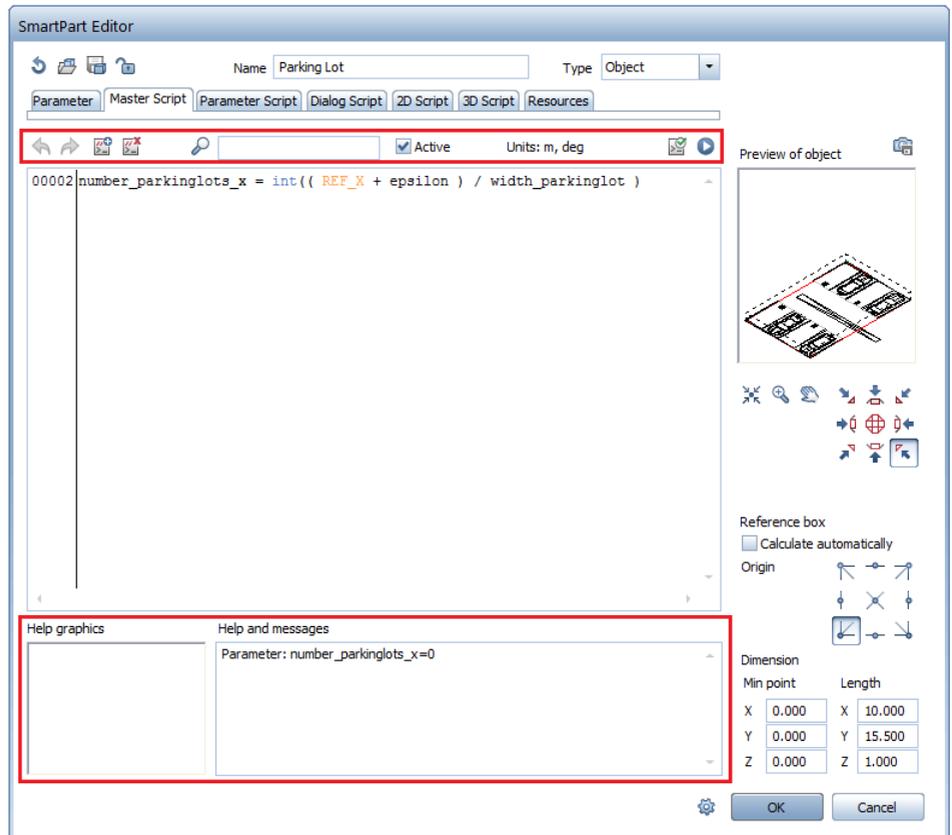


The entries you make in the **Description** and **Value** columns are freely definable.

The **Attribute** column associates the parameter with an Allplan attribute. When you select the **Show all attributes** options, all available Allplan attributes are presented for selection in the list.

You can use the  **Check / Format Script** tool to check you script for syntax errors and format it again. To run all the scripts defined in the editor, select the  **Run Script** tool. As a result, the corresponding dialog box opens.

Master script



The Master Script manages all global variables. In other words, the object information that is to apply to all parts of the script is defined in the Master Script. It runs prior to any other script (as if it was copied and placed in front of any other script).

The Master Script, Parameter Script, Dialog Script, 2D Script and 3D Script tabs provide the following tools:



  **Undo and Redo:** you can undo and redo the last text you entered in the script character by character.

 **Add Comment:** you can add comments that describe the actions of the following program lines or you can comment out program lines, which means that these lines will be ignored when you run the script. Lines that are commented out start with an exclamation mark "!".

 **Remove Comment:** you can remove comments. In other words, lines that have been commented out are re-integrated into the program and considered again when the program runs. The exclamation mark is deleted.

 **Search:** you can find strings or regular expressions in the script. The program scans the script for the text entered in the box and selects it after finding it. When you click again, the program starts at the current position and continues to scan the script for the text specified.

Active: you can activate or deactivate the script. If it is not active, it does not run.

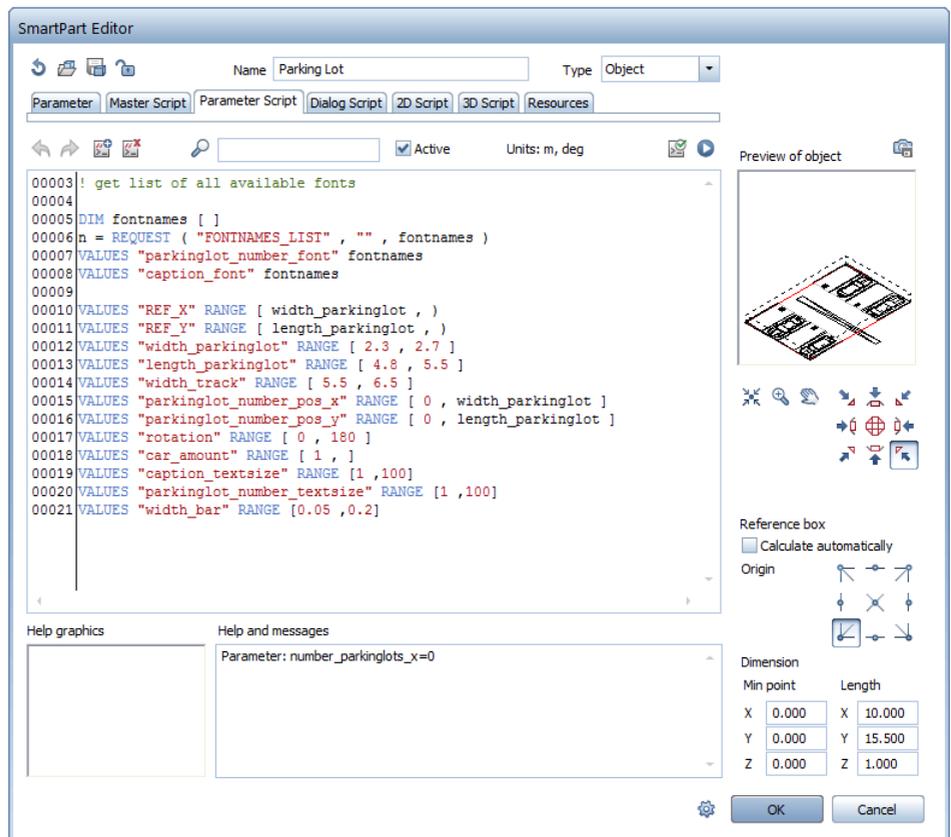
 **Check / Format Script:** you can check you script for syntax errors and format it again.

 **Run Script:** you can run the script. The result is displayed in the preview.

You can find help on the syntax in the bottom part of all script tabs. After you have clicked a command in the script, the **Help graphics** area graphically illustrates how the command in question functions. The **Help and messages** area shows the syntax of the command clicked and describes how it functions. Clicking a variable shows its current value. However, this is only possible if you have run the script before.

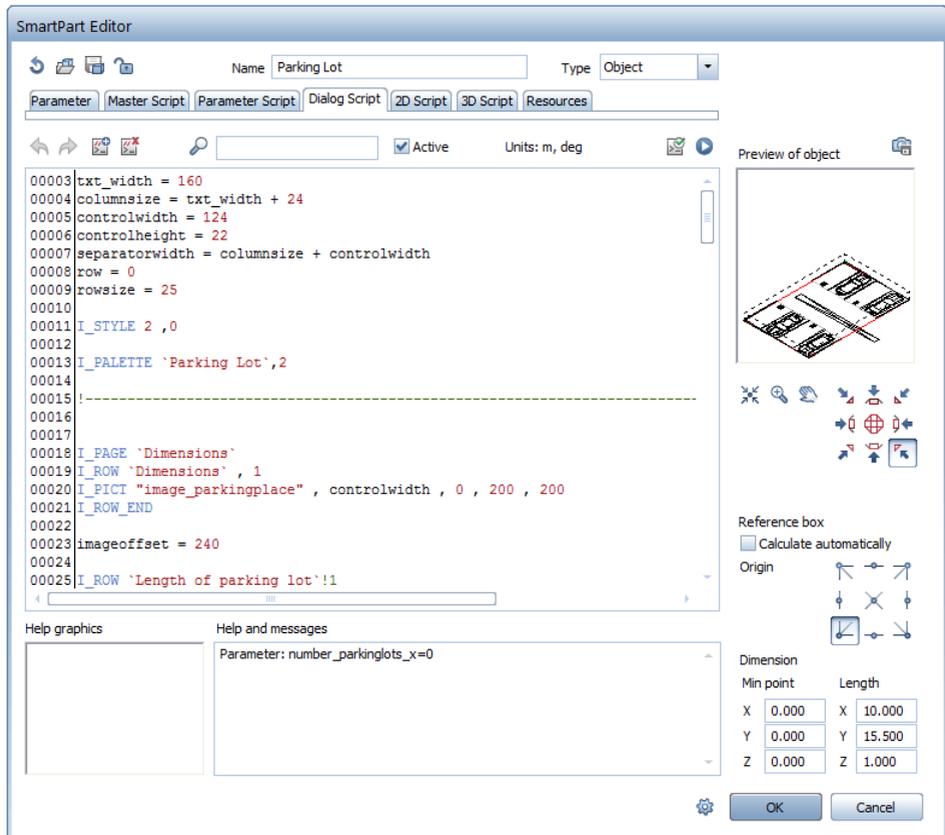
In this area, you can find any errors and messages that might occur while the script is running.

Parameter script



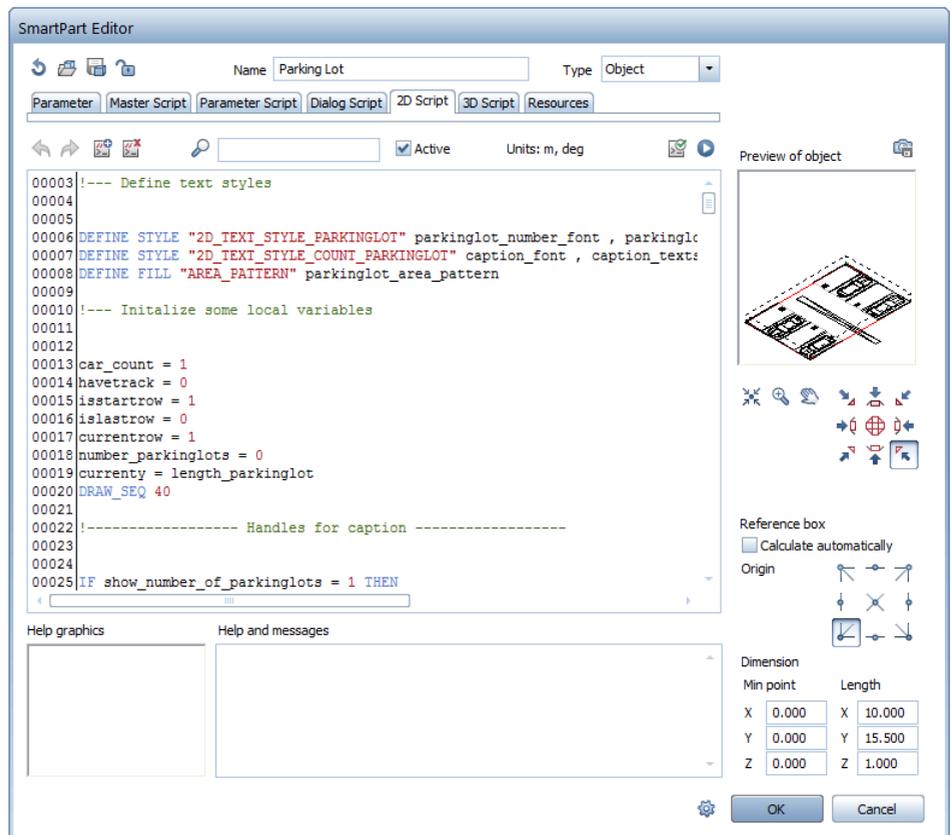
You can assign values to parameters and check entire areas in this script. It runs whenever you use a handle, apply changes in a dialog box or load and insert objects.

Dialog script



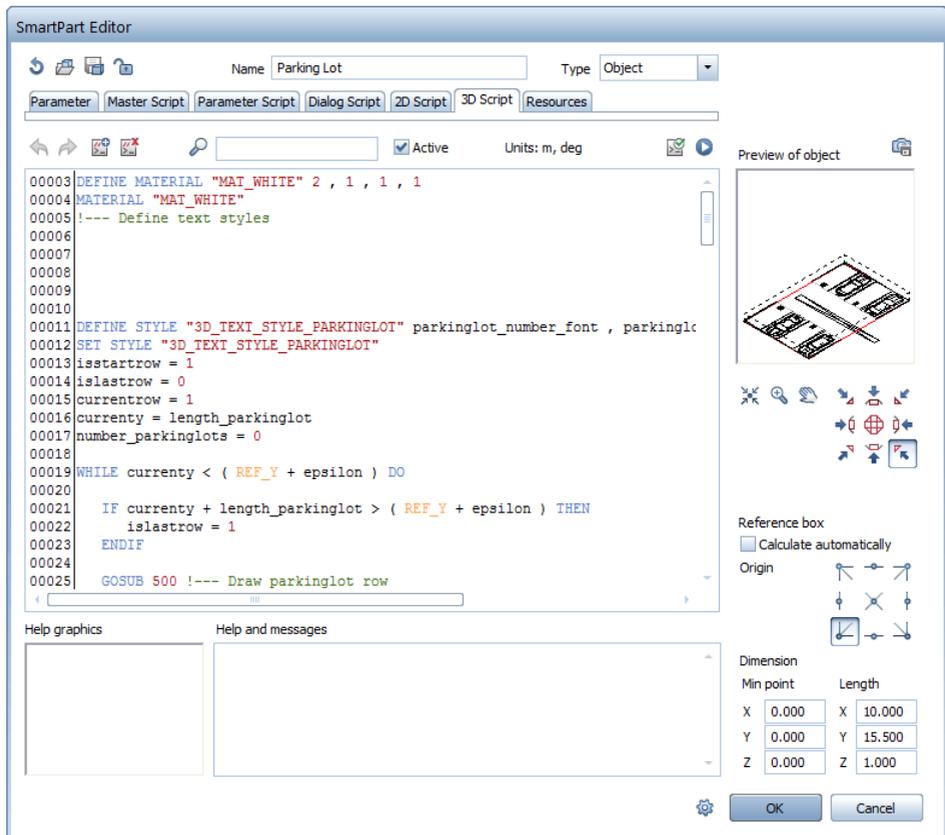
The Dialog script is used to generate the input dialog box. In this script, you can assign parameters, bitmaps, text and so on to this object-based dialog box.

2D script



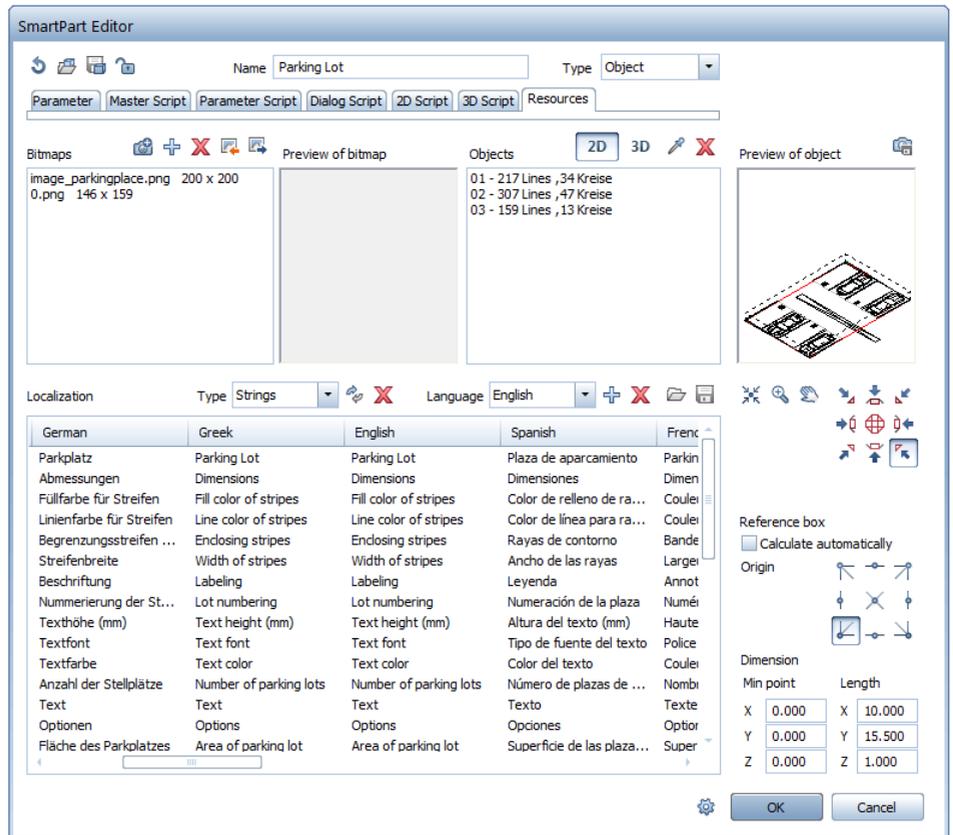
The 2D script is used to define the SmartPart's 2D data. In other words, you generate the 2D representation of the SmartPart.

3D script



The 3D script generates the 3D representation of the SmartPart.

Resources



Resources are geometric objects (lines, circles, solids), images or other SmartParts (subscripts) that are required for running the scripts. You can import bitmaps in the left-hand part and objects in the right-hand part.

You can make language-specific adjustments in the part at the bottom. For example, you can create separate parameter descriptions for each language.

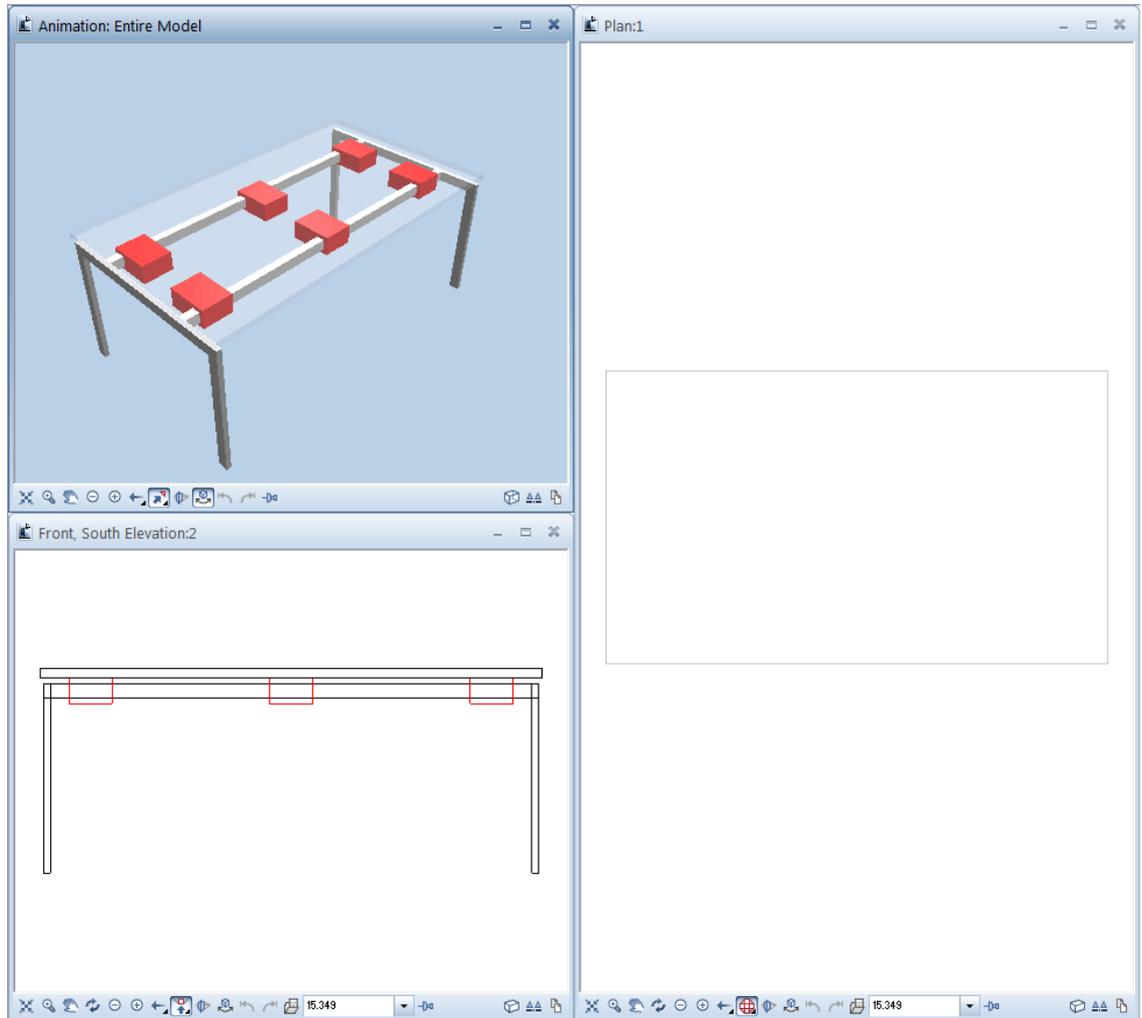
Look in Allplan's online Help for detailed descriptions of all the tools on this tab. Please refer to the chapter "SmartPart Editor, Resources tab".

As you do not want to change the existing SmartPart right now, click **Cancel** to close the SmartPart Editor.

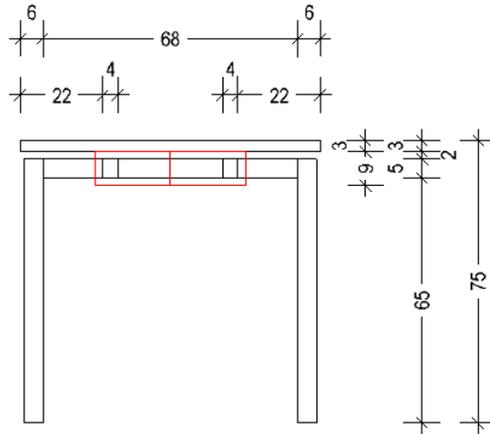
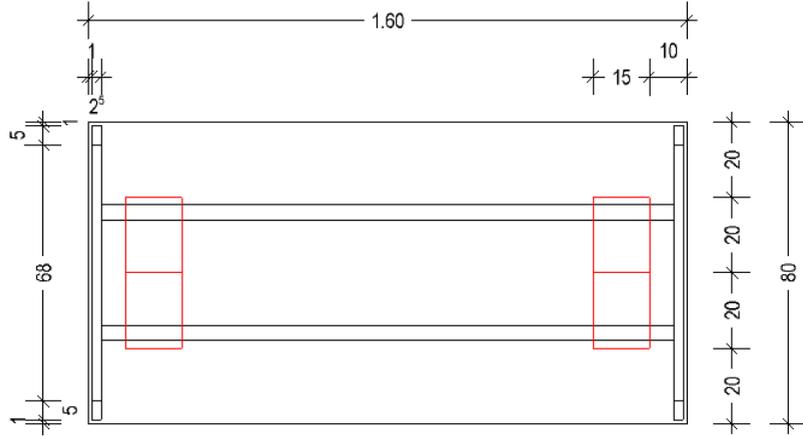
Step 4: Creating Your Own SmartPart

Objective

The aim of this exercise is to create your own SmartPart. You will create a table by generating a script in the SmartPart Editor. This table - Flexi 01 - will be adjustable in length, width and height. The surface of the tabletop will be variable. Similarly, the colors for the frame, the individual table elements and for the representation of the table in plan will be variable, too.

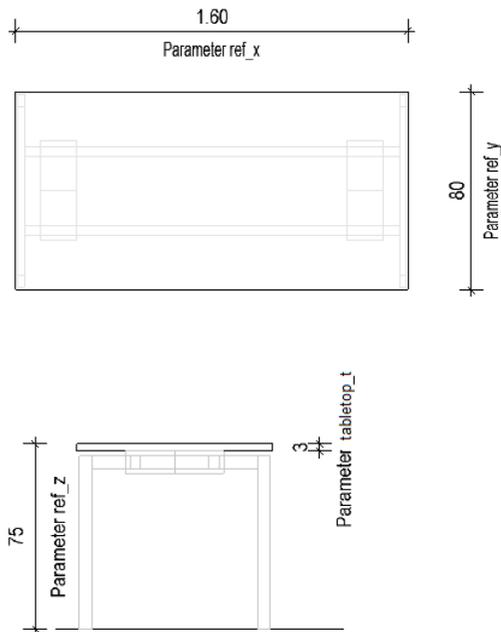


The following illustrations show the Flexi 01 table with its main dimensions. At the beginning of each exercise, the required dimensions are displayed again in detailed drawings.



Creating the tabletop

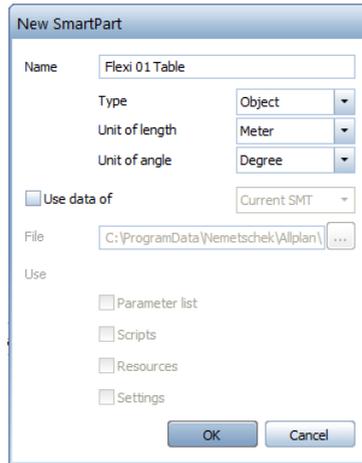
Start by creating the tabletop.



To create the geometry of the tabletop

- ➔ Allplan is open and drawing file 3 is current.
- 1 Open a new drawing file by clicking  **Open on a Project-Specific Basis** on the **Default** toolbar.
- 2 Select the **Fileset structure** tab. Make drawing file 4 current and close all the others.
- 3 Click  **Create SmartPart** on the **Create** toolbar of the **SmartParts** module.
- 4 The entries of the last SmartPart you used are displayed in the **SmartPart Editor**. To empty the **SmartPart Editor**, click  **Reset**.
- 5 The **New SmartPart** dialog box opens. Type in **Flexi 01 Table** for the name.

- 6 Set the type to **Object**, the unit of length to **Meter** and the unit of angle to **Degree**.
- 7 As the new SmartPart is not to be based on any existing data, you do not need to select any option.



- 8 Click **OK** to close the dialog box.

The **Parameters** tab is open.

- 9 The table is to be created completely within the reference box. Therefore, enter the following initial values:
ref_x = 1.600
ref_y = 0.800
ref_z = 0.750

Click in the relevant box in the **Value** column, enter the value and press ENTER to confirm.

Note: All length entries are in meters.

Decimal values are separated by *points* and not by *commas*.

The reference box in the preview adapts accordingly. The same applies to the length values displayed at bottom right in the dialog box.

- 10 Switch to the **3D Script** tab.
- 11 It makes sense to begin each part of the program with a comment so that you can quickly find specific parts later.

Comments describe the actions of the subsequent program lines. Lines you comment out are ignored when the program runs. Lines that are commented out start with an exclamation mark "!".

Therefore, in line 00003, enter:

```
!Define tabletop
```

12 Pressing ENTER takes you to the next line of the script.

To create a blank line, press ENTER again. This takes you to line 00005.

13 First, the coordinate system is to be moved to the position where the tabletop is to be created.

The initial height of the table is to be 75cm. This requires the `ref_z` parameter.

The command for moving the coordinate system is TRANS.

In line 00005, enter:

```
TRANSZ ref_z
```

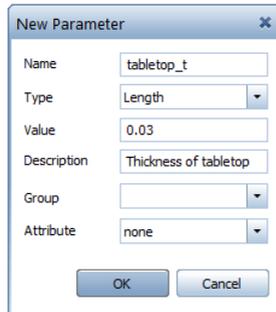
14 Click  **Run Script**.

The coordinate system has been moved to the top left corner of the reference box.

15 To enter the dimensions (length= 1.6 m = `ref_x`; width= 0.8 m = `ref_y` and thickness = 0.03 m) for the tabletop, you need to define a parameter for the thickness of the tabletop, which is to be variable.

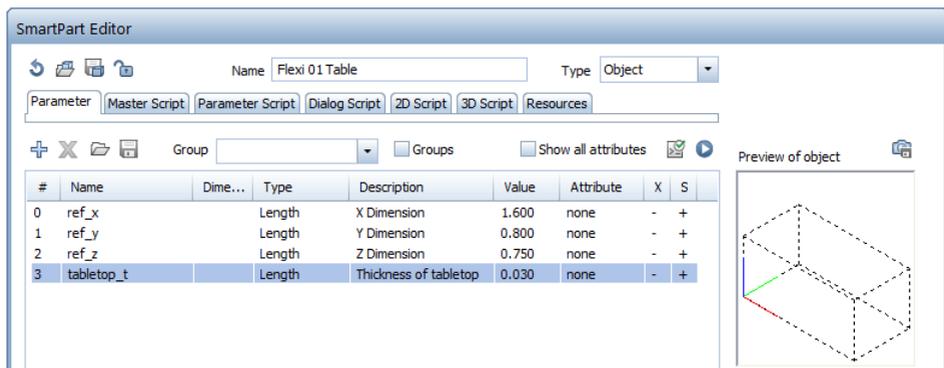
Switch to the Parameters tab and click  **Add Parameter**.

16 Make the following settings in the New Parameter dialog box:



Note: Always use capital letters for commands (TRANS, BOX...) and small letters for parameters.

17 Click OK.



18 Switch back to the 3D Script tab.

19 To create the tabletop, use the **BOX** command.

In line **00006**, enter:

```
BOX ref_x, ref_y, -tabletop_t
```

Bear in mind: dimensions of the tabletop

Length = 1.6 m = ref_x; width= 0.8 m = ref_y and thickness = tabletop_t = 0.03 m

Note: The bottom part of the SmartPart Editor provides help on the **BOX** command, which is displayed graphically in the "Help

Graphics” area and described in detail in the “Help and messages” area.

- 20 To define more elements based on scripts later, it is a good idea to move the coordinate system back to its initial position (bottom left corner). This requires the **RESTORE** command.

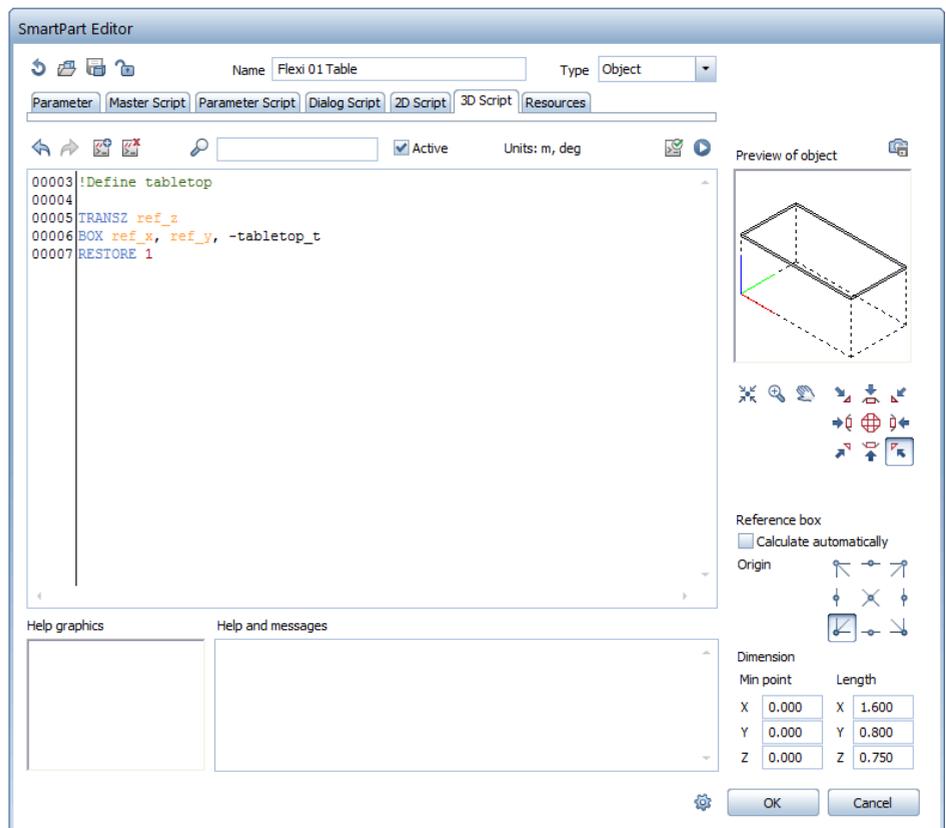
In line 00007, enter:

```
RESTORE 1
```

- 21 Click  **Check / Format Script**.

The **Help and messages** area indicates whether your entries are correct.

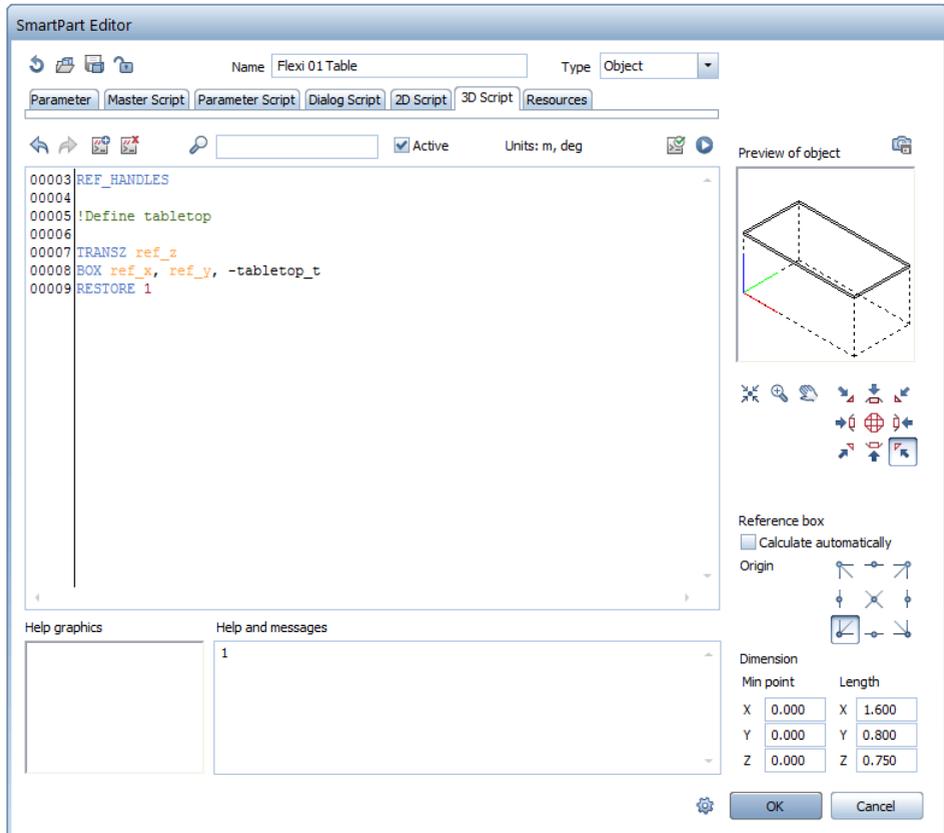
- 22 Click  **Run Script**.



23 Insert two more lines at the beginning of the 3D script and write in the first line:

```
REF_HANDLES
```

This automatically creates handles at the tabletop.



24 Click  Run Script again.

25 Click OK to close the SmartPart Editor dialog box.

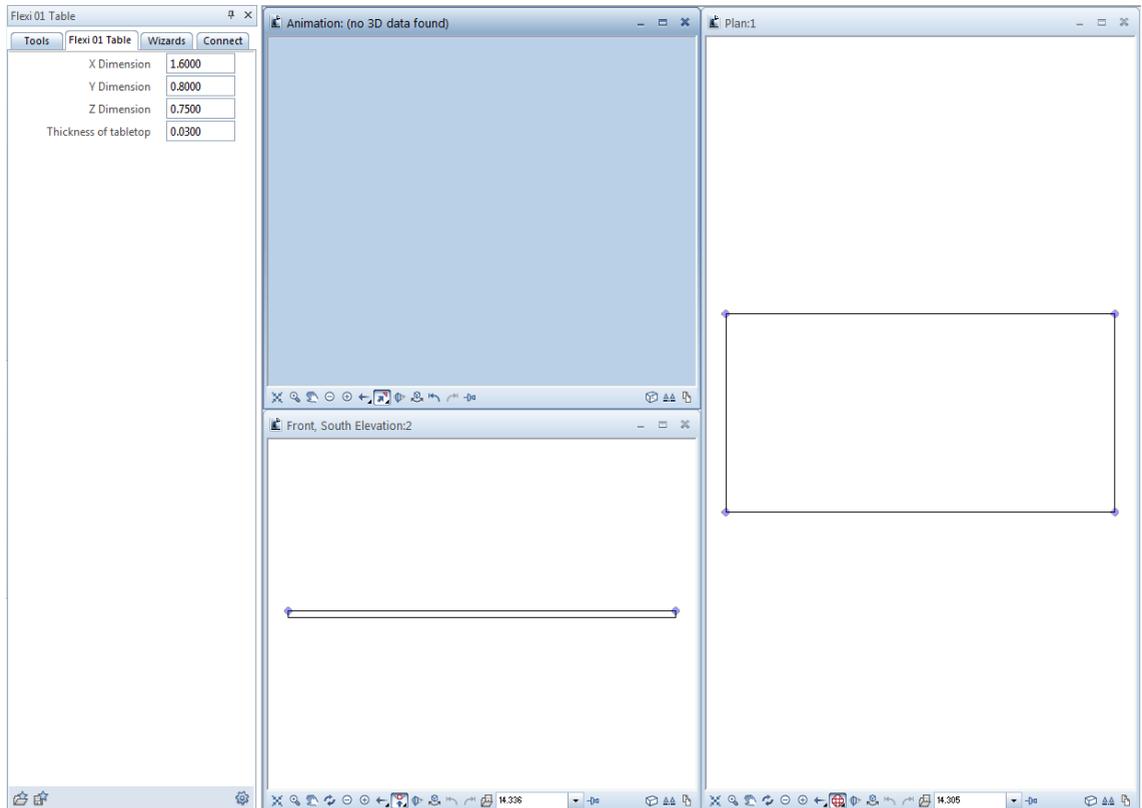
26 Place the SmartPart in the drawing file and press ESC to quit the tool.

The SmartPart is saved in the drawing file for the first time.

27 Click  2+1 Animation Window to look at the result.

28 Double-click the Flexi 01 Table SmartPart with the left mouse button.

The SmartPart is displayed with handles and the Flexi 01 Table palette appears. Now you can use either option to modify the SmartPart: you can enter values directly in the palette or drag the handles. Try it out for yourself!



29 When you have finished, change the SmartPart's dimensions back to those shown in the illustration above and click  Close to close the Flexi 01 Table palette.

Tip: You can select the entire script or parts thereof in this summary, copy the data to the Clipboard and paste it into the corresponding tab of Allplan's SmartPart Editor. Blank lines are ignored.

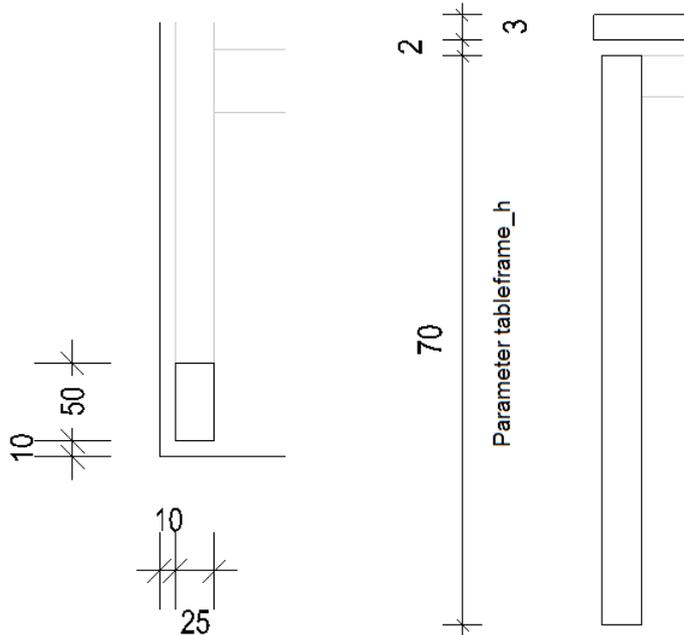
Summary of the current 3D script:

```
REF_HANDLES
!Define tabletop
TRANSZ REF_Z
BOX REF_X , REF_Y , -tabletop_t
RESTORE 1
```

Creating table legs

The subframe of the table consists of 4 legs, 2 cross braces connecting two legs each and 2 longitudinal bars.

In the next step, you will create the four table legs. The geometry of all four legs is the same. It is the position that varies.



To create the geometry of the table legs

- Allplan is open and drawing file 4 is current.
- 1 Click  **Modify SmartPart using Script (SmartParts module)** in the **Change** area of the Tools palette.
- 2 Click the tabletop.
- 3 Open the **3D Script** tab in the SmartPart Editor.

- 4 For a better overview in the script, it is a good idea to leave blank lines between the individual program parts.
Insert a blank line after the **RESTORE 1** command.
Write the following comment in the next line:

```
!Leg at bottom left
```

- 5 The tabletop is to project over the table legs by one centimeter in the x direction and the y direction. To position the first table leg accordingly, do the following:
Leave a blank line and enter:

```
TRANS 0.01, 0.01, 0
```

This moves the coordinate system by 1 cm in the x direction and the y direction. The z direction is not affected by the movement.

- 6 Next, enter the dimensions for the table leg. Its width is 2.5 cm, its depth is 5 cm and its height is to be defined so that the leg ends 2 cm below the tabletop.
The height of the table legs is to be adjustable. The **height of table frame** variable is given the following name:
tableframe_h
It consists of the total height of the table (ref_z) minus the thickness of the tabletop (tabletop_t) and the 2 cm offset from the bottom of the tabletop.
Insert blank lines below **REF_HANDLES** (line 00003) and write in one of these lines:

```
tableframe_h=ref_z-tabletop_t-0.02
```

Note: Dimensions you require a number of times can be defined as variables. If necessary, you can quickly replace them with parameters in the script later. As a result, the relevant dimension becomes parametric.

- 7 Now you can create the **BOX** for the table leg. Press **ENTER** to insert a line after **TRANS 0.01, 0.01, 0** and enter the following in the new line:

```
BOX 0.025, 0.05, tableframe_h
```

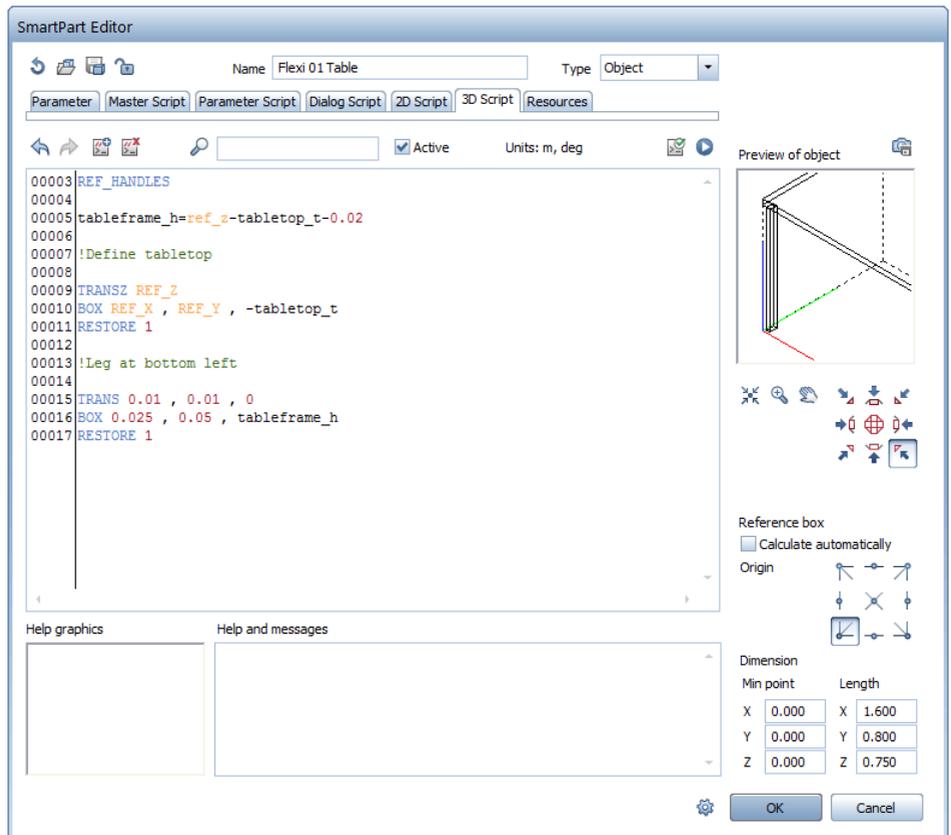
- 8 Next, restore the original position of the coordinate system:

```
RESTORE 1
```

- 9 Click  **Check / Format Script**.

The Help and messages area indicates whether your entries are correct.

10 Click  Run Script.



11 After having created the leg at bottom left, you can enter the lines for the remaining three table legs:

```
!Leg at top left
```

```
TRANS 0.01 , REF_Y - 0.01 - 0.05 , 0
```

```
BOX 0.025 , 0.05 , tableframe_h
```

```
RESTORE 1
```

```
!Leg at bottom right
```

```
TRANS REF_X - 0.01 - 0.025 , 0.01 , 0
```

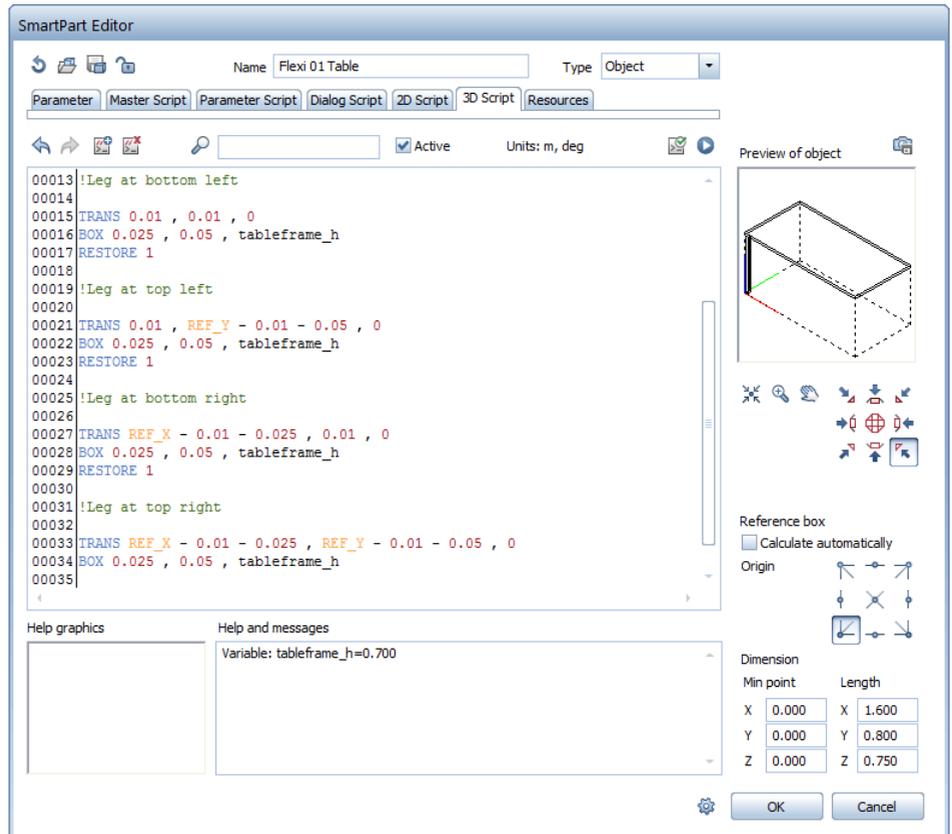
```
BOX 0.025 , 0.05 , tableframe_h
```

```
RESTORE 1
```

```
!Leg at top right
```

```
TRANS REF_X - 0.01 - 0.025 , REF_Y - 0.01 - 0.05 , 0
```

```
BOX 0.025 , 0.05 , tableframe_h
```



Check the position of the coordinate system in the reference box every time you enter the RESTORE and TRANS commands.

12 To finish, enter:

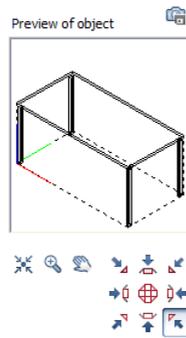
```
RESTORE 1
```

13 Click  Check / Format Script.

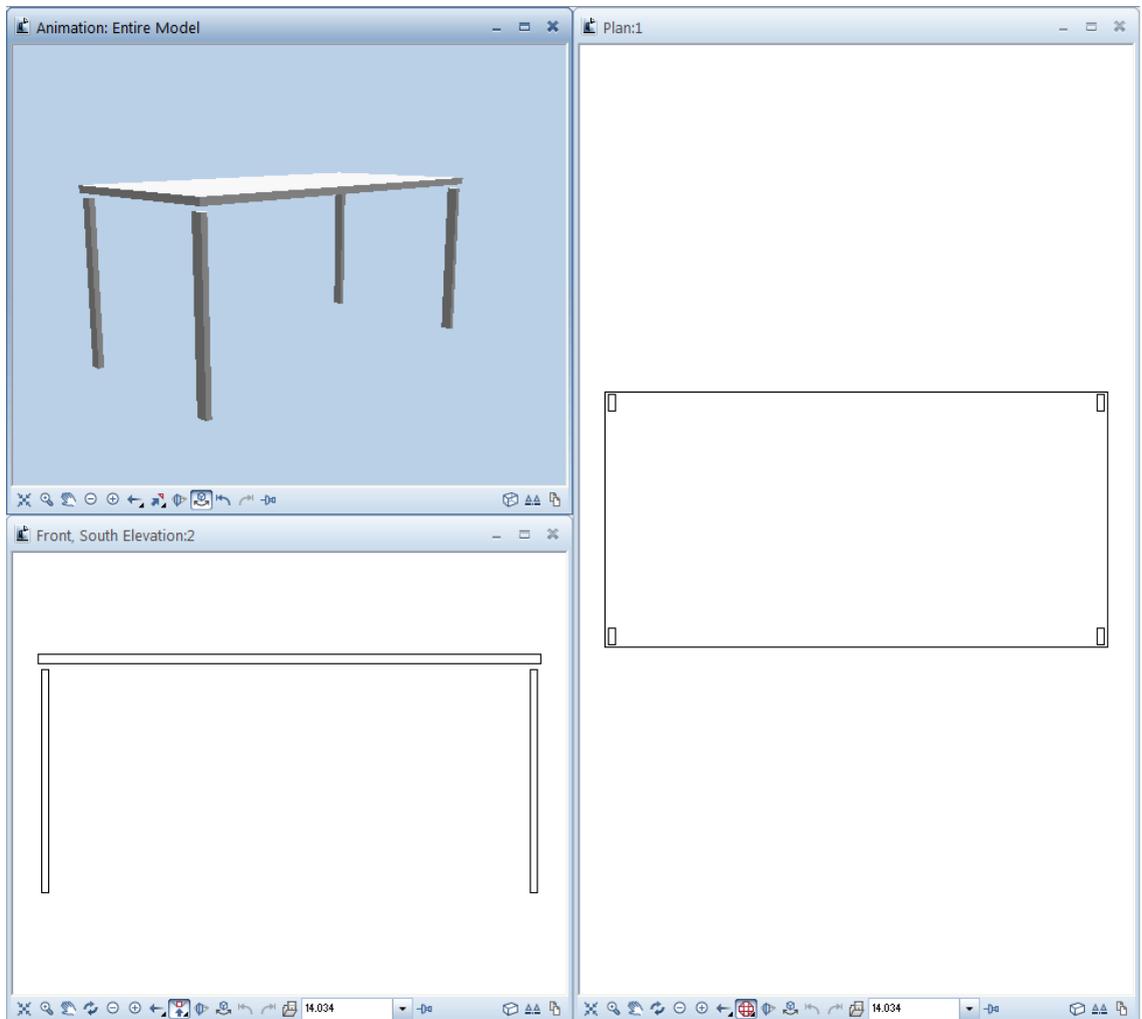
The Help and messages area indicates whether your entries are correct.

14 Click  Run Script.

If everything is correct, the preview of the object should now look like this:



15 Click OK to close the **SmartPart Editor** dialog box and check the result.



Tip: You can select the entire script or parts thereof in this summary, copy the data to the Clipboard and paste it into the corresponding tab of Allplan's SmartPart Editor. Blank lines are ignored.

Summary of the current 3D script:

```
REF_HANDLES
tableframe_h=ref_z-tabletop_t-0.02
!Define tabletop
TRANSZ REF_Z
BOX REF_X , REF_Y , -tabletop_t
RESTORE 1

!Leg at bottom left
TRANS 0.01 , 0.01 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1

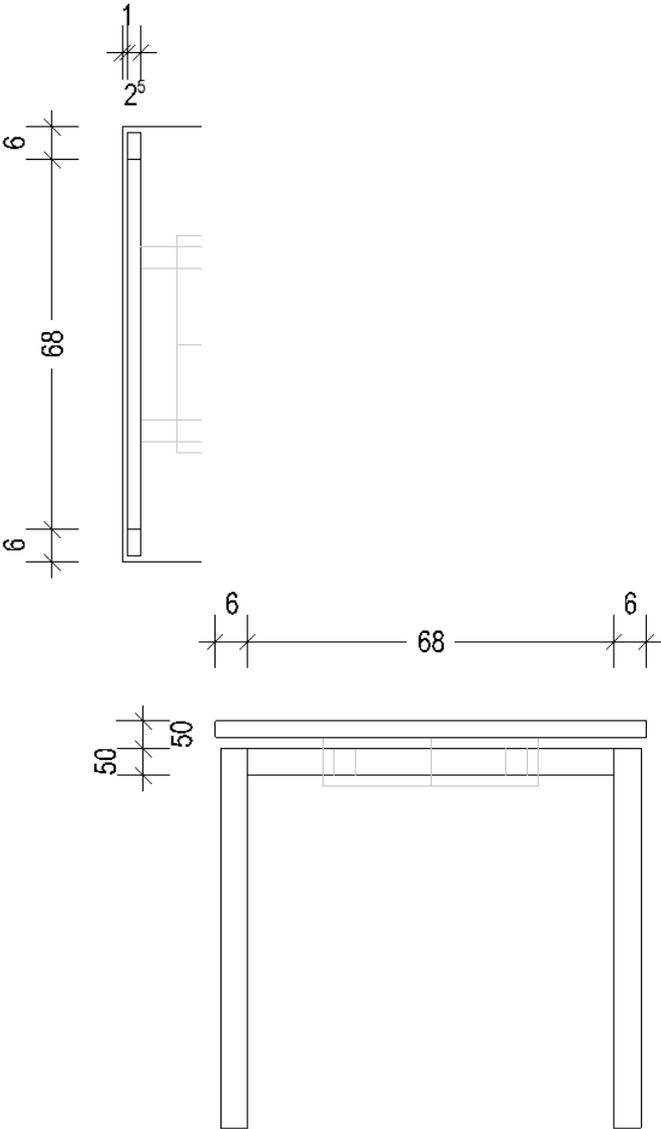
!Leg at top left
TRANS 0.01 , REF_Y - 0.01 - 0.05 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1

!Leg at bottom right
TRANS REF_X - 0.01 - 0.025 , 0.01 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1

!Leg at top right
TRANS REF_X - 0.01 - 0.025 , REF_Y - 0.01 - 0.05 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1
```

Creating cross braces

Cross braces are used to connect the table legs at the shorter sides of the table.



To create the geometry of the cross braces

- Allplan is open and drawing file 4 is current.
- 1 Click  **Modify SmartPart using Script** on the **Change** toolbar of the **SmartParts** module.
- 2 Click the SmartPart.
- 3 Open the **3D Script** tab in the **SmartPart Editor**.
- 4 After you have inserted blank lines, enter the following comment:

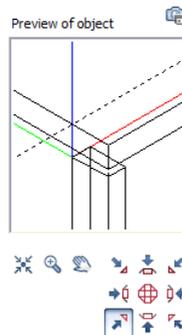
```
!Brace on the left
```

- 5 Here, too, the tabletop is to project over the cross brace by one centimeter in the x direction and the y direction. In addition, you need to consider the depth of the table leg (5 cm) in the y direction. The height of the table frame (tableframe_h) is defined as the initial point in the y direction.

Leave a blank line and enter:

```
TRANS 0.01, 0.01+0.05, tableframe_h
```

- 6 Click  **Run Script** and select a suitable view in the preview. The result should look like this:



- 7 Next, enter the dimensions for the cross brace. Its width is 2.5 cm, its height is 5 cm and its length is to be defined so that the brace extends as far as the rear table leg.
The length is calculated from: $\text{ref_y} - 2 * (0.05 + 0.01)$
Explanation: total table width - 2*(depth of table leg + projection)

of tabletop)

In the next line, enter:

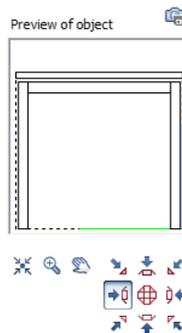
```
BOX 0.025, ref_y-2*(0.05+0.01), -0.05
```

8 Reset the coordinate system:

```
RESTORE 1
```

9 Click  Check / Format Script.

10 Click  Run Script.



11 Next, define the cross brace on the right.

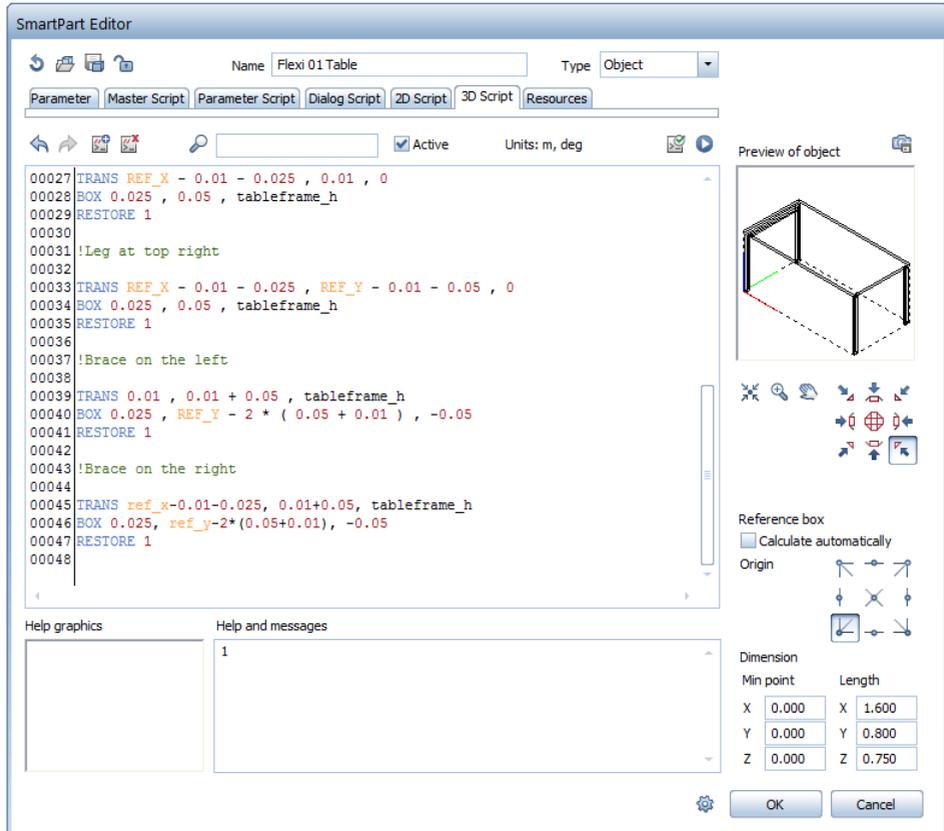
```
!Brace on the right
```

```
TRANS ref_x-0.01-0.025, 0.01+0.05, tableframe_h
```

```
BOX 0.025, ref_y-2*(0.05+0.01), -0.05
```

```
RESTORE 1
```

12 Click  Check / Format Script and then  Run Script.



13 Click OK to close the SmartPart Editor dialog box and check the result.

Tip: You can select the entire script or parts thereof in this summary, copy the data to the Clipboard and paste it into the corresponding tab of Allplan's SmartPart Editor. Blank lines are ignored.

Summary of the current 3D script:

```
REF_HANDLES
tableframe_h=ref_z-tabletop_t-0.02
!Define tabletop

TRANSZ REF_Z
BOX REF_X , REF_Y , -tabletop_t
RESTORE 1

!Leg at bottom left
TRANS 0.01 , 0.01 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1

!Leg at top left
TRANS 0.01 , REF_Y - 0.01 - 0.05 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1

!Leg at bottom right
TRANS REF_X - 0.01 - 0.025 , 0.01 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1

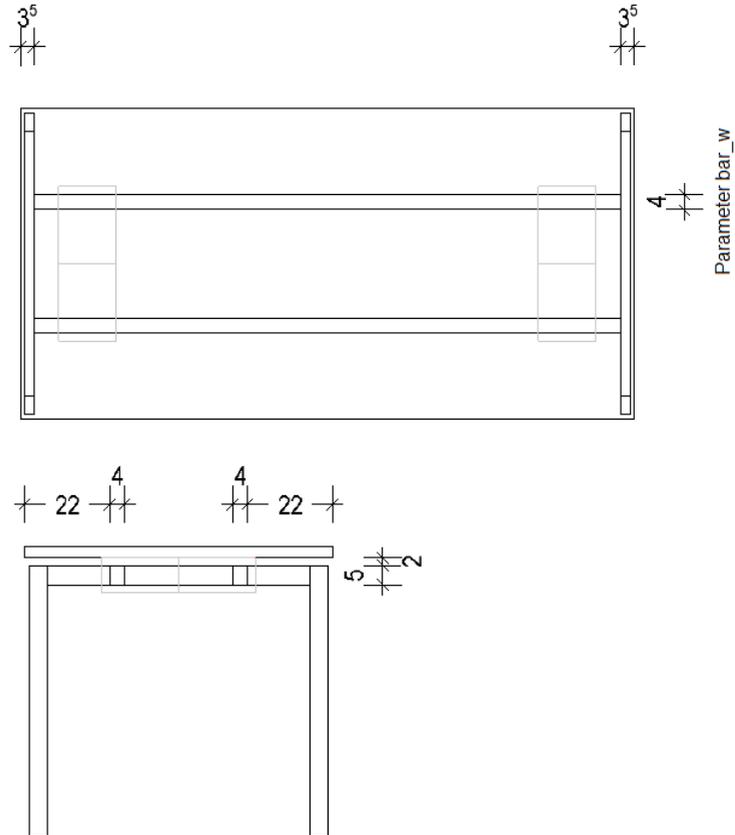
!Leg at top right
TRANS REF_X - 0.01 - 0.025 , REF_Y - 0.01 - 0.05 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1

!Brace on the left
TRANS 0.01 , 0.01 + 0.05 , tableframe_h
BOX 0.025 , REF_Y - 2 * ( 0.05 + 0.01 ) , -0.05
RESTORE 1

!Brace on the right
TRANS REF_X - 0.01 - 0.025 , 0.01 + 0.05 , tableframe_h
BOX 0.025 , REF_Y - 2 * ( 0.05 + 0.01 ) , -0.05
RESTORE 1
```

Creating bars

The table legs and the cross braces form two frames, which will be connected by longitudinal bars.



To create the geometry of the bars

- Allplan is open and drawing file 4 is current.
- 1 Click  **Modify SmartPart using Script** on the **Change** toolbar of the **SmartParts** module.
- 2 Click the SmartPart.

3 Open the 3D Script tab in the SmartPart Editor.

4 Write the following comment:

```
!Bars
```

5 Write another comment in the next line:

```
!Bar at bottom
```

Note: Do not forget to insert blank lines for a better overview.

6 To move the coordinate system to the correct position, enter the following in the next line:

```
TRANS 0.01+0.025, 0.22, tableframe_h
```

- Explanation - x direction: 0.01 m projection of tabletop + 0.025 m width of cross brace
- Explanation - y direction: 0.22 m fixed offset of bar from edge of tabletop
- Explanation - z direction: height of table frame

7 Here, you will use a subscript. The geometry of the bar will be created in this subscript.

The command for calling subscripts is **GOSUB**.

Enter:

```
GOSUB "bar"
```

8 After having inserted several blank lines, enter the following comment:

```
!Subscript for bar
```

9 After having inserted another blank line, enter the following:

```
Bar:
```

10 To define the geometry of the bar, you require a new parameter - the bar width.

Switch to the Parameters tab.

11 Click  Add Parameter.

12 Enter the following:

13 Click **OK** to close the **New Parameter** dialog box.

14 Switch back to the **3D Script** tab.

15 Here, too, you will use the **BOX** command to create the geometry of the bar.

In the next line after **Bar**, enter the following:

```
BOX ref_x-2*(0.01+0.025), bar_w, -0.05
```

- Explanation - x direction: length of tabletop - 2*(0.01 m projection of tabletop + 0.025 m width of cross brace)
- Explanation - y direction: bar width
- Explanation - z direction: bar height

16 To complete the subscript, enter:

```
RETURN
```

17 After having inserted a blank line, enter the following comment:

```
!Subscript for bar - end
```

18 Go back to the **GOSUB "bar"** line and enter in the next line:

```
RESTORE 1
```

19 Next, define the second bar. To do this, insert the following lines between the last **RESTORE 1** command and the **!Subscript for bar** comment:

```
!Bar at top
```

```
TRANS 0.01+0.025, ref_y-0.22-bar_w, tableframe_h
```

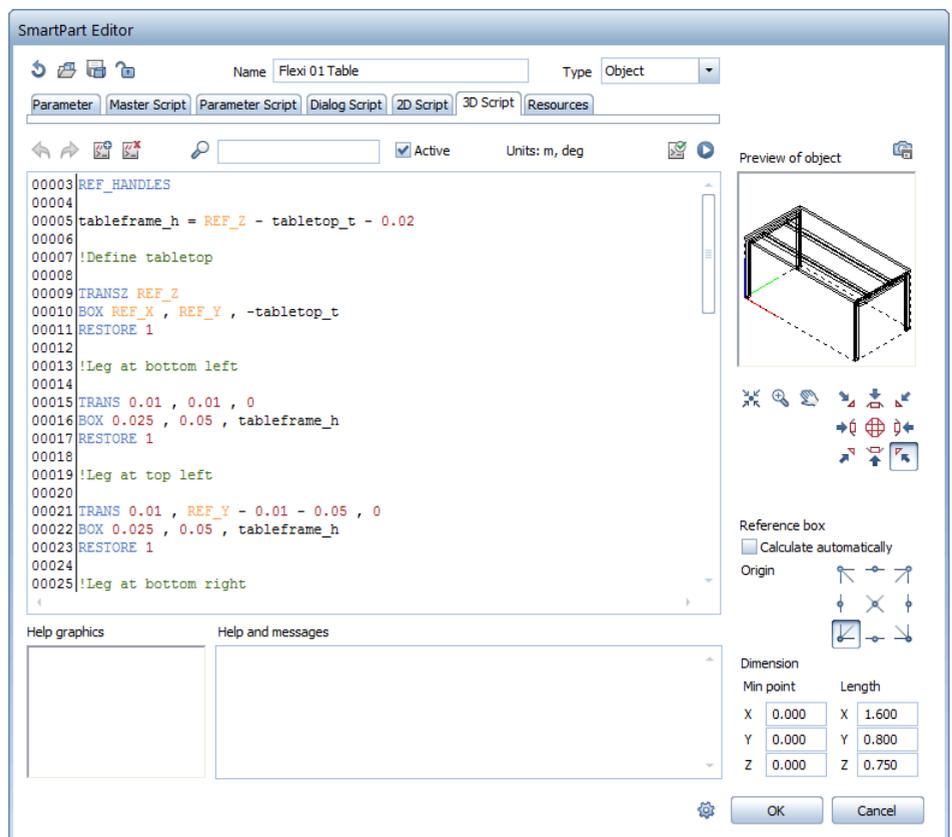
```
GOSUB "bar"
```

```
RESTORE 1
```

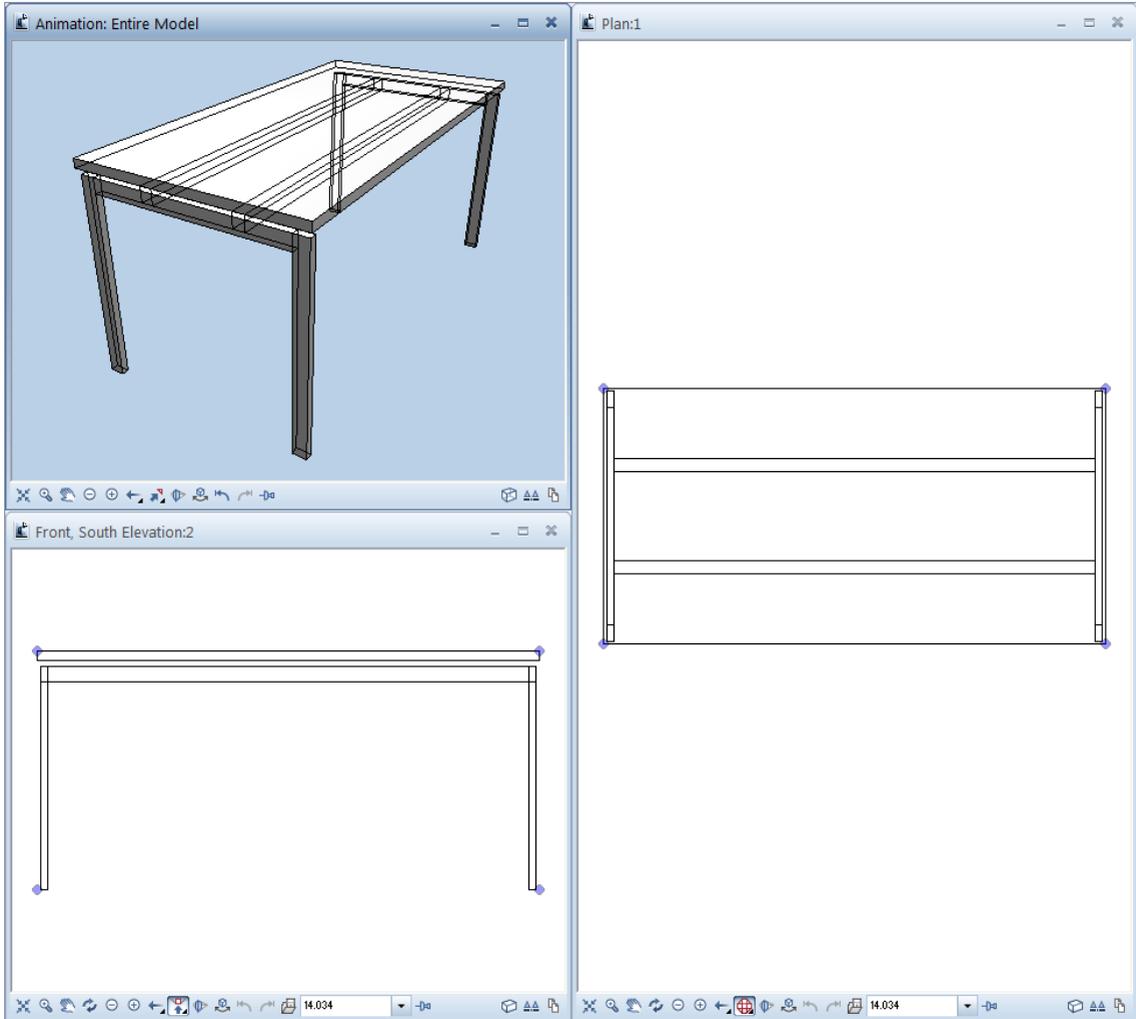
20 After having inserted a blank line, enter the command for completing the program:

```
END
```

21 Click  **Check / Format Script** and then  **Run Script**.



22 Click OK to close the SmartPart Editor dialog box and check the result.



Tip: You can select the entire script or parts thereof in this summary, copy the data to the Clipboard and paste it into the corresponding tab of Allplan's SmartPart Editor. Blank lines are ignored.

Summary of the current 3D script:

```

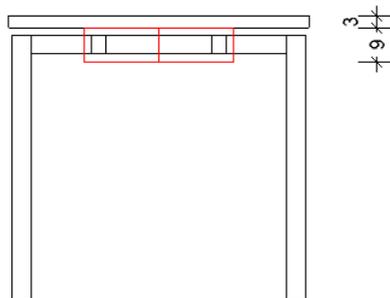
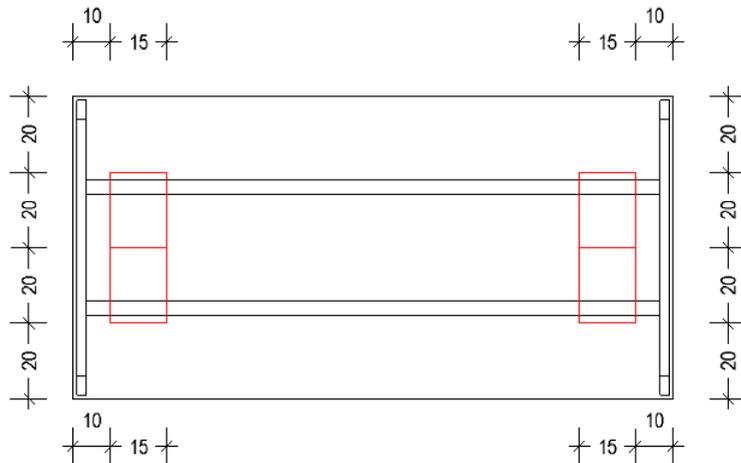
REF_HANDLES
tableframe_h=ref_z-tabletop_t-0.02
!Define tabletop
TRANSZ REF_Z
BOX REF_X , REF_Y , -tabletop_t
RESTORE 1
!Leg at bottom left
TRANS 0.01 , 0.01 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1
!Leg at top left
TRANS 0.01 , REF_Y - 0.01 - 0.05 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1
!Leg at bottom right
TRANS REF_X - 0.01 - 0.025 , 0.01 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1
!Leg at top right
TRANS REF_X - 0.01 - 0.025 , REF_Y - 0.01 - 0.05 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1
!Brace on the left
TRANS 0.01 , 0.01 + 0.05 , tableframe_h
BOX 0.025 , REF_Y - 2 * ( 0.05 + 0.01 ) , -0.05
RESTORE 1
!Brace on the right
TRANS REF_X - 0.01 - 0.025 , 0.01 + 0.05 , tableframe_h
BOX 0.025 , REF_Y - 2 * ( 0.05 + 0.01 ) , -0.05
RESTORE 1
!Bars
!Bar at bottom
TRANS 0.01 + 0.025 , 0.22 , tableframe_h
GOSUB "bar"
RESTORE 1
!Bar at top
TRANS 0.01 + 0.025 , REF_Y - 0.22 - bar_w , tableframe_h
GOSUB "bar"
RESTORE 1
END
!Subscript for bar
Bar:
BOX REF_X - 2 * ( 0.01 + 0.025 ) , bar_w , -0.05
RETURN
!Subscript for bar END

```

Creating connectors

To connect the subframe of the table - consisting of the table legs, cross braces and longitudinal bars - with the tabletop, you will attach box-shaped connectors. You will start by creating these connectors in Allplan. After this, you will insert them as a resource in the SmartPart Editor.

The "box" resource will then be used in the SmartPart Editor and placed at four different positions of the table.

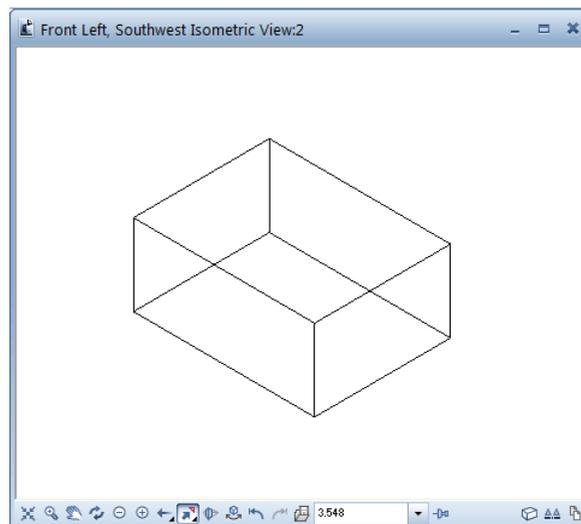


Note: This box-shaped connector only serves as an example. Of course, you can create even the most complex elements in Allplan and import them as resources into the SmartPart Editor.

Creating a box and importing it as a resource

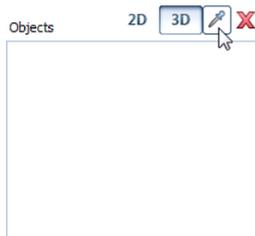
To create a box and insert it as a resource in the SmartPart Editor

- Allplan is open and drawing file 4 is current.
- 1 In the **Tools** palette, select the **3D Modeling** module (**Bonus Tools** family).
 - 2 Select the  **Box** tool (**Create area**).
 - 3 Click  **Based on diagonal line** in the input options.
 - 4 *Start point*
Click in the workspace.
 - 5 *Click diagonal point*
Enter $dx = 0.15$ m and $dy = 0.20$ m.
Press ENTER to confirm.
 - 6 *Point on parallel surface or height*
Enter **0.089** m.
Press ENTER to confirm.



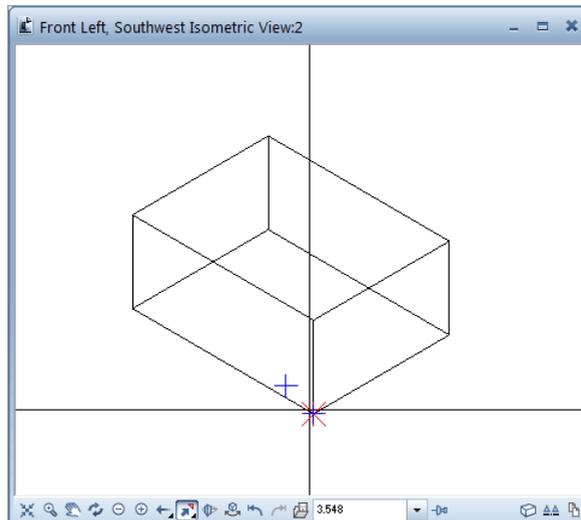
- 7 Press ESC to quit the  **Box** tool.
- 8 Switch to the **SmartParts** module (**Bonus Tools** family).

- 9 Click  **Modify SmartPart using Script** on the **Change** toolbar of the **SmartParts** module.
- 10 Click **Flexi 01 Table SmartPart**.
- 11 Open the **Resources** tab in the **SmartPart Editor**.
- 12 In the **Objects** area, click **3D** **3D Objects** first and then  **Match Object**.

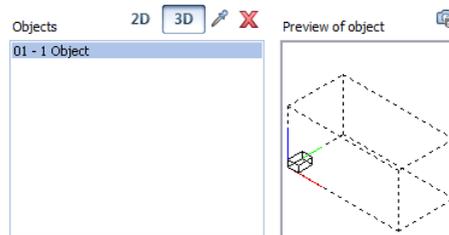


The SmartPart Editor closes temporarily.

- 13 Display the box in  **Front Left, Southwest Isometric View**.
- 14 Click the box.
- 15 Select base point...
Click the bottom left corner of the box.



This imports the box as a 3D object in the SmartPart Editor.



01 indicates the resource index and 1 the number of objects included.

When you select this entry, the box is displayed in the preview.

Using the resource

To use the "box" resource

- Allplan is open and drawing file 4 is current.
- The Resources tab is open in the SmartPart Editor.
- 1 Switch to the 3D Script tab in the SmartPart Editor.

Note: Everything that follows is inserted *before* the END command.

- 2 Enter the following comment:

```
!Insert resource of connectors
```

- 3 Insert two blank lines and write:

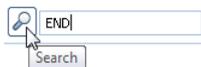
```
!Connector at bottom left
```

- 4 Position the coordinate system. To do this, enter:

```
TRANS 0.1, 0.2, ref_z-tabletop_t-0.09
```

- Explanation - x direction: the connector at bottom left is to be placed at a fixed offset of 10 cm from the left edge of the tabletop.

Tip: To quickly find a command in the script, you can use the **Search** tool.



- Explanation - y direction: the connector at bottom left is to be placed at a fixed offset of 20 cm from the bottom edge of the tabletop.
 - Explanation - z direction: total height of table - thickness of table top - height of connector
- 5 The command for inserting a resource in the script is: **PLACE**
Enter:

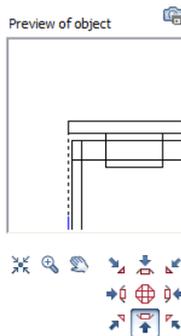
```
PLACE 01,1
```

- 6 Reset the coordinate system.

```
RESTORE 1
```

- 7 Click  **Check / Format Script** and then  **Run Script**.

Select a suitable view in the preview. The result should look like this:



8 Define the remaining three connectors.

!Connector at bottom right

```
TRANS ref_x-0.1-0.15, 0.2, ref_z-tabletop_t-0.09
```

```
PLACE 01,1
```

```
RESTORE 1
```

!Connector at top left

```
TRANS 0.1, ref_y-0.2-0.2, ref_z-tabletop_t-0.09
```

```
PLACE 01,1
```

```
RESTORE 1
```

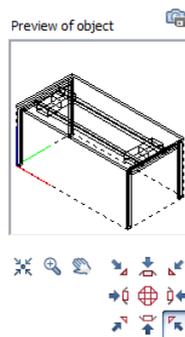
!Connector at top right

```
TRANS ref_x-0.1-0.15, ref_y-0.2-0.2,  
ref_z-tabletop_t-0.09
```

```
PLACE 01,1
```

```
RESTORE 1
```

9 Click  Check / Format Script and then  Run Script.



Tip: You can select the entire script or parts thereof in this summary, copy the data to the Clipboard and paste it into the corresponding tab of Allplan's SmartPart Editor. Blank lines are ignored.

Summary of the current 3D script:

```

REF_HANDLES
tableframe_h=ref_z-tabletop_t-0.02
!Define tabletop
TRANSZ REF_Z
BOX REF_X , REF_Y , -tabletop_t
RESTORE 1
!Leg at bottom left
TRANS 0.01 , 0.01 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1
!Leg at top left
TRANS 0.01 , REF_Y - 0.01 - 0.05 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1
!Leg at bottom right
TRANS REF_X - 0.01 - 0.025 , 0.01 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1
!Leg at top right
TRANS REF_X - 0.01 - 0.025 , REF_Y - 0.01 - 0.05 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1
!Brace on the left
TRANS 0.01 , 0.01 + 0.05 , tableframe_h
BOX 0.025 , REF_Y - 2 * ( 0.05 + 0.01 ) , -0.05
RESTORE 1
!Brace on the right
TRANS REF_X - 0.01 - 0.025 , 0.01 + 0.05 , tableframe_h
BOX 0.025 , REF_Y - 2 * ( 0.05 + 0.01 ) , -0.05
RESTORE 1
!Bars
!Bar at bottom
TRANS 0.01 + 0.025 , 0.22 , tableframe_h
GOSUB "bar"
RESTORE 1
!Bar at top
TRANS 0.01 + 0.025 , REF_Y - 0.22 - bar_w , tableframe_h
GOSUB "bar"
RESTORE 1
!Insert resource of connectors
!Connector at bottom left
TRANS 0.1 , 0.2 , REF_Z - tabletop_t - 0.09
PLACE 01 , 1
RESTORE 1
!Connector at bottom right
TRANS REF_X - 0.1 - 0.15 , 0.2 , REF_Z - tabletop_t - 0.09
PLACE 01 , 1
RESTORE 1
!Connector at top left
TRANS 0.1 , REF_Y - 0.2 - 0.2 , REF_Z - tabletop_t - 0.09
PLACE 01 , 1
RESTORE 1
!Connector at top right
TRANS REF_X - 0.1 - 0.15 , REF_Y - 0.2 - 0.2 , REF_Z - tabletop_t - 0.09
PLACE 01 , 1

```

```
RESTORE 1
END
!Subscript for bar

Bar:
BOX REF_X - 2 * ( 0.01 + 0.025 ) , bar_w , -0.05
RETURN
!Subscript for bar END
```

The IF - THEN condition

You have defined four fixed connectors for the table. Now you will place two more connectors in the middle of the table. This is required for tables that are longer than 1.60 m.

To use the IF condition

- Allplan is open and drawing file 4 is current.
- The 3D Script tab is open in the SmartPart Editor.

Note: Everything that follows is inserted *before* the END command.

Tip: To quickly find a command in the script, you can use the **Search** tool.



- 1 Insert blank lines before the END command and write the following comment:

```
!Connectors when table longer than 1.6m
```

- 2 Leave a blank line and enter:

```
IF ref_x>1.60 THEN
```

- 3 Leave a blank line and enter the following comment:

```
!Connector centered at bottom
```

- 4 Leave a blank line and enter the following three lines:

```
TRANS ref_x/2-0.075, 0.2, ref_z-tabletop_t-0.09
```

```
PLACE 01,1
```

```
RESTORE 1
```

- 5 Leave a blank line and enter the following comment:

```
!Connector centered at top
```

- 6 Leave another blank line and enter the following three lines:

```
TRANS ref_x/2-0.075, ref_y-0.2-0.2,
```

```
ref_z-tabletop_t-0.09
```

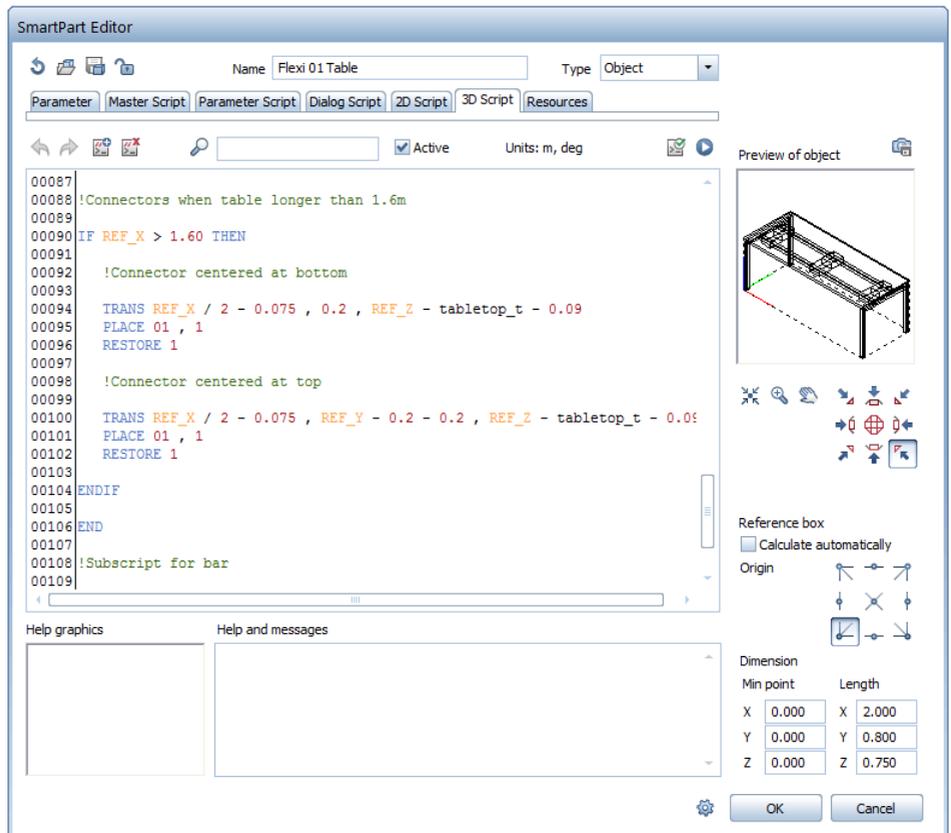
```
PLACE 01,1
```

```
RESTORE 1
```

After having inserted a blank line, enter the command for completing the IF condition:

```
ENDIF
```

- 7 Click  Check / Format Script and then  Run Script.



Note: The preview shows a table that is longer than 1.60m.

Tip: You can select the entire script or parts thereof in this summary, copy the data to the Clipboard and paste it into the corresponding tab of Allplan's SmartPart Editor. Blank lines are ignored.

Summary of the current 3D script:

```

REF_HANDLES
tableframe_h=ref_z-tabletop_t-0.02
!Define tabletop
TRANSZ REF_Z
BOX REF_X , REF_Y , -tabletop_t
RESTORE 1
!Leg at bottom left
TRANS 0.01 , 0.01 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1
!Leg at top left
TRANS 0.01 , REF_Y - 0.01 - 0.05 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1
!Leg at bottom right
TRANS REF_X - 0.01 - 0.025 , 0.01 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1
!Leg at top right
TRANS REF_X - 0.01 - 0.025 , REF_Y - 0.01 - 0.05 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1
!Brace on the left
TRANS 0.01 , 0.01 + 0.05 , tableframe_h
BOX 0.025 , REF_Y - 2 * ( 0.05 + 0.01 ) , -0.05
RESTORE 1
!Brace on the right
TRANS REF_X - 0.01 - 0.025 , 0.01 + 0.05 , tableframe_h
BOX 0.025 , REF_Y - 2 * ( 0.05 + 0.01 ) , -0.05
RESTORE 1
!Bars
!Bar at bottom
TRANS 0.01 + 0.025 , 0.22 , tableframe_h
GOSUB "bar"
RESTORE 1
!Bar at top
TRANS 0.01 + 0.025 , REF_Y - 0.22 - bar_w , tableframe_h
GOSUB "bar"
RESTORE 1
!Insert resource of connectors
!Connector at bottom left
TRANS 0.1 , 0.2 , REF_Z - tabletop_t - 0.09
PLACE 01 , 1
RESTORE 1
!Connector at bottom right
TRANS REF_X - 0.1 - 0.15 , 0.2 , REF_Z - tabletop_t - 0.09
PLACE 01 , 1
RESTORE 1
!Connector at top left
TRANS 0.1 , REF_Y - 0.2 - 0.2 , REF_Z - tabletop_t - 0.09
PLACE 01 , 1
RESTORE 1
!Connector at top right
TRANS REF_X - 0.1 - 0.15 , REF_Y - 0.2 - 0.2 , REF_Z - tabletop_t - 0.09
PLACE 01 , 1

```

```
RESTORE 1
!Connectors when table longer than 1.6m
IF ref_x > 1.60 THEN
!Connector centered at bottom
TRANS ref_x/2-0.075,0.2,ref_z-tabletop_t-0.09
PLACE 01,1
RESTORE 1
!Connector centered at top
TRANS ref_x/2-0.075,ref_y-0.2-0.2,ref_z-tabletop_t-0.09
PLACE 01,1
RESTORE 1
ENDIF
END
!Subscript for bar

Bar:
BOX REF_X - 2 * ( 0.01 + 0.025 ) , bar_w , -0.05
RETURN
!Subscript for bar END
```

Parameter script

The table is defined so that its length, width and height can be adjusted. The next step is to restrict these changes in size to sensible dimensions.

To assign values to parameters

➤ Allplan is open and drawing file 4 is current.

➤ The 3D Script tab is open in the SmartPart Editor.

1 Switch to the **Parameter Script** tab.

2 The table length is to be defined so that it can be adjusted from 0.08 m to a maximum of 2.00 m in increments of 5 cm.

In line 00003, enter:

```
VALUES "ref_x" RANGE [0.80, 2.00] STEP 0.05,0.05
```

Explanation: the ref_x value is a variable value ranging from 0.80 m to 2.00 m in increments of 0.05 m (second value), with the first increment starting at 0.05 m (first value). Square brackets indicate that the limits (0.08 m and 2.00 m) are included in the value range.

3 The table width is to be defined so that it can be adjusted from 0.08 m to a maximum of 1.20 m in increments of 5 cm.

In line 00004, enter:

```
VALUES "ref_y" RANGE [0.80, 1.20] STEP 0.05,0.05
```

4 The height of the table is to be adjustable, too. The minimum height is to be 0.20 m and the maximum height 0.80 m. Here, too, 5 cm increments are to apply.

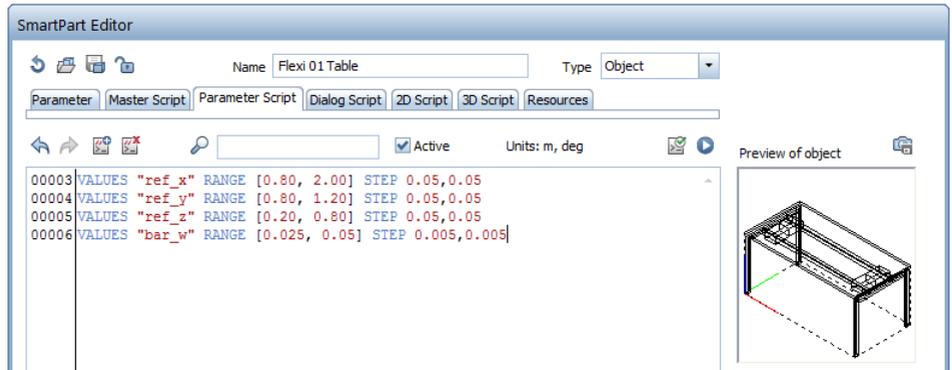
In line 00005, enter:

```
VALUES "ref_z" RANGE [0.20, 0.80] STEP 0.05,0.05
```

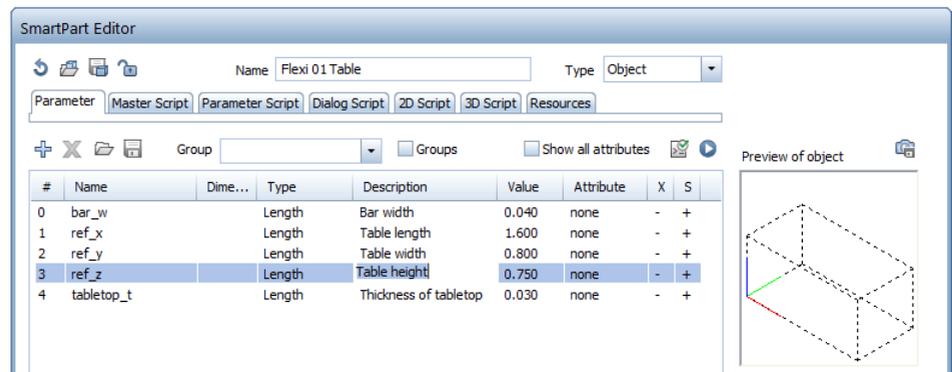
- 5 The width of the bars belonging to the subframe of the table is to be defined so that is adjustable in increments of 5 mm.

In line 00006, enter:

```
VALUES "bar_w" RANGE [0.025, 0.05] STEP 0.005,0.005
```

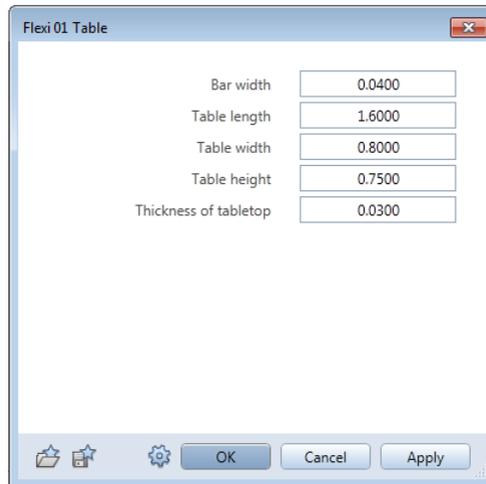


- 6 Click Check / Format Script and then Run Script.
- 7 Switch to the Parameters tab.
- 8 Change the entries for ref_x, ref_y and ref_z in the Description column.



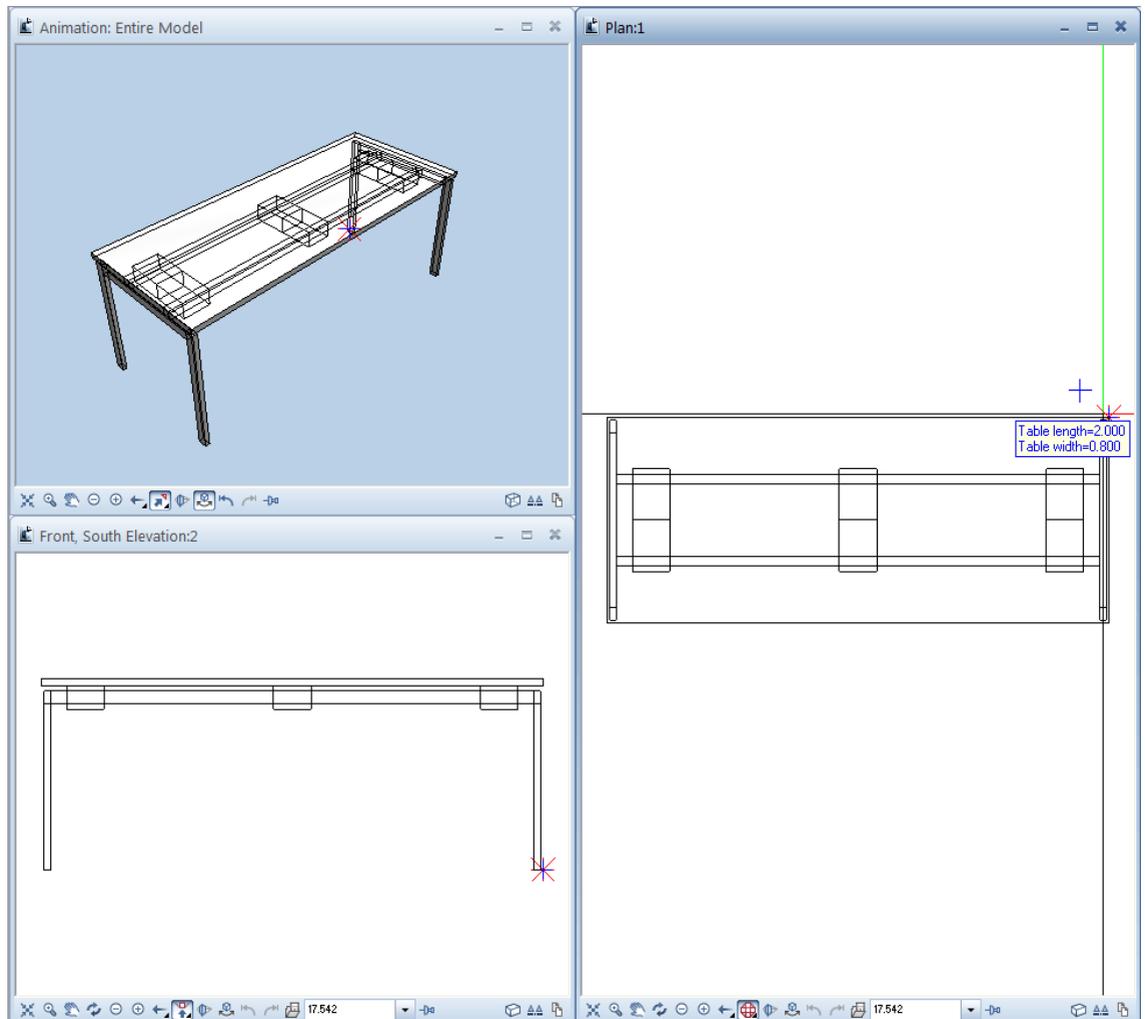
- 9 Click Run Script.

The dialog box for the Flexi 01 Table SmartPart now looks like this:



- 10 Click **OK** to close the dialog box.
- 11 Click **OK** to close the SmartPart Editor.
- 12 Double-click the Flexi 01 Table SmartPart with the left mouse button.

Use the handles or the dialog box to check whether the parameter restrictions work as intended.

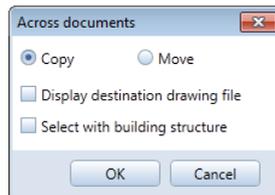


Saving the intermediate result

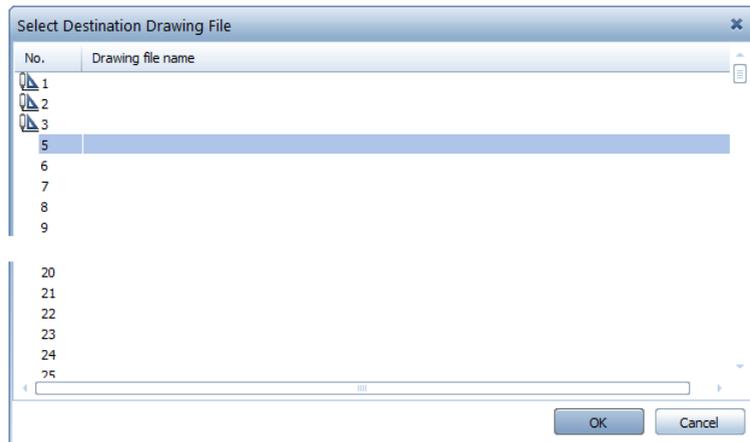
The geometry of the Flexi 01 Table is finished. Before you continue, it is a good idea to save your work.

To save the SmartPart

- Allplan is open and drawing file 4 is current.
- 1 On the File menu, click  Copy, Move Elements between Documents....
- 2 Select the Copy option in the dialog box and click OK to confirm.



- 3 Select drawing file 5 and click OK to confirm.



- 4 Select the element(s) you want to copy to drawing file 5
Enclose the Flexi 01 Table in a selection rectangle.

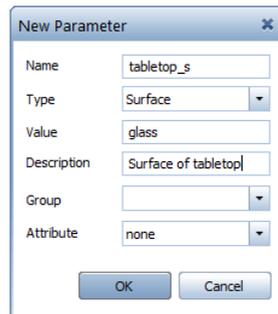
- 5 Click  **Open on a Project-Specific Basis (Standard toolbar)**, make drawing file 5 current and close all the others.
-

Parametric surfaces

You will assign parametric surfaces to the table. The tabletop is to have a surface that is visible in the animation. The table and the connectors will be given individual colors. You will define an additional parameter that controls the color of the table in 2D (plan view).

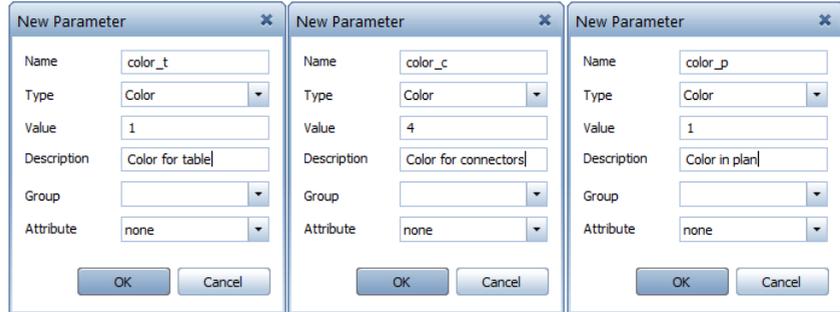
To define additional parameters

- ➔ Allplan is open and drawing file 5 is current.
- 1 Click  **Modify SmartPart using Script (SmartParts module)** in the **Change** area of the Tools palette.
- 2 Click **Flexi 01 Table SmartPart**.
- 3 Switch to the **Parameters** tab.
- 4 Click  **Add Parameter**.
- 5 Start by defining the **Surface** for tabletop parameter. Enter the following:

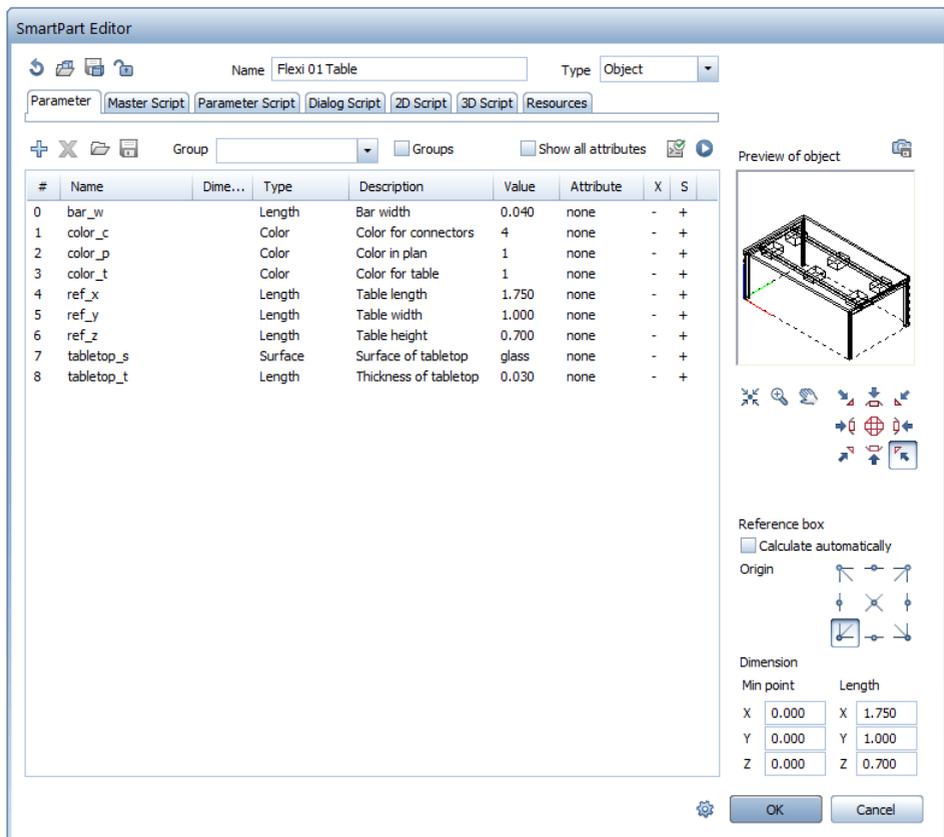


New Parameter	
Name	tabletop_s
Type	Surface
Value	glass
Description	Surface of tabletop
Group	
Attribute	none
OK Cancel	

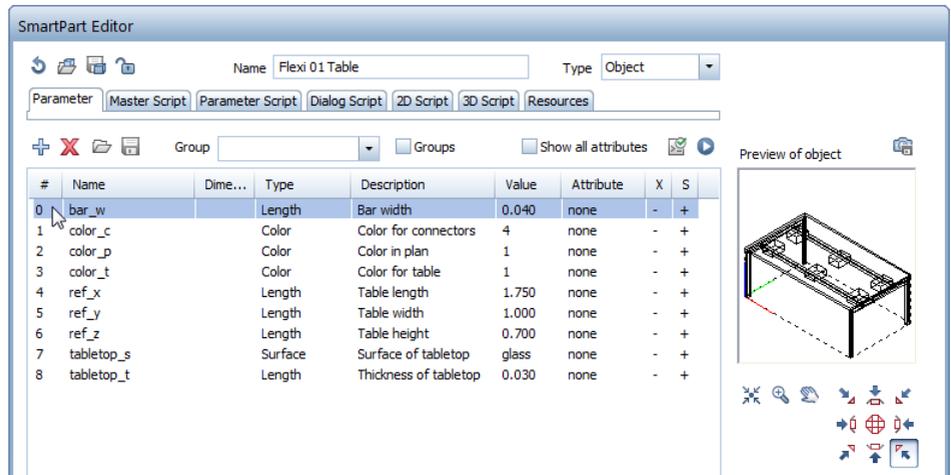
- 6 Click **OK**.
- 7 Next define the **Color** for table, **Color** for connectors and **Color in plan** parameters one after the other.



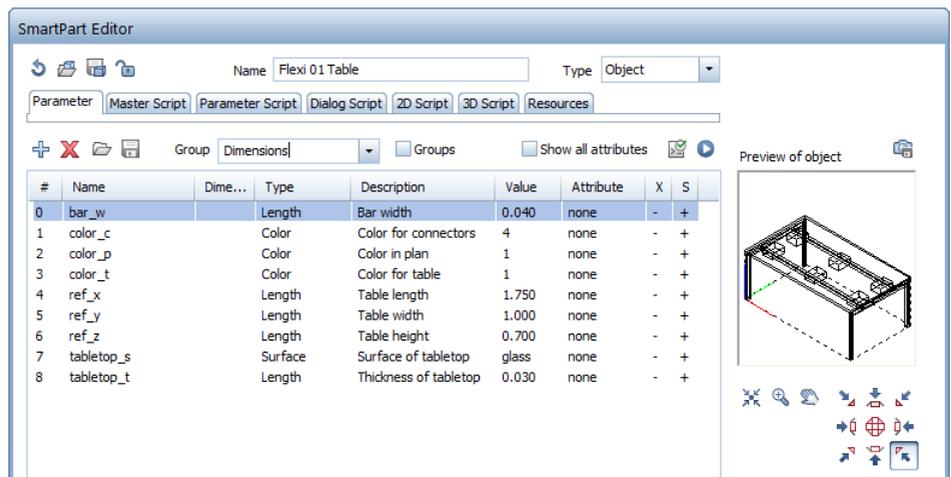
- 8 The Parameters tab should now look like this. However, the values for the length, width and height of the table and the bar width can differ. These values are based on the last modification of the SmartPart.



- 9 To get a better overview, you can group the parameters.
In the Parameters tab, click line 0 to select it.

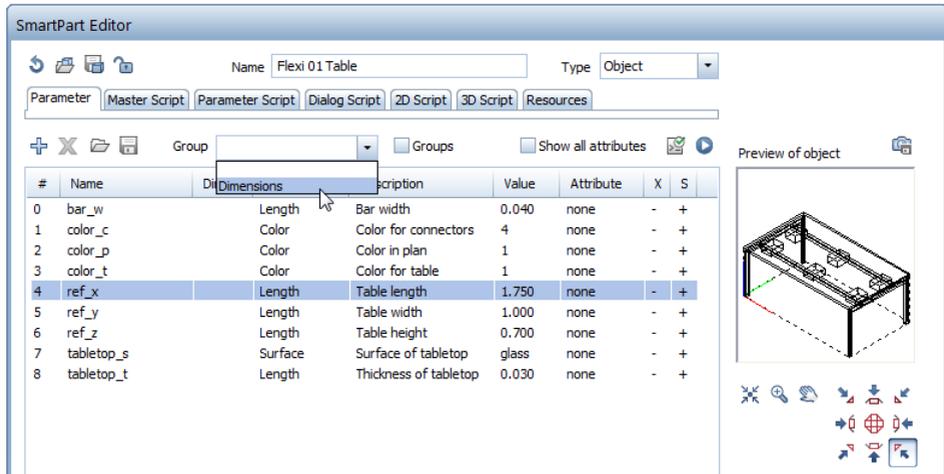


- 10 Click in the box beside Group and enter Dimensions for the name of the group.



- 11 Now select line 4 by clicking it.

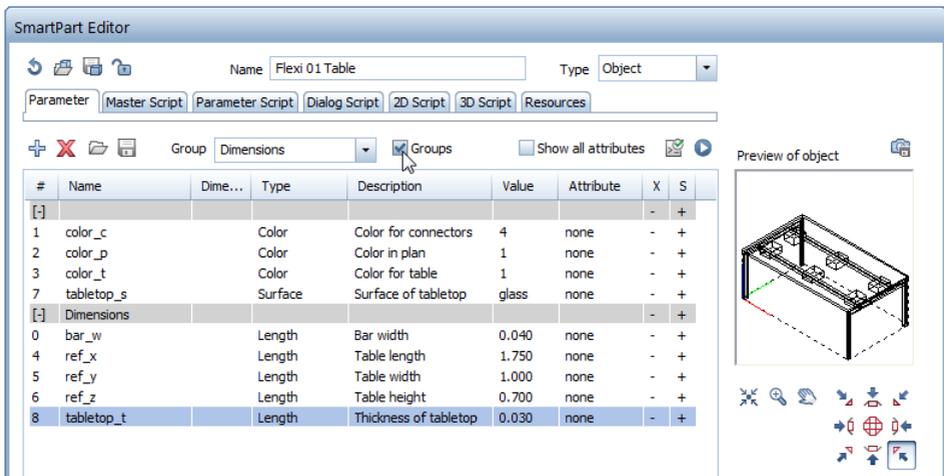
12 Open the Group list and select Dimensions.



13 Repeat these two steps for lines 5 (ref_y), 6 (ref_z) and 8 (tabletop_t).

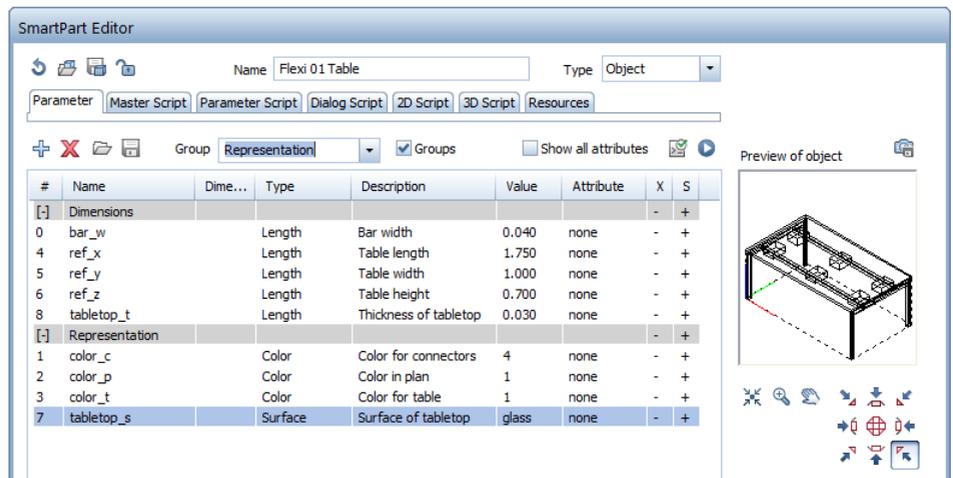
14 Select the Groups option.

The group you have just created is displayed.



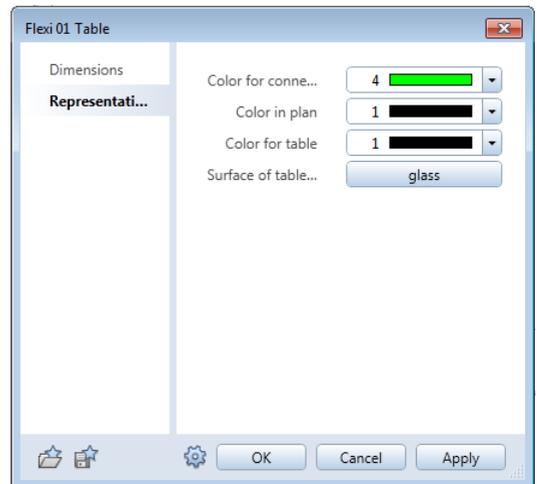
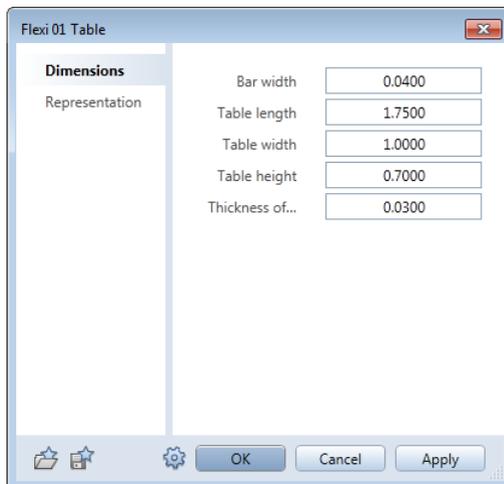
15 Create a second group and name it Representation. Add all remaining parameters to this group.

The **Parameters** tab should now look like this:



These groups form the basis for creating your own dialog box (see the section entitled "Defining your own dialog box using scripts").

To get a first impression of the new dialog box, click  **Check / Format Script** and then  **Run Script**.



Integrating parameters into the script

Have you seen the dialog box? Click **OK** to close it. Now, you will integrate the new parameters into the script.

To add new parameters to the script

- Allplan is open and drawing file 5 is current.
 - The **Parameters** tab is open in the **SmartPart Editor**.
- 1 Switch to the **3D Script** tab.
 - 2 Start by adding the color for the table (**color_t**) to the script. The color is to be used for the whole table with the exception of the connectors, which will be given their own color parameter (**color_c**). The command for assigning a color is **COLOR**. Insert some blank lines after the **tableframe_h=ref_z-tabletop_t-0,02** line (at the beginning of the script) and enter the following:

```
COLOR color_t
```

- 3 Insert two blank lines and write the following comment:

```
!Define surface of tabletop
```

- 4 Leave two blank lines and enter:

```
MATERIAL tabletop_s
```

This activates the **tabletop_s** parameter for creating the tabletop.

- 5 Insert a blank line for a better overview.

There follows the geometry of the tabletop in the script.

Note: The **COLOR** and **MATERIAL** commands start at the line in which they are entered in the script and apply to all the following lines. The **COLOR** command is valid until you define a new color in the script. The **MATERIAL** command ends with the **MATERIAL ""** command.

- 6 As the material is to be assigned to the tabletop only, you need to end the **MATERIAL** command after the definition of the tabletop. Therefore, insert blank lines after the definition of the tabletop's geometry.

Tip: To quickly find a command or entry in the script, you can use the **Search** tool.



7 Enter the comment:

```
!Reset surface
```

8 There follows:

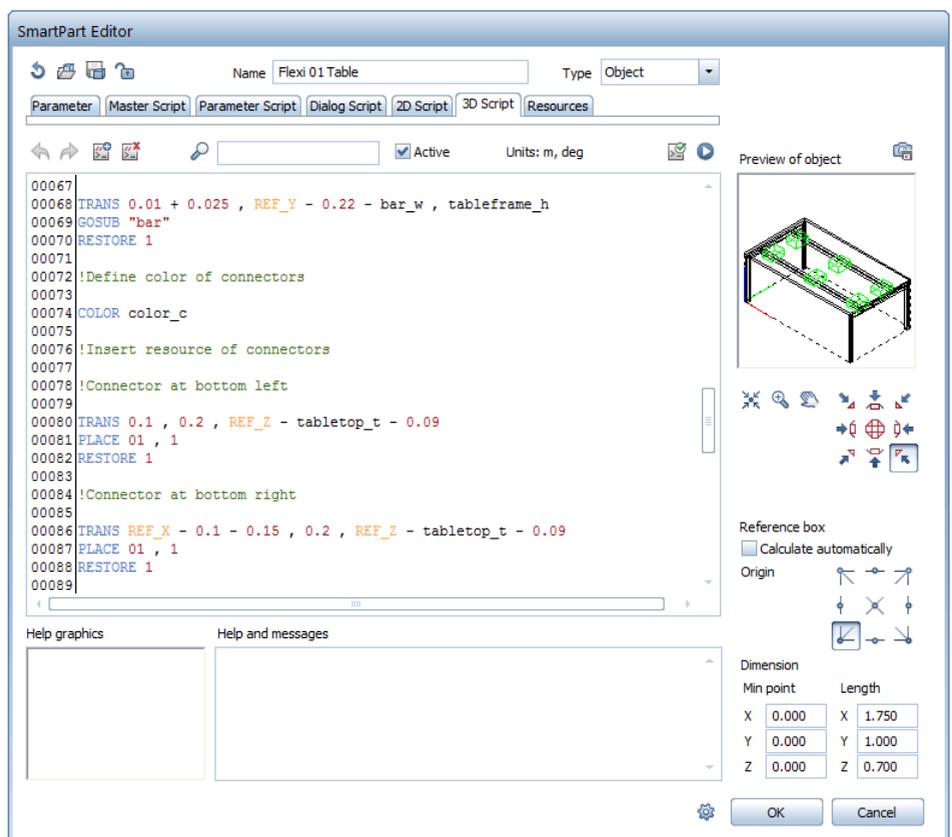
```
MATERIAL " "
```

9 The connectors are to be given their own color assignment. Therefore, insert some blank lines after the script for the bars and before the !Insert resource of connectors comment and enter the following comment:

```
!Define color of connectors
```

```
COLOR color_c
```

10 Click  Check / Format Script and then  Run Script.



That's it! The 3D script is complete.

Note: The preview shows a table that is longer than 1.60m. This ensures that all components of the table are displayed.

- 11 Click **OK** to close the **SmartPart Editor** dialog box and check the result.
-

Tip: You can select the entire script or parts thereof in this summary, copy the data to the Clipboard and paste it into the corresponding tab of Allplan's SmartPart Editor. Blank lines are ignored.

Summary of the current 3D script:

```

REF_HANDLES
tableframe_h=ref_z-tabletop_t-0.02
COLOR color_t
!Define surface of tabletop
MATERIAL tabletop_s

!Define tabletop
TRANSZ REF_Z
BOX REF_X , REF_Y , -tabletop_t
RESTORE 1

!Reset surface
MATERIAL ""

!Leg at bottom left
TRANS 0.01 , 0.01 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1

!Leg at top left
TRANS 0.01 , REF_Y - 0.01 - 0.05 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1

!Leg at bottom right
TRANS REF_X - 0.01 - 0.025 , 0.01 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1

!Leg at top right
TRANS REF_X - 0.01 - 0.025 , REF_Y - 0.01 - 0.05 , 0
BOX 0.025 , 0.05 , tableframe_h
RESTORE 1

!Brace on the left
TRANS 0.01 , 0.01 + 0.05 , tableframe_h
BOX 0.025 , REF_Y - 2 * ( 0.05 + 0.01 ) , -0.05
RESTORE 1

!Brace on the right
TRANS REF_X - 0.01 - 0.025 , 0.01 + 0.05 , tableframe_h
BOX 0.025 , REF_Y - 2 * ( 0.05 + 0.01 ) , -0.05
RESTORE 1

!Bars
!Bar at bottom
TRANS 0.01 + 0.025 , 0.22 , tableframe_h
GOSUB "bar"
RESTORE 1

!Bar at top
TRANS 0.01 + 0.025 , REF_Y - 0.22 - bar_w , tableframe_h
GOSUB "bar"
RESTORE 1

!Define color of connectors
COLOR color_c

!Insert resource of connectors
!Connector at bottom left
TRANS 0.1 , 0.2 , REF_Z - tabletop_t - 0.09
PLACE 01 , 1
RESTORE 1

!Connector at bottom right
TRANS REF_X - 0.1 - 0.15 , 0.2 , REF_Z - tabletop_t - 0.09

```

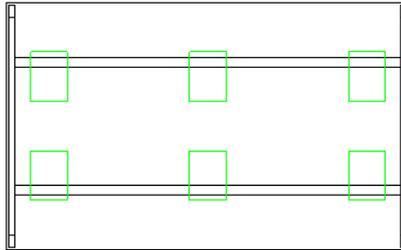
```
PLACE 01 , 1
RESTORE 1
!Connector at top left
TRANS 0.1 , REF_Y - 0.2 - 0.2 , REF_Z - tabletop_t - 0.09
PLACE 01 , 1
RESTORE 1
!Connector at top right
TRANS REF_X - 0.1 - 0.15 , REF_Y - 0.2 - 0.2 , REF_Z - tabletop_t - 0.09
PLACE 01 , 1
RESTORE 1
!Connectors when table longer than 1.60m, centered
IF ref_x > 1.60 THEN
!Connector centered at bottom
TRANS ref_x/2-0.075,0.2,ref_z-tabletop_t-0.09
PLACE 01,1
RESTORE 1
!Connector centered at top
TRANS ref_x/2-0.075,ref_y-0.2-0.2,ref_z-tabletop_t-0.09
PLACE 01,1
RESTORE 1

ENDIF
END
!Subscript for bar

Bar:
BOX REF_X - 2 * ( 0.01 + 0.025 ) , bar_w , -0.05
RETURN
!Subscript for bar END
```

Plan view

Currently, the table looks like this in plan view:



Note: You can see a table that is longer than 1.60m. This ensures that all components of the table are displayed.

The aim is to produce a 2D representation of the table that only consists of a rectangle in a different color. The command for a rectangle is `RECT2` with the coordinates of the diagonal points.

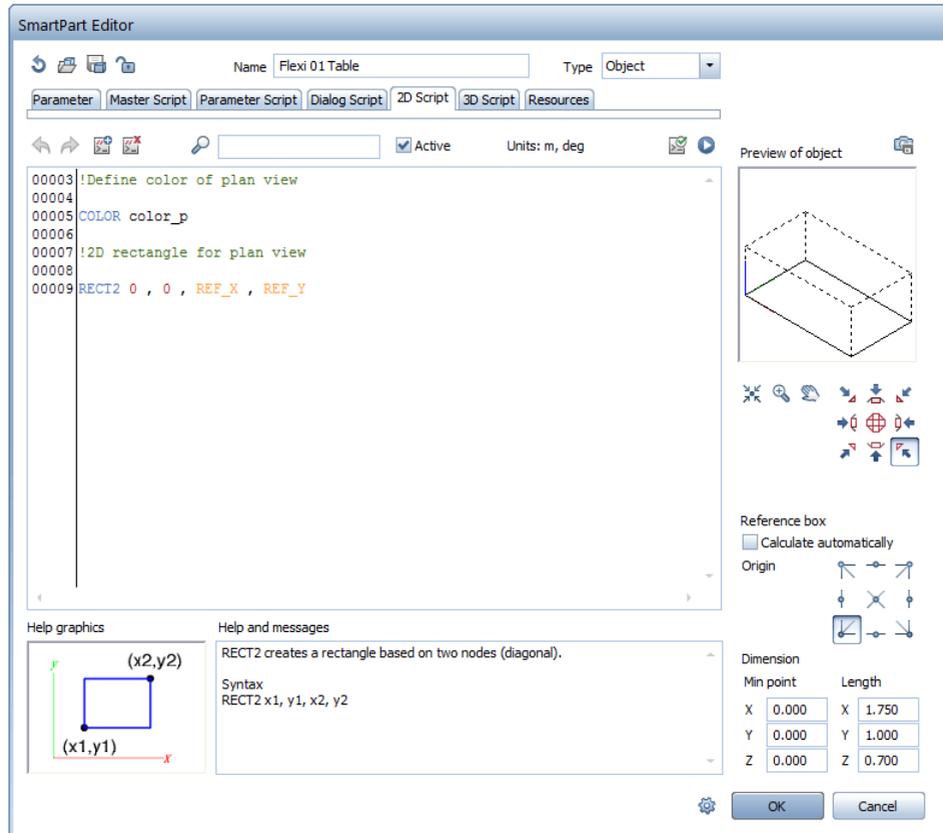
To define the 2D representation

➡ Allplan is open and drawing file 5 is current.

- 1 Click  **Modify SmartPart using Script** on the **Change** toolbar of the **SmartParts** module.
- 2 Click **Flexi 01 Table SmartPart**.
- 3 Switch to the **2D Script** tab.
- 4 Enter the following lines:

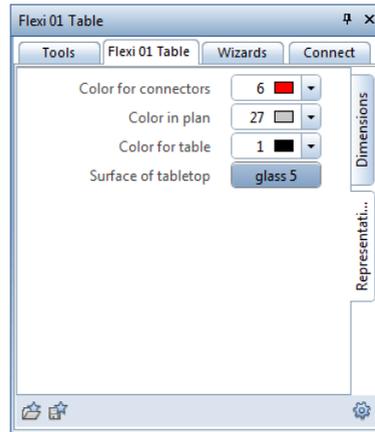
```
!Define color of plan view  
COLOR color_p  
  
!2D rectangle for plan view  
RECT2 0,0,ref_x,ref_y
```

- 5 Click  Check / Format Script and then  Run Script.



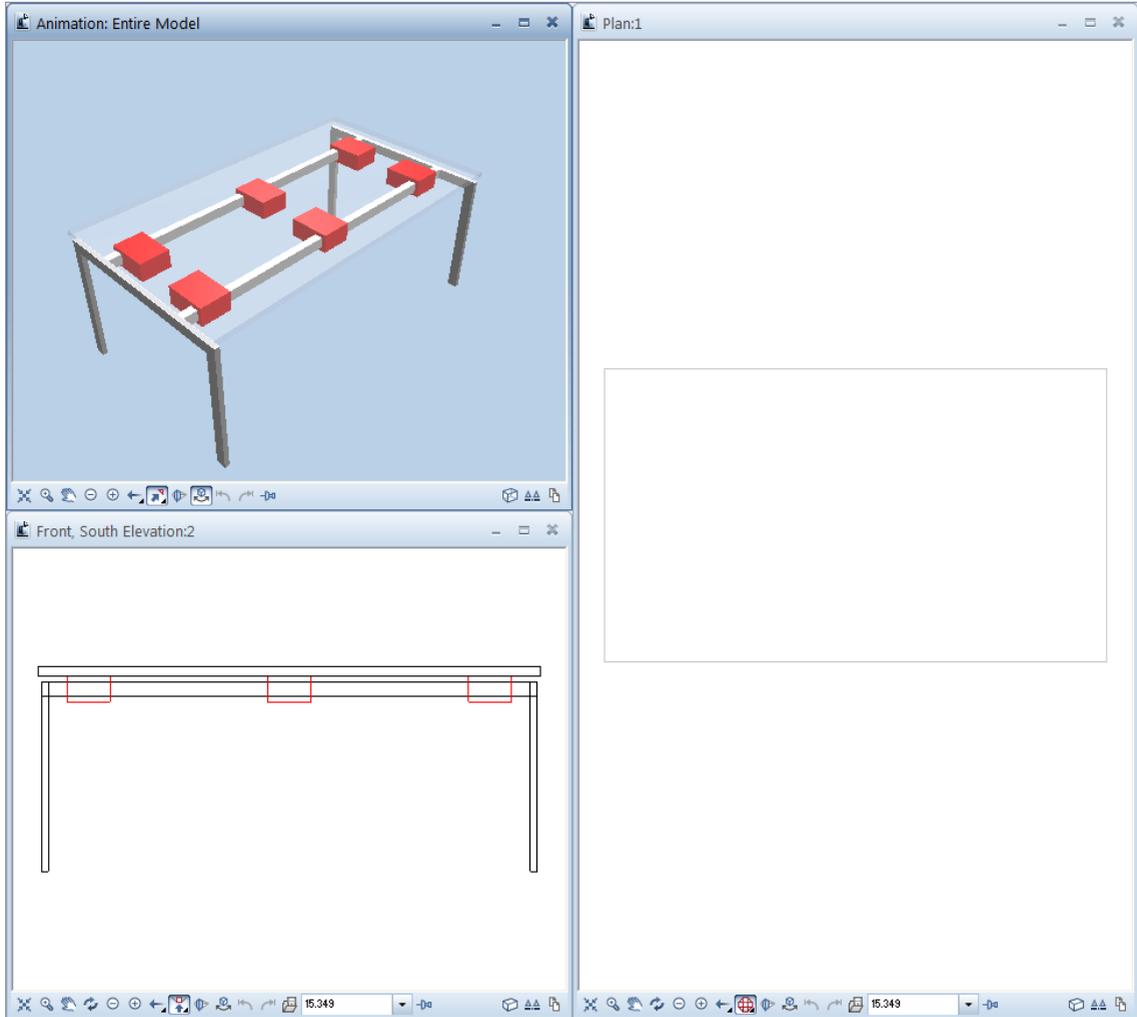
- 6 Click **OK** to close the SmartPart Editor.
- 7 Look at the result in plan.
The table is displayed as a rectangle.
- 8 Double-click the SmartPart with the left mouse button.
- 9 Open the **Representation** page in the **Flexi 01 Table** palette and change the color for the plan view from color 1 to 27, for example.
- 10 Select color 6 (red) for the color of the connectors.
- 11 Click the **Surface** for tabletop button.

- 12 Select the **Office** folder at top left in the dialog box and choose a surface file of your choice. In this example, select the `Glass5.surf` file in the `Standard\Bauwerk\Rohbau\Glas` folder.



- 13 Press ESC to finish.

14 Look at the result.



Summary of the 2D script:

```
!Define color of plan view  
COLOR color_p  
!2D rectangle for plan view  
RECT2 0,0,ref_x,ref_y
```

Defining your own dialog box using scripts

In the previous step, you modified the surface, colors and dimensions. Next, you will customize the dialog box for your needs.

To customize the SmartPart dialog box

➤ Allplan is open and drawing file 5 is current.

1 Click  **Modify SmartPart using Script (SmartParts module)** in the **Change** area of the Tools palette.

2 Click **Flexi 01 Table SmartPart**.

3 Switch to the **Dialog Script** tab.

4 Write the following comment in the first line:

```
!Define name of dialog
```

5 You can use the **I_DIALOG** command to specify which name is to appear in the title bar of the dialog box.

```
I_DIALOG "Properties of Flexi 01 Table"
```

6 The dialog box is to consist of two pages.

To define the first page of the dialog box, enter the following comment:

```
!Define page 1
```

7 The command for defining the name of a page is **I_PAGE**:

```
I_PAGE "Dimensions"
```

8 Enter the following comment:

```
!Define output and input boxes
```

9 You can use the **I_OUTFIELD** command to define that and how a specific element is displayed in the dialog box. The name of the element to be displayed in the dialog box must be enclosed in quotation marks. The values after the name define the position of the element displayed in the dialog box (in pixels). Enter

```
I_OUTFIELD "Table length",0,0,160,22
```

Explanation:

"**Table length**": the name of the element to be displayed in the dialog box.

0: the start point for the position of the element's name in the x direction.

0: the start point for the position of the element's name in the y direction.

160: the maximum length of the element's name in the x direction.

22: the height of the name.

- 10 You can use the `I_INFIELD` command to define how a parameter to be changed is displayed. The values after the name define the position and size of the input box for the parameter to be changed (in pixels). Enter

```
I_INFIELD "ref_x",180,0,120,22
```

Explanation:

"**ref_x**": the parameter to be changed.

180: the start point for the input box in the x direction.

0: the start point for the input box in the y direction.

160: the length of the input box in the x direction.

22: the height of the input box.

Customize four more parameters on the **Dimensions** page of your dialog box:

```
I_OUTFIELD "Table width",0,25,160,22
```

```
I_INFIELD "ref_y",180,25,120,22
```

```
I_OUTFIELD "Table height",0,50,160,22
```

```
I_INFIELD "ref_z",180,50,120,22
```

```
I_OUTFIELD "Thickness of tabletop",0,75,160,22
```

```
I_INFIELD "tabletop_t",180,75,120,22
```

```
I_OUTFIELD "Bar width",0,100,160,22
```

```
I_INFIELD "bar_w",180,100,120,22
```

The first page of the dialog box is now finished.

11 Next, enter a comment on the second page:

```
!Define page 2
```

12 To define the name of the second page, enter:

```
I_PAGE "Representation"
```

13 Enter the following comment:

```
!Define output and input boxes
```

14 The first parameter is to facilitate the selection of the tabletop's surface:

```
I_OUTFIELD "Surface of tabletop",0,0,160,22
```

```
I_INFIELD "tabletop_s",180,0,120,22
```

Using the following three parameters, you can control the selection of colors using the dialog box:

```
I_OUTFIELD "Color for table",0,50,160,22
```

```
I_INFIELD "color_t",180,50,120,22
```

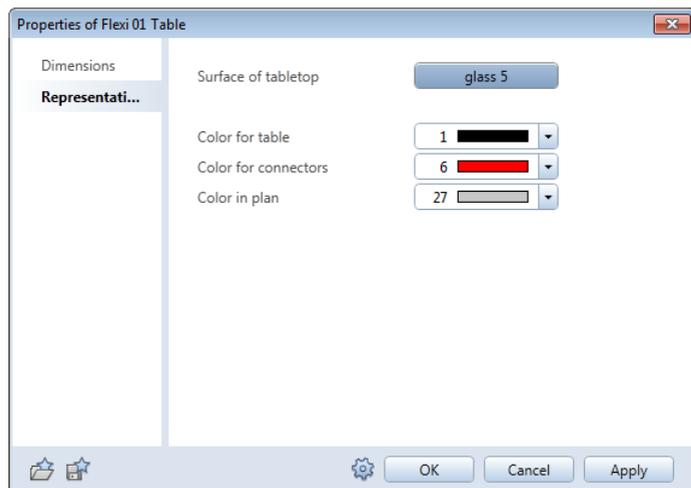
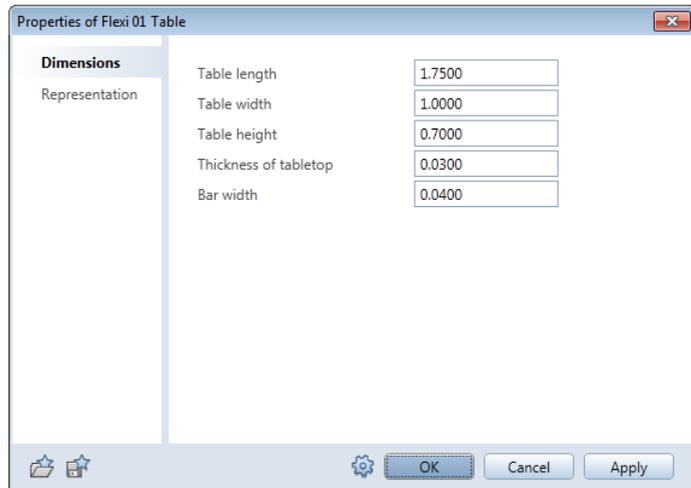
```
I_OUTFIELD "Color for connectors",0,75,160,22
```

```
I_INFIELD "color_c",180,75,120,22
```

```
I_OUTFIELD "Color in plan",0,100,160,22
```

```
I_INFIELD "color_p",180,100,120,22
```

15 Click  Check / Format Script and then  Run Script.



16 What about separating the selection option for the surface from the color dropdown lists on the Representation page? No problem!
First close the Properties of Flexi 01 Table dialog box by clicking OK.

- 17 Open the SmartPart Editor, switch to the Dialog Script tab and enter the following below the I_INFIELD "tabletop_s" , 180 , 0 , 120 , 22 line:

```
I_SEPARATOR 0,36,300,36
```

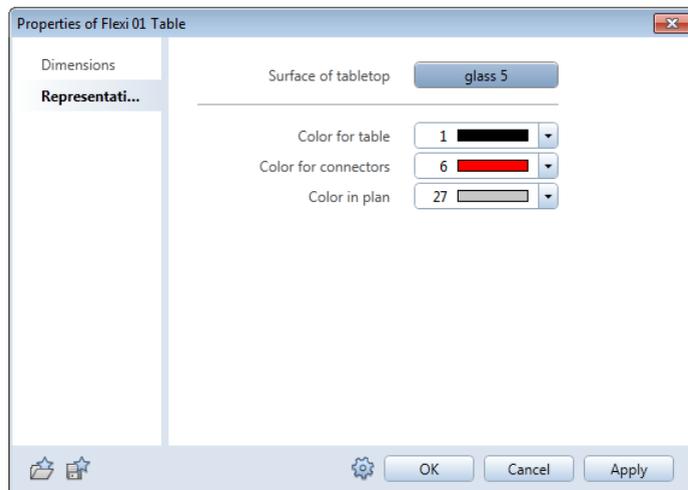
- 18 To enhance the Representation page, you can make the text right-aligned.

This requires just a few entries.

Add a comma and the number 1 (,1) to the end of each I_OUTFIELD command below the !Define page 2 comment. See the summary of the dialog script.

- 19 Click  Check / Format Script and then  Run Script.

The result should look like this:



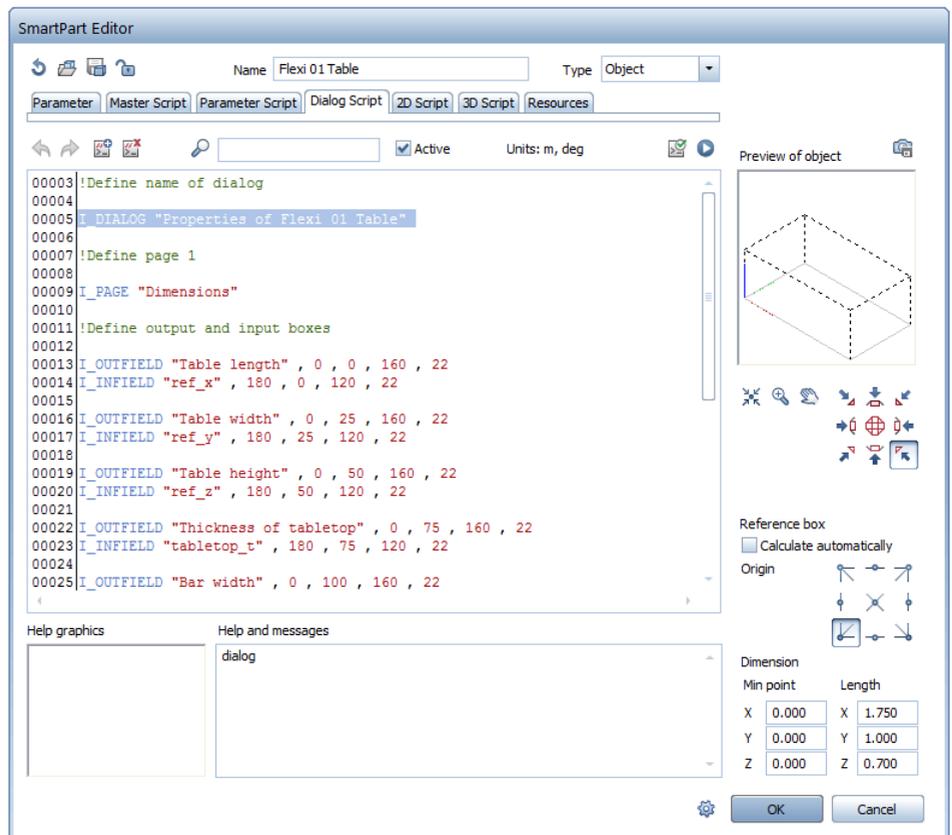
This is the first SmartPart you designed yourself. And what's more, you created a dialog box appropriate to the Flexi 01 Table SmartPart.

- 20 Instead of displaying the customized Properties of Flexi 01 Table dialog box, you now want to display the SmartPart properties in a specific sequence in a palette called Flexi 01 Table. To achieve this, you do not need to revise the entire dialog script.

It is enough if you replace the I_DIALOG command with the I_PALETTE command. Everything else is done automatically.

Start by closing the Properties of Flexi 01 Table dialog box.

- 21 In the Dialog Script, replace the I_DIALOG command with the I_PALETTE command and change the Properties of Flexi 01 Table name to Flexi 01 Table to define the new name for the palette of the SmartPart.

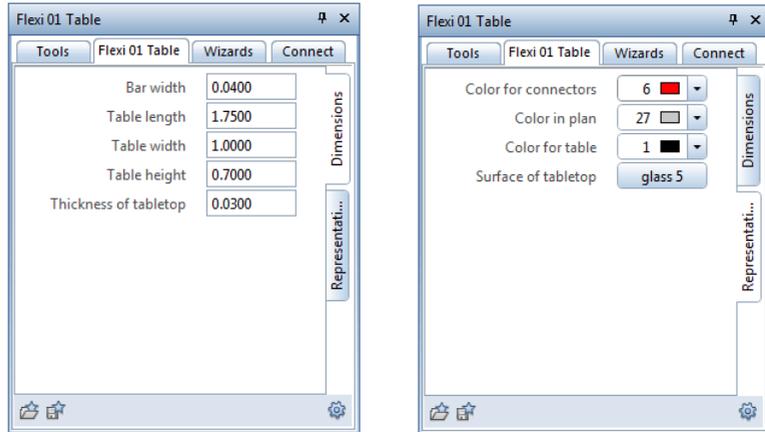


- 22 Click Check / Format Script and then Run Script.

23 Click OK to close the SmartPart Editor.

- 24 Double-click the Flexi 01 Table with the left mouse button.

The Flexi 01 Table palette opens.



The contents of the Flexi 01 Table palette match the entries on the Dialog Script tab of the SmartPart Editor.

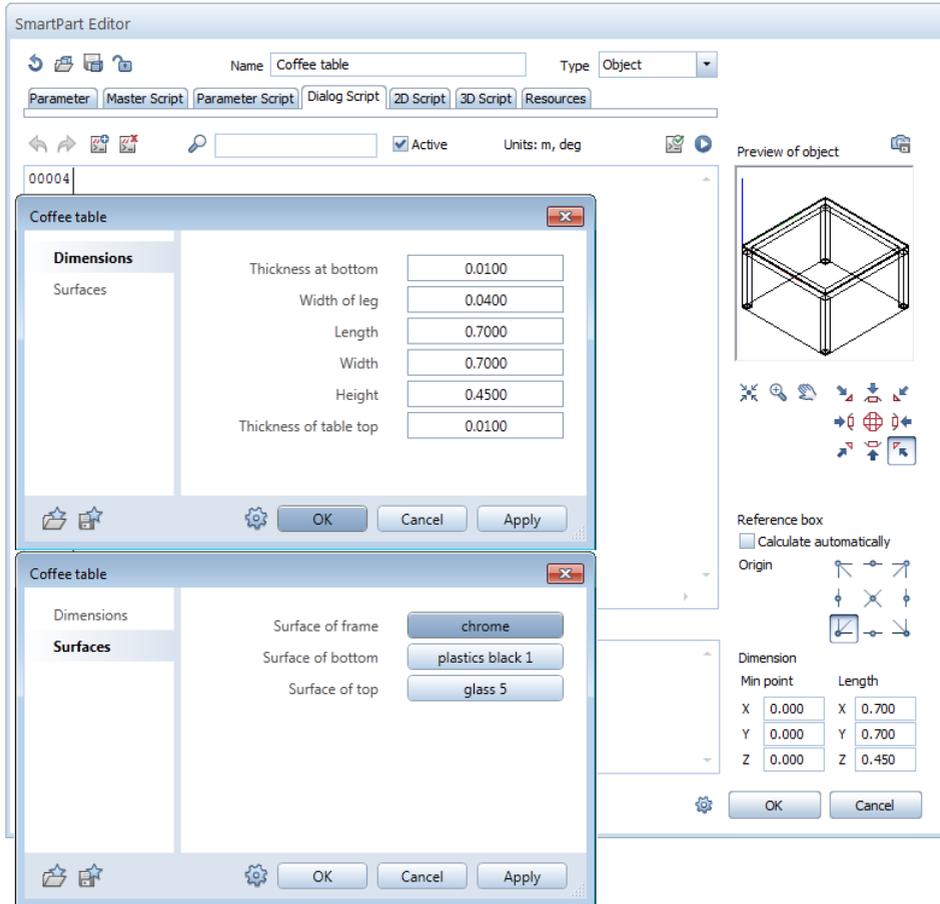
Some special notes

This section provides some background information on how to automatically create dialog boxes for SmartParts.

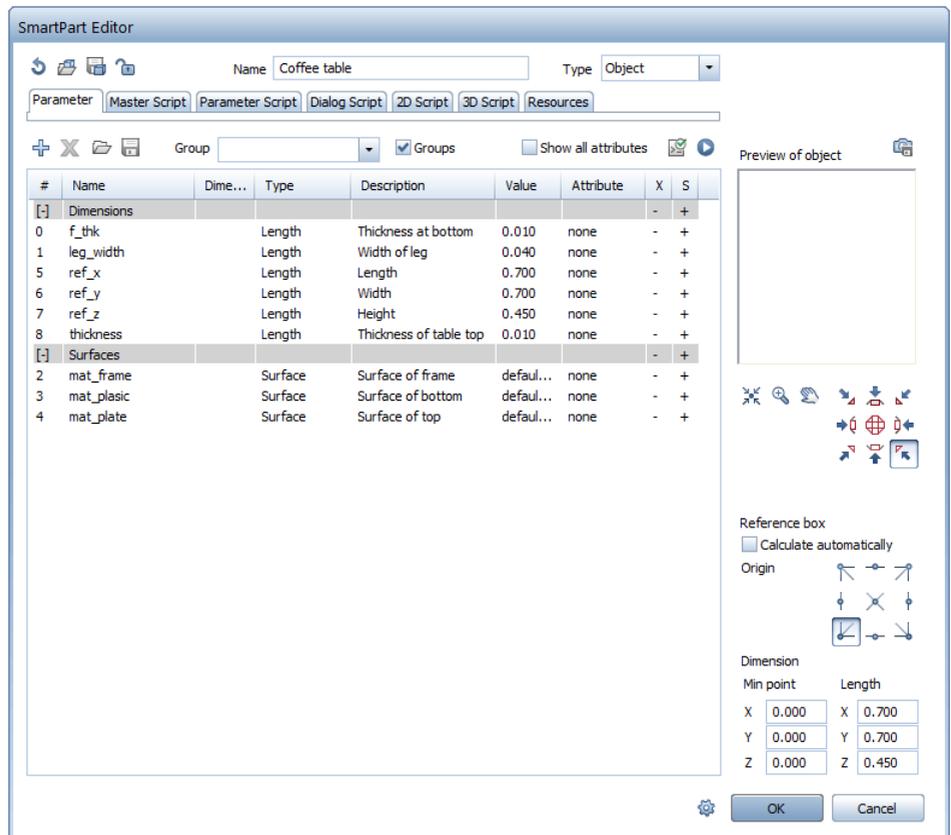
If you do not enter anything on the **Dialog Script** tab, the program automatically creates a dialog box based on the entries on the **Parameters** tab. The program uses the parameter groups created to arrange the parameters on different tabs in the palette of the SmartPart and on the pages of the dialog box. The tabs are created based on the sequence of the parameters in the script.

For example: look at the **Coffee Table** SmartPart displayed. In this example, there is no dialog box or the existing dialog box has been deleted.

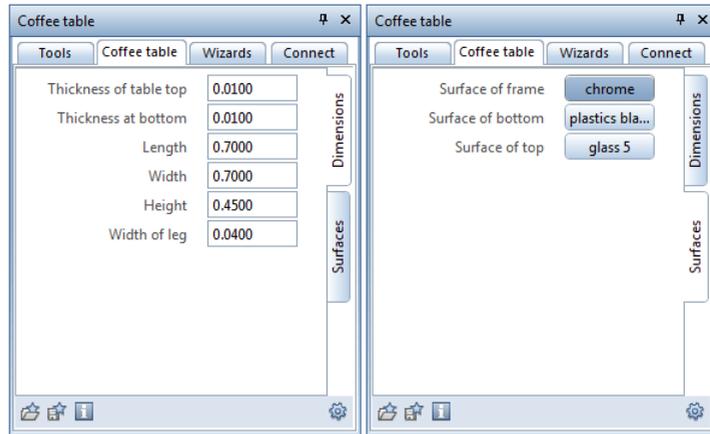
When you select the  **Run Script** tool on the **Dialog Script** tab, the program automatically creates the following dialog boxes:



Open the Parameters tab. Now you can see the following entries sorted in groups:



Next look at the palette of this SmartPart:



When comparing the contents of the **Parameters** tab of the SmartPart script with those of the SmartPart palette, you can see that the palette represents all the parameters in accordance with the sequence defined in the script and sorted by the existing groups. The same applies to the parameters in the dialog box that is automatically created from the **Dialog Script**.

Summary of the dialog script:

```
!Define name of dialog
I_PALETTE "Flexi 01 Table"
!Define page 1
I_PAGE "Dimensions"
!Define output and input boxes

I_OUTFIELD "Table length" , 0 , 0 , 160 , 22
I_INFIELD "ref_x" , 180 , 0 , 120 , 22
I_OUTFIELD "Table width" , 0 , 25 , 160 , 22
I_INFIELD "ref_y" , 180 , 25 , 120 , 22

I_OUTFIELD "Table height" , 0 , 50 , 160 , 22
I_INFIELD "ref_z" , 180 , 50 , 120 , 22
I_OUTFIELD "Thickness of tabletop" , 0 , 75 , 160 , 22
I_INFIELD "tabletop_t" , 180 , 75 , 120 , 22
I_OUTFIELD "Bar width" , 0 , 100 , 160 , 22

I_INFIELD "bar_w" , 180 , 100 , 120 , 22
!Define page 2
I_PAGE "Representation"
!Define output and input boxes

I_OUTFIELD "Surface of tabletop" , 0 , 0 , 160 , 22, 1
I_INFIELD "tabletop_s" , 180 , 0 , 120 , 22
I_SEPARATOR 0 , 36 , 300 , 36
I_OUTFIELD "Color for table" , 0 , 50 , 160 , 22, 1
I_INFIELD "color_t" , 180 , 50 , 120 , 22

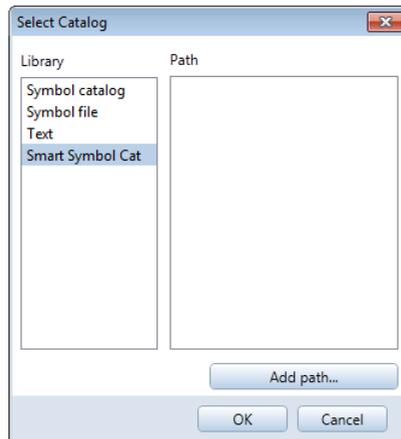
I_OUTFIELD "Color for connectors" , 0 , 75 , 160 , 22, 1
I_INFIELD "color_c" , 180 , 75 , 120 , 22
I_OUTFIELD "Color in plan" , 0 , 100 , 160 , 22, 1
I_INFIELD "color_p" , 180 , 100 , 120 , 22
```

Saving the SmartPart

Before you label the Flexi 01 Table SmartPart in step 5, you need to save it in the smart symbol catalog.

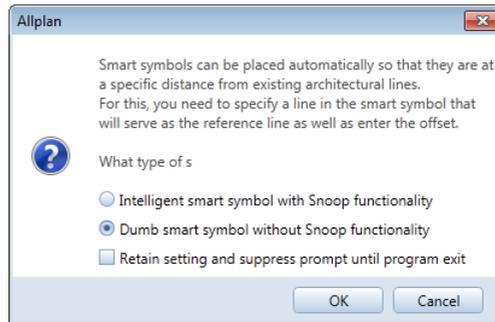
To save the Flexi 01 table SmartPart

- Allplan is open and drawing file 5 is current.
- 1 Press ESC to close the Flexi 01 Table or Coffee Table palette.
- 2 Click  Write to Library (Default toolbar).
- 3 Select Smart symbol catalog and click OK to confirm.

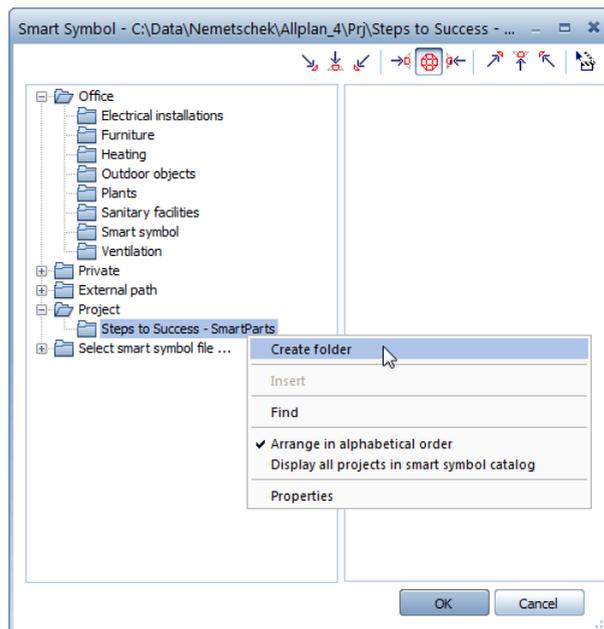


- 4 *Select smart symbol you want to save*
Open a selection rectangle around the Flexi 01 table in plan view.
- 5 *Specify base point of smart symbol*
Click the bottom left corner of the table in plan view.

- 6 Select Dumb smart symbol without Snoop functionality and click OK to confirm.

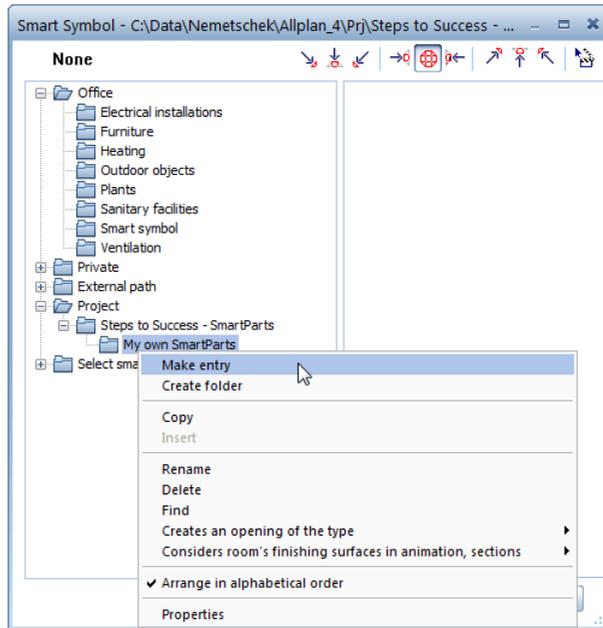


- 7 Open the Project folder and the Steps to Success - SmartParts folder. Open its shortcut menu and click Create folder.



- 8 Enter My own SmartParts for the name of the new folder.

- 9 Open the shortcut menu of the My own SmartParts folder and select **Make entry**.

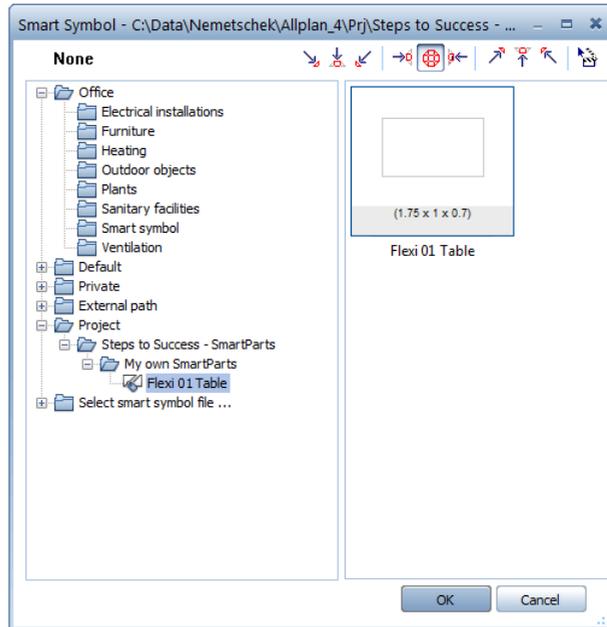


- 10 Enter **Flexi 01 Table** for the name and click **OK** to confirm.



- 11 Press **ESC** to quit the tool.

Note: To retrieve the Flexi 01 Table SmartPart from the catalog, use the  Get from Library tool. You can find the Flexi 01 Table SmartPart in the My own SmartParts folder:



Digression

In the previous step you created the Flexi 01 Table. It only takes a few changes in the script of the Flexi 01 Table to create a table with round legs.

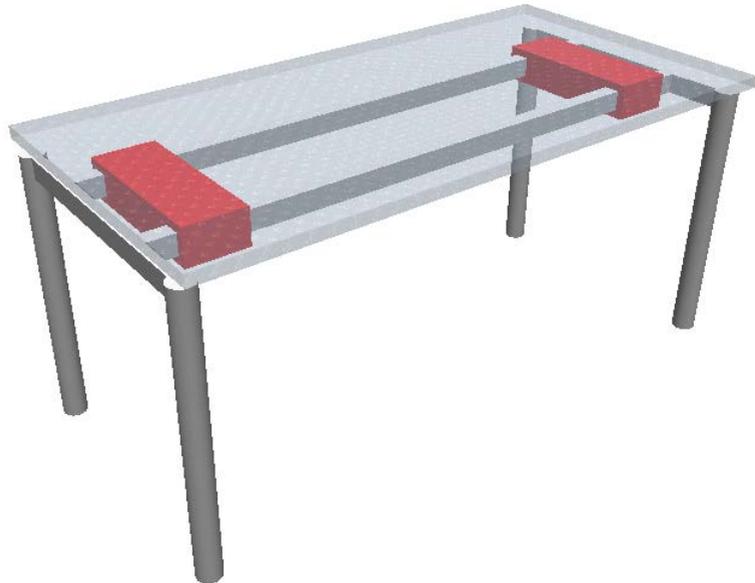
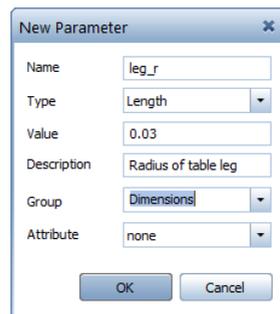


Table with round legs - Flexi 02

To define the script for the Flexi 02 table with round legs, we recommend that you proceed as follows:

- 1 Copy the Flexi 01 Table to an empty drawing file. Open this drawing file and close all the others.
- 2 Select the  **Modify SmartPart using Script** tool and click the Flexi 01 Table.
- 3 Change the Name of the SmartPart from Flexi 01 Table to Flexi 02 Table.
- 4 Open the **Parameters** tab. To define round legs for the Flexi 02 table, you need to add a new parameter.
- 5 Create the `leg_r` parameter (radius of table leg).



As you have assigned a group to the `leg_r` parameter when you created it, the **Parameters** tab now looks like this (provided the **Groups** option is selected):

The screenshot shows the SmartPart Editor window for 'Flexi 02 Table'. The 'Parameter' tab is selected. The table below lists the parameters:

#	Name	Dime...	Type	Description	Value	Attribute	X	S
[-] Dimensions								
0	bar_w		Length	Bar width	0,040	none	-	+
4	leg_r		Length	Radius of table leg	0,030	none	-	+
5	REF_X		Length	Table length	2,000	none	-	+
6	REF_Y		Length	Table width	0,800	none	-	+
7	REF_Z		Length	Table height	0,700	none	-	+
9	tabletop_t		Length	Thickness of tabletop	0,030	none	-	+
[-] Representation								
1	color_c		Color	Color for connectors	6	none	-	+
2	color_p		Color	Color in plan	27	none	-	+
3	color_t		Color	Color for table	1	none	-	+
8	tabletop_s		Surface	Surface of tabletop	glass 5	none	-	+

- 6 Switch to the **Parameter Script** tab to restrict the new parameter. The radius of the table legs is to be defined so that it can be adjusted from 3 to 5 cm in increments of 1 mm, with the first increment starting at 3 cm. The definition looks like this:

```
VALUES "leg_r" RANGE [ 0.03 , 0.05 ] STEP 0.03 , 0.001
```

The screenshot shows the SmartPart Editor window for 'Flexi 02 Table' with the 'Parameter Script' tab selected. The script content is as follows:

```
00003 VALUES "REF_X" RANGE [ 0.80 , 2.00 ] STEP 0.05 , 0.05
00004 VALUES "REF_Y" RANGE [ 0.80 , 1.20 ] STEP 0.05 , 0.05
00005 VALUES "REF_Z" RANGE [ 0.20 , 0.80 ] STEP 0.05 , 0.05
00006 VALUES "bar_w" RANGE [ 0.025 , 0.05 ] STEP 0.005 , 0.005
00007 VALUES "leg_r" RANGE [ 0.03 , 0.05 ] STEP 0.03 , 0.001
```

- 7 After you have created this parameter and restricted its variable dimensions, you can use it in the 3D script. Switch to the **3D Script** tab.
- 8 The script of the table legs starts with the **!Leg at bottom left** comment. Find this comment in the 3D script. To turn the rectangular table legs into round ones, you need to replace the **TRANS** (position of coordinate system) and **BOX** commands.

9 Creating round table legs requires a new command in the 3D

Script: CYLIND

To define the geometry of the leg at bottom left, enter the following:

```
TRANS 0.0225, 0.06, 0
```

```
CYLIND tableframe_h, leg_r
```

10 To define the leg at top left, enter:

```
TRANS 0.0225, ref_y-0.01-0.05, 0
```

```
CYLIND tableframe_h, leg_r
```

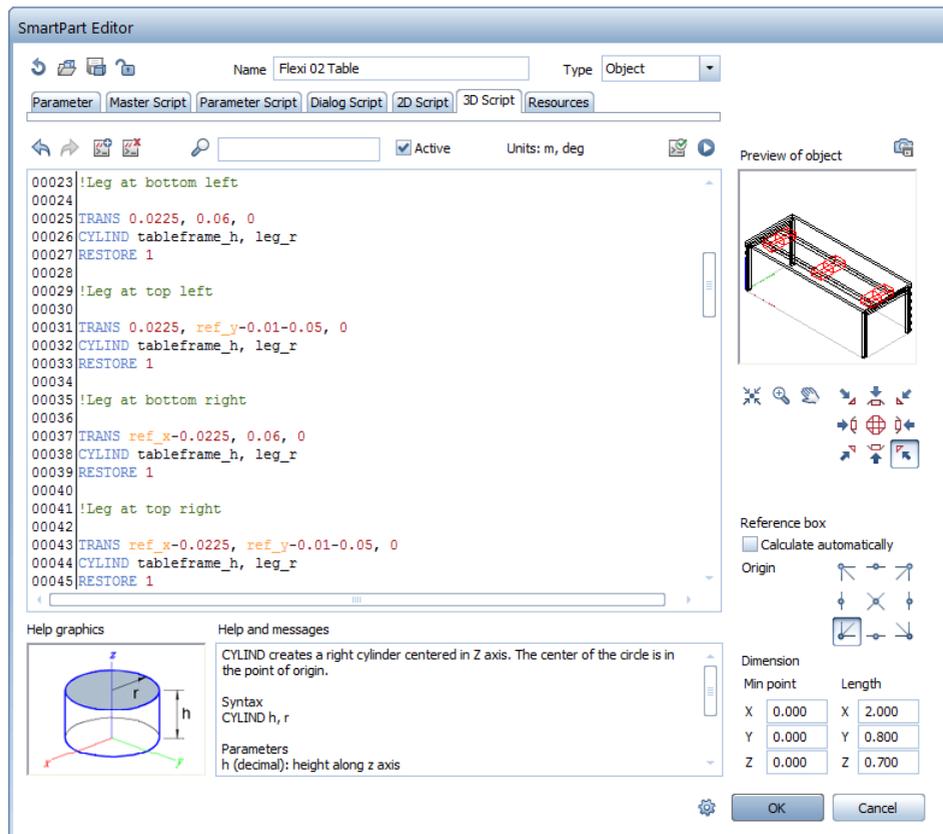
11 To define the leg at bottom right, enter:

```
TRANS ref_x-0.0225, 0.06, 0
```

```
CYLIND tableframe_h, leg_r
```

12 To define the leg at top right, enter:

```
TRANS ref_x-0.0225, ref_y-0.01-0.05, 0
CYLIND tableframe_h, leg_r
```



13 Switch to the Dialog Script tab.

14 Change the name to

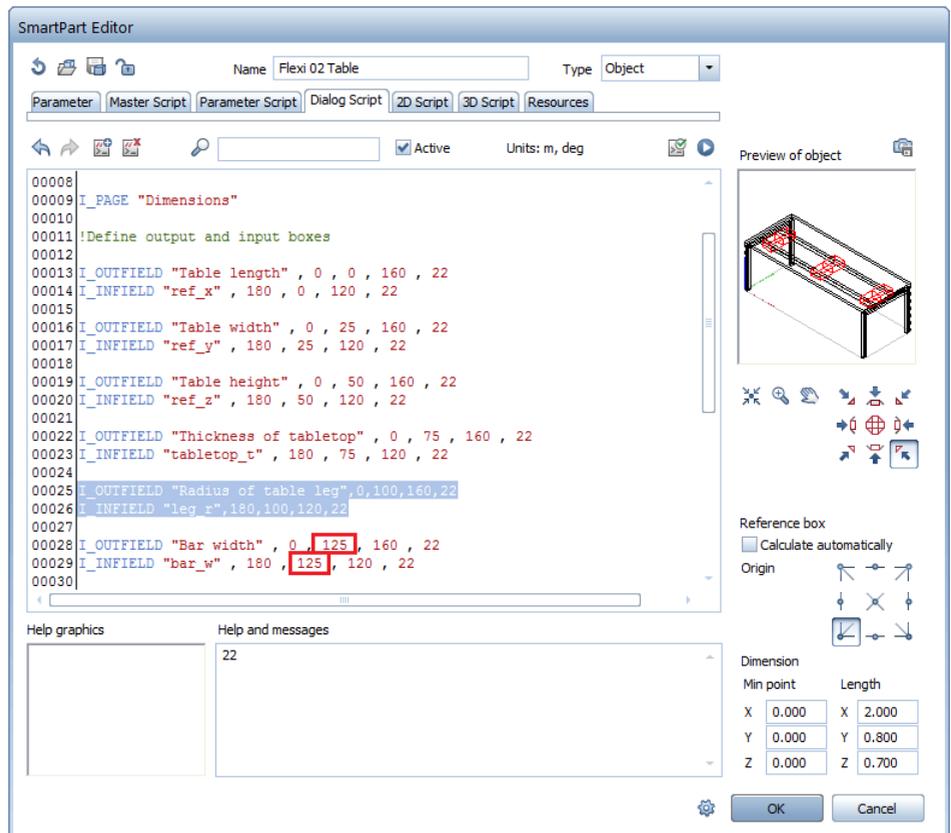
```
I_PALETTE "Flexi 02 Table"
```

15 In addition, you need to add two lines to include the radius of the table legs as a variable parameter on the Dimensions page of the dialog box of the Flexi 02 table.

Insert the following two lines between I_INFIELD "tabletop_t" and I_OUTFIELD "Bar width":

```
I_OUTFIELD "Radius of table leg",0,100,160,22
I_INFIELD "leg_r",180,100,120,22
```

- 16 Please note that the start points of the **Bar width** parameter change in the y direction. This applies to both the position of the element's name in the dialog box and the input box (these values are highlighted in the following illustration).



As you can see, it just takes a few changes to quickly and easily define a variant of the Flexi table. Now you can save the Flexi 02 Table SmartPart in the smart symbol catalog (see "Saving the SmartPart (on page 115)").

Digression - summary of parameters

SmartPart Editor

Name: Flexi 02 Table Type: Object

Parameter | Master Script | Parameter Script | Dialog Script | 2D Script | 3D Script | Resources

Group: Groups Show all attributes

#	Name	Dime...	Type	Description	Value	Attribute	X	S
0	bar_w		Length	Bar width	0.040	none	-	+
1	color_c		Color	Color for connectors	6	none	-	+
2	color_p		Color	Color in plan	27	none	-	+
3	color_t		Color	Color for table	1	none	-	+
4	leg_r		Length	Radius of table leg	0.030	none	-	+
5	REF_X		Length	Table length	2.000	none	-	+
6	REF_Y		Length	Table width	0.800	none	-	+
7	REF_Z		Length	Table height	0.700	none	-	+
8	tabletop_s		Surface	Surface of tabletop	glass 5	none	-	+
9	tabletop_t		Length	Thidkness of tabletop	0.030	none	-	+

Digression - summary of parameter script

```
VALUES "REF_X" RANGE [ 0.80 , 2.00 ] STEP 0.05 , 0.05  
VALUES "REF_Y" RANGE [ 0.80 , 1.20 ] STEP 0.05 , 0.05  
VALUES "REF_Z" RANGE [ 0.20 , 0.80 ] STEP 0.05 , 0.05  
VALUES "bar_w" RANGE [ 0.025 , 0.05 ] STEP 0.005 , 0.005  
VALUES "leg_r" RANGE [ 0.03 , 0.05 ] STEP 0.03 , 0.001
```

Digression - summary of dialog script

```

!Define name of dialog
I_PALETTE "Flexi 02 Table"
!Define page 1
I_PAGE "Dimensions"
!Define output and input boxes
I_OUTFIELD "Table length" , 0 , 0 , 160 , 22
I_INFIELD "ref_x" , 180 , 0 , 120 , 22

I_OUTFIELD "Table width" , 0 , 25 , 160 , 22
I_INFIELD "ref_y" , 180 , 25 , 120 , 22
I_OUTFIELD "Table height" , 0 , 50 , 160 , 22
I_INFIELD "ref_z" , 180 , 50 , 120 , 22
I_OUTFIELD "Thickness of tabletop" , 0 , 75 , 160 , 22
I_INFIELD "tabletop_t" , 180 , 75 , 120 , 22
I_OUTFIELD "Radius of table leg" , 0 , 100 , 160 , 22
I_INFIELD "leg_r" , 180 , 100 , 120 , 22

I_OUTFIELD "Bar width" , 0 , 125 , 160 , 22
I_INFIELD "bar_w" , 180 , 125 , 120 , 22
!Define page 2
I_PAGE "Representation"
!Define output and input boxes
I_OUTFIELD "Surface of tabletop" , 0 , 0 , 160 , 22 , 1
I_INFIELD "tabletop_s" , 180 , 0 , 120 , 22
I_SEPARATOR 0 , 36 , 300 , 36
I_OUTFIELD "Colr for table" , 0 , 50 , 160 , 22 , 1
I_INFIELD "color_t" , 180 , 50 , 120 , 22
I_OUTFIELD "Color for connectors" , 0 , 75 , 160 , 22 , 1
I_INFIELD "color_c" , 180 , 75 , 120 , 22
I_OUTFIELD "Color in plan" , 0 , 100 , 160 , 22 , 1
I_INFIELD "color_p" , 180 , 100 , 120 , 22

```

Digression - summary of 2D script

```
!Define color of plan view  
COLOR color_p  
!2D rectangle for plan view  
RECT2 0 , 0 , REF_X , REF_Y
```

Digression - summary of 3D script

```

REF_HANDLES
tableframe_h=ref_z-tabletop_t-0.02
COLOR color_t
!Define surface of tabletop
MATERIAL tabletop_s

!Define tabletop
TRANSZ REF_Z
BOX REF_X , REF_Y , -tabletop_t
RESTORE 1

!Reset surface
MATERIAL ""

!Leg at bottom left
TRANS 0.0225 , 0.06 , 0
CYLIND tableframe_h , leg_r
RESTORE 1

!Leg at top left
TRANS 0.0225 , REF_Y - 0.01 - 0.05 , 0
CYLIND tableframe_h , leg_r
RESTORE 1

!Leg at bottom right
TRANS REF_X - 0.0225 , 0.06 , 0
CYLIND tableframe_h , leg_r
RESTORE 1

!Leg at top right
TRANS REF_X - 0.0225 , REF_Y - 0.01 - 0.05 , 0
CYLIND tableframe_h , leg_r
RESTORE 1

!Brace on the left
TRANS 0.01 , 0.01 + 0.05 , tableframe_h
BOX 0.025 , REF_Y - 2 * ( 0.05 + 0.01 ) , -0.05
RESTORE 1

!Brace on the right
TRANS REF_X - 0.01 - 0.025 , 0.01 + 0.05 , tableframe_h
BOX 0.025 , REF_Y - 2 * ( 0.05 + 0.01 ) , -0.05
RESTORE 1

!Bars
!Bar at bottom
TRANS 0.01 + 0.025 , 0.22 , tableframe_h
GOSUB "bar"
RESTORE 1

!Bar at top
TRANS 0.01 + 0.025 , REF_Y - 0.22 - bar_w , tableframe_h
GOSUB "bar"
RESTORE 1

!Define color of connectors
COLOR color_c

!Insert resource of connectors
!Connector at bottom left
TRANS 0.1 , 0.2 , REF_Z - tabletop_t - 0.09

```

```
PLACE 01 , 1
RESTORE 1

!Connector at bottom right
TRANS REF_X - 0.1 - 0.15 , 0.2 , REF_Z - tabletop_t - 0.09
PLACE 01 , 1
RESTORE 1

!Connector at top left
TRANS 0.1 , REF_Y - 0.2 - 0.2 , REF_Z - tabletop_t - 0.09
PLACE 01 , 1
RESTORE 1

!Connector at top right
TRANS REF_X - 0.1 - 0.15 , REF_Y - 0.2 - 0.2 , REF_Z - tabletop_t - 0.09
PLACE 01 , 1
RESTORE 1

!Connectors when table longer than 1.60m
IF ref_x > 1.60 THEN
!Connector centered at bottom
TRANS ref_x/2-0.075,0.2,ref_z-tabletop_t-0.09
PLACE 01,1
RESTORE 1

!Connector centered at top
TRANS ref_x/2-0.075,ref_y-0.2-0.2,ref_z-tabletop_t-0.09
PLACE 01,1
RESTORE 1

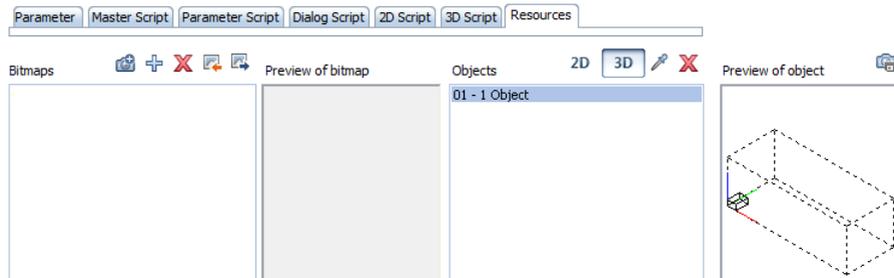
ENDIF
END

!Subscript for bar

Bar:
BOX REF_X - 2 * ( 0.01 + 0.025 ) , bar_w , -0.05
RETURN

!Subscript for bar END
```

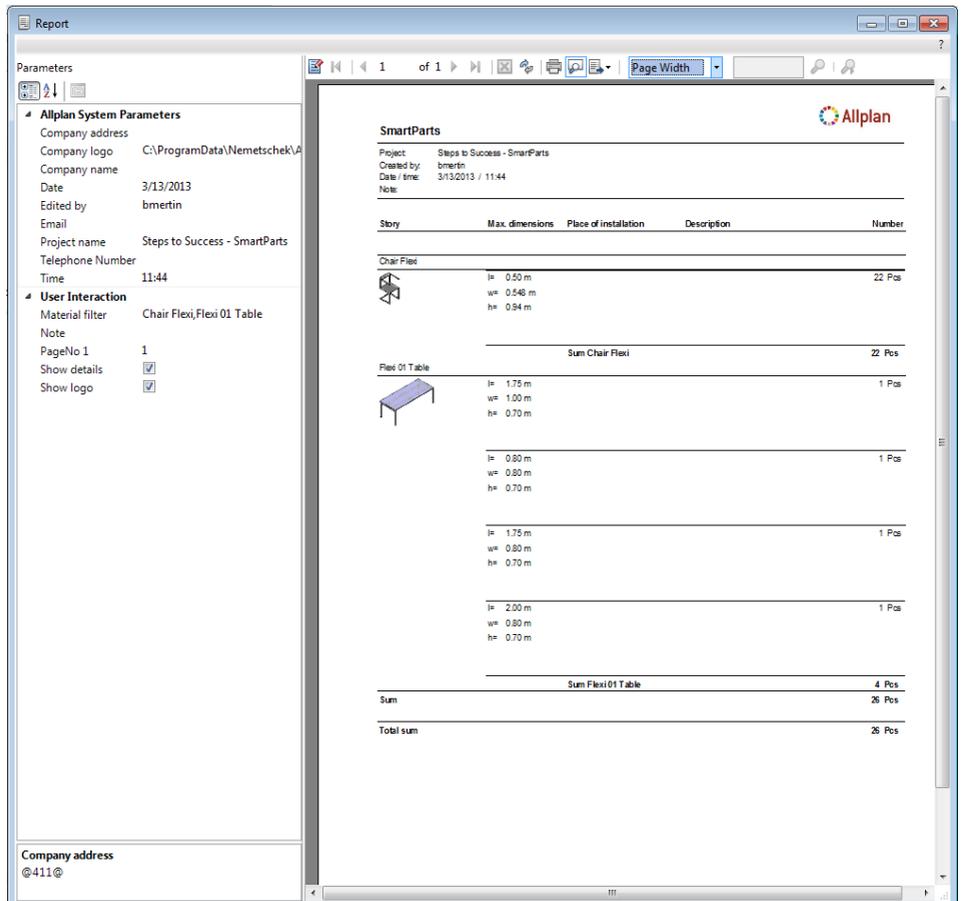
Digression - summary of resources



Step 5: Analysis

Objective

In the last step, you will place your own SmartPart in the drawing file a number of times, make modifications, place another SmartPart that comes with Allplan and make several copies of this SmartPart. Afterwards, you will analyze all SmartParts in a list. Finally, you will label the Flexi 01 Table SmartPart.



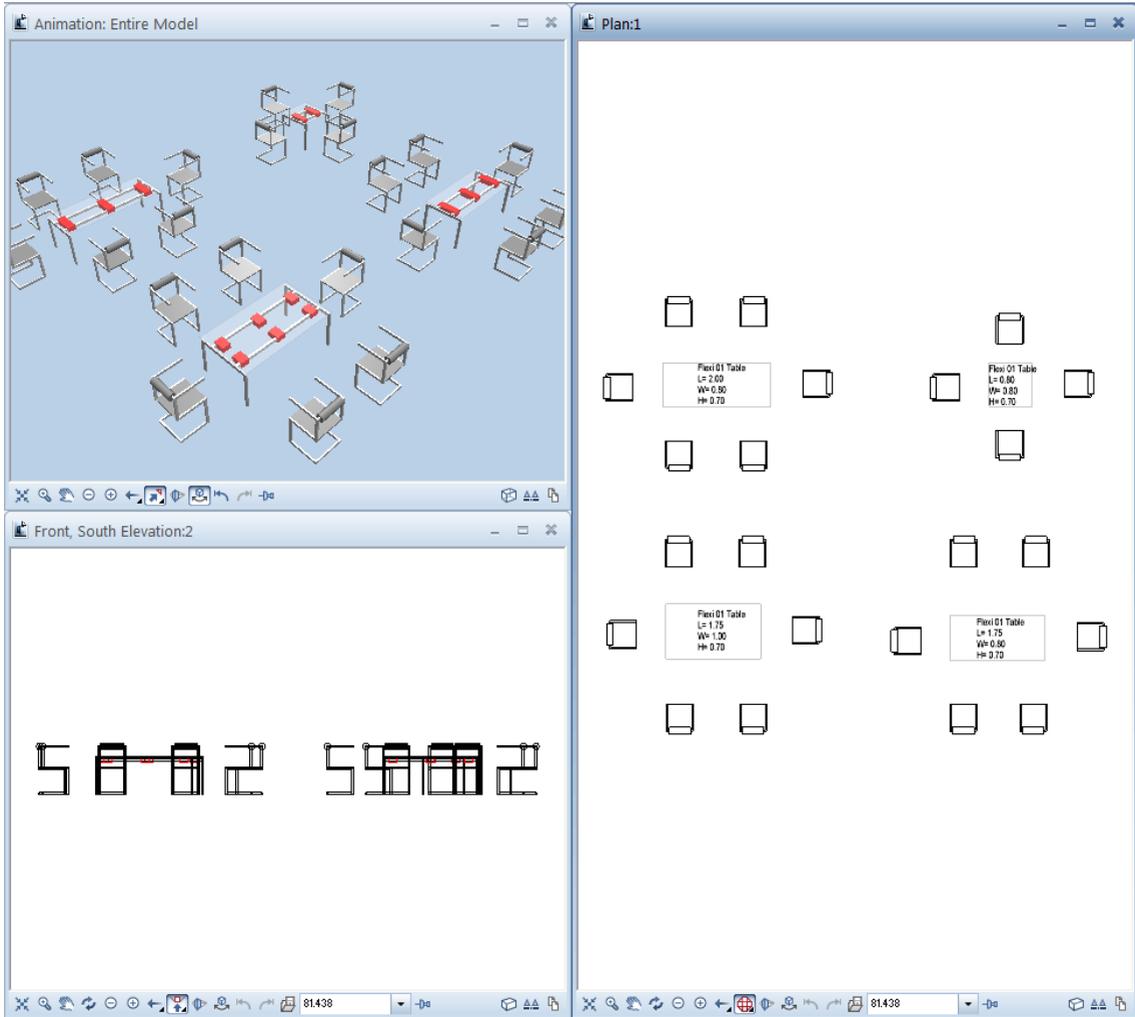
The screenshot shows the Allplan Report window with the following parameters:

- Allplan System Parameters**
 - Company address
 - Company logo: C:\ProgramData\Nemetschek\A
 - Company name
 - Date: 3/13/2013
 - Edited by: bmertin
 - Email
 - Project name: Steps to Success - SmartParts
 - Telephone Number
 - Time: 11:44
- User Interaction**
 - Material filter: Chair Flexi, Flexi 01 Table
 - Note
 - PageNo 1: 1
 - Show details:
 - Show logo:

The main report area displays the following table:

Story	Max. dimensions	Place of installation	Description	Number
Chair Flexi				
	l= 0.50 m w= 0.548 m h= 0.94 m			22 Pos
Sum Chair Flexi				22 Pos
Flexi 01 Table				
	l= 1.75 m w= 1.00 m h= 0.70 m			1 Pos
	l= 0.80 m w= 0.80 m h= 0.70 m			1 Pos
	l= 1.75 m w= 0.80 m h= 0.70 m			1 Pos
	l= 2.00 m w= 0.80 m h= 0.70 m			1 Pos
Sum Flexi 01 Table				4 Pos
Sum				26 Pos
Total sum				26 Pos

At the bottom left of the report window, the company address is listed as @411@.



Completing the drawing file

To complete the drawing file

➤ Allplan is running.

1 If you have defined the script for the Flexi 02 table, make drawing file 5 current and close all the other drawing files.

2 Double-click the Flexi 01 table with the right mouse button.

The Flexi 01 table is attached to the crosshairs.

3 Place the SmartPart in the workspace.

4 The SmartPart is displayed with handles. As you do not want to use the handles to modify the SmartPart right now, press ESC.

The next SmartPart is attached to the crosshairs and the input options are displayed.

5 Switch off the  **Modify SmartPart using Handles** tool in the input options.

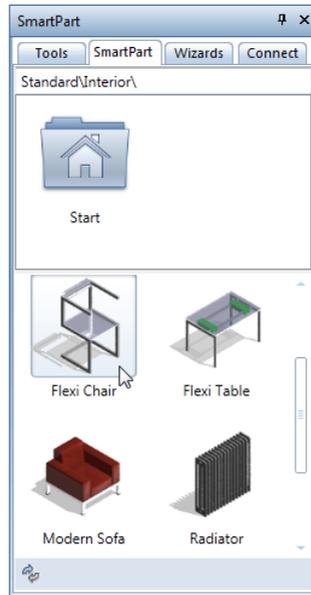


6 Place two more Flexi 01 tables in the workspace and press ESC to quit the tool.

7 Click  **SmartPart** in the Create area.

8 Select the **Interior** folder in the top part of the SmartPart palette.

9 Select the Flexi Chair SmartPart.



10 Switch off the  **Modify SmartPart** using **Handles** tool in the input options.

11 Place the chair in the workspace.

The next SmartPart is attached to the crosshairs.

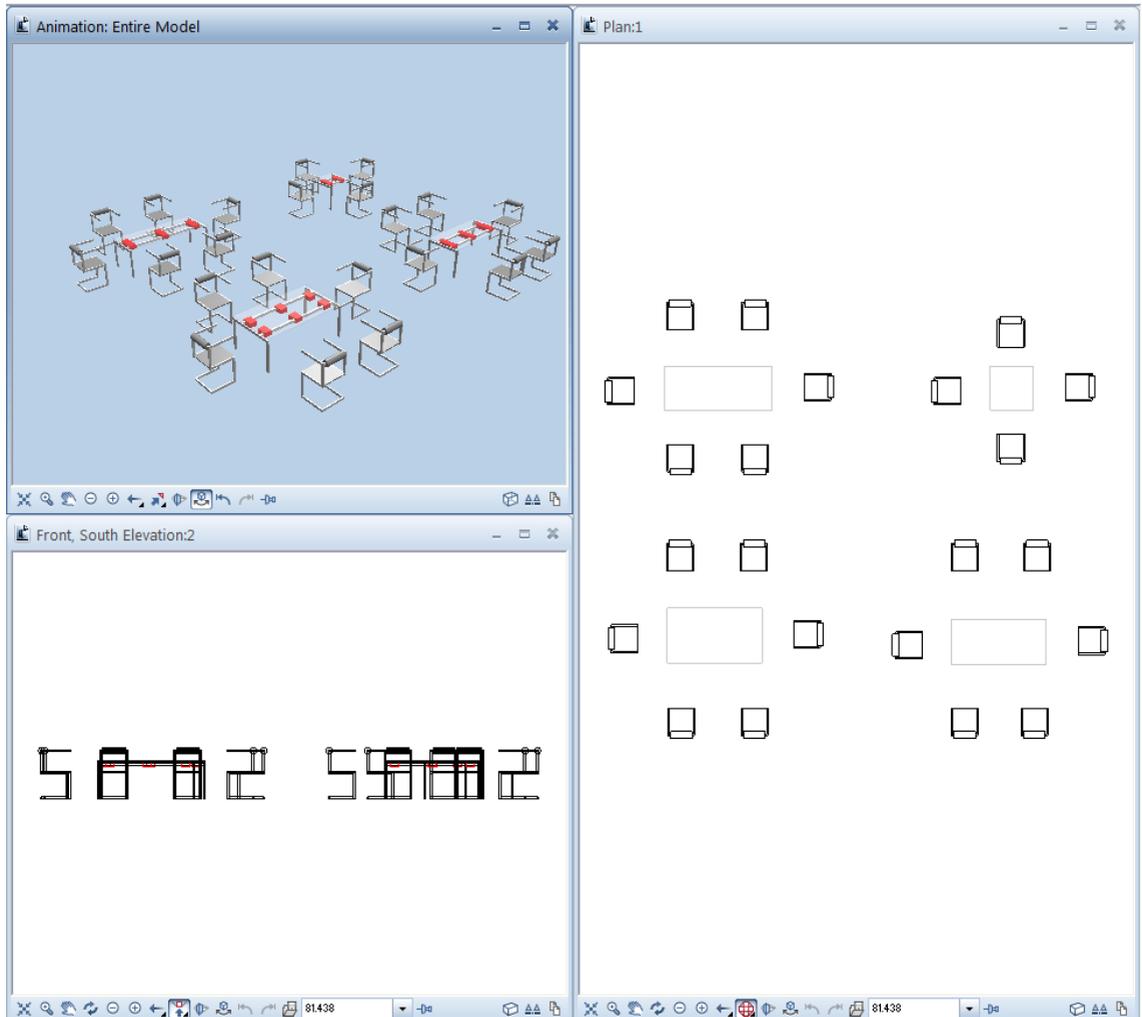
Place as many chairs as you need for the four tables. You can specify an **Angle of rotation** in the dialog line.

12 Now you can modify the dimensions of the tables.

Note: You can modify the **Flexi Chair** SmartPart in many different ways. Try it out for yourself! (Double-click the left mouse button.)

13 Place the chairs as required.

Now the drawing file might look something like this:

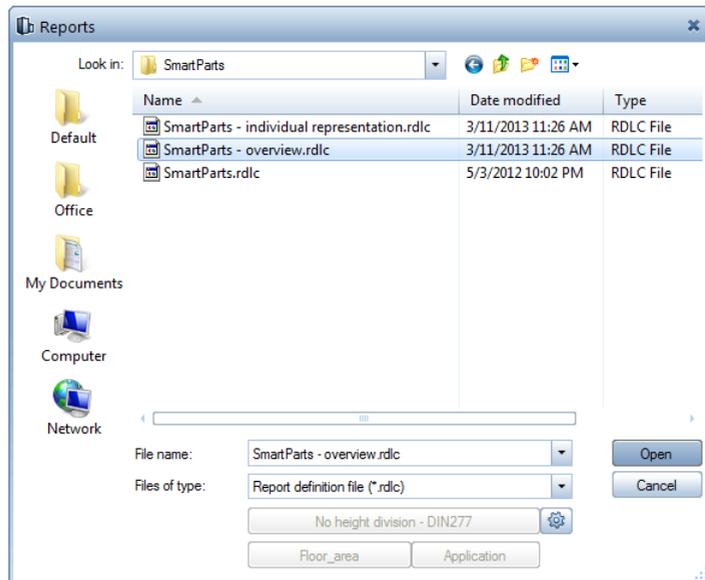


Note: Allplan 2013 comes with the predefined Flexi Table SmartPart, which you can find in the Interior folder of the SmartPartpalette. This SmartPart is equivalent to the Flexi 01 table you created. The scripts only differ slightly. By the way, the script of the Flexi Table SmartPart is available as international content.

Analysis using a report

To analyze SmartParts in a report

- ➔ Allplan is open and drawing file 5 is current.
- 1 In the Tools palette, open the **Smart Symbols** module (**Bonus Tools** family).
 - 2 In the **Create** area of the **Smart Symbols** module, click .
 - 3 Select the **Default** folder on the left side of the **Reports** dialog box.
 - 4 Select the **SmartParts** folder and the `SmartParts - overview.rdlc` file.
 - 5 Click **Open**.



- 6 Click **All** in the input options.

The report is displayed in a separate window.

The screenshot shows a software window titled "Report" with a sidebar for "Parameters" and a main area for the report content. The "Parameters" sidebar is divided into two sections: "Allplan System Parameters" and "User Interaction".

Parameters:

- Allplan System Parameters:**
 - Company address
 - Company logo: C:\ProgramData\Nemetschek\A
 - Company name
 - Date: 3/13/2013
 - Edited by: bmartin
 - Email
 - Project name: Steps to Success - SmartParts
 - Telephone Number
 - Time: 11:44
- User Interaction:**
 - Material filter: Chair Flexi, Flexi 01 Table
 - Note
 - PageNo 1: 1
 - Show details:
 - Show logo:

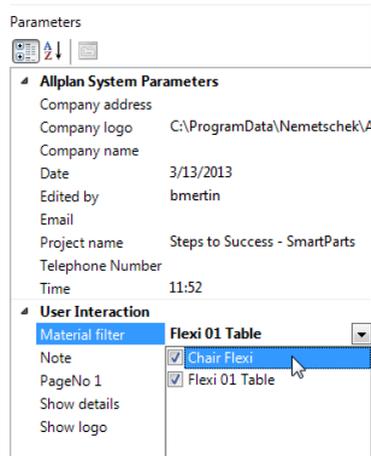
SmartParts Report:

Project: Steps to Success - SmartParts
 Created by: bmartin
 Date / time: 3/13/2013 / 11:44
 Note:

Story	Max. dimensions	Place of installation	Description	Number
Chair Flexi				
	l= 0.50 m w= 0.548 m h= 0.94 m			22 Pcs
Sum Chair Flexi				22 Pcs
Flexi 01 Table				
	l= 1.75 m w= 1.00 m h= 0.70 m			1 Pcs
	l= 0.80 m w= 0.80 m h= 0.70 m			1 Pcs
	l= 1.75 m w= 0.80 m h= 0.70 m			1 Pcs
	l= 2.00 m w= 0.80 m h= 0.70 m			1 Pcs
Sum Flexi01 Table				4 Pcs
Sum				26 Pcs
Total sum				26 Pcs

At the bottom of the window, there is a field for "Company address" containing "@411@".

Using the User Interaction area on the left, you can apply a material filter.



Using this filter in this example, you can create separate reports for the Flexi 01 Table and Flexi Chair SmartParts.

You can edit the report as follows:

- You can print it.
- You can place it in the current document,
- You can save it as a file in Excel, PDF or Word format or
- You can edit it using the **Layout Designer**.
- You can save changes as a new template in RDLC format.

7 Close the Report.

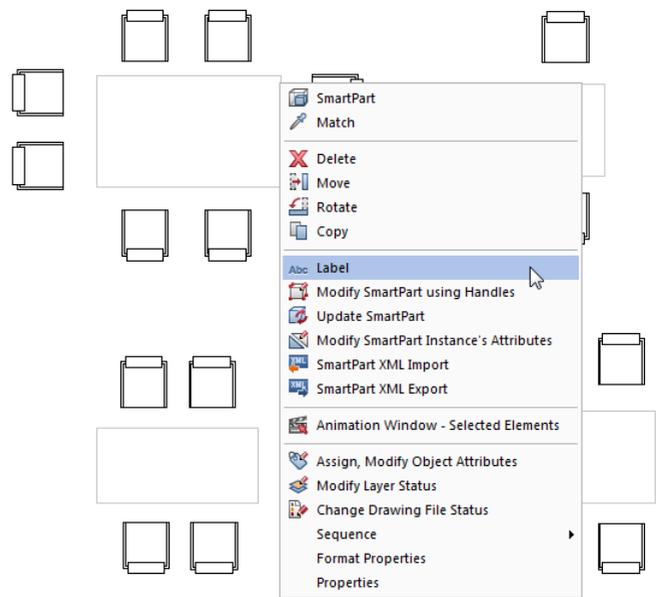
Labeling the SmartPart

Finally, you will label the Flexi 01 Table SmartPart.

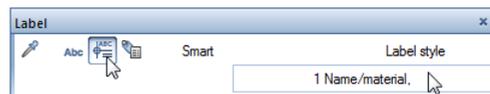
To label a SmartPart

➤ Allplan is open and drawing file 5 is current.

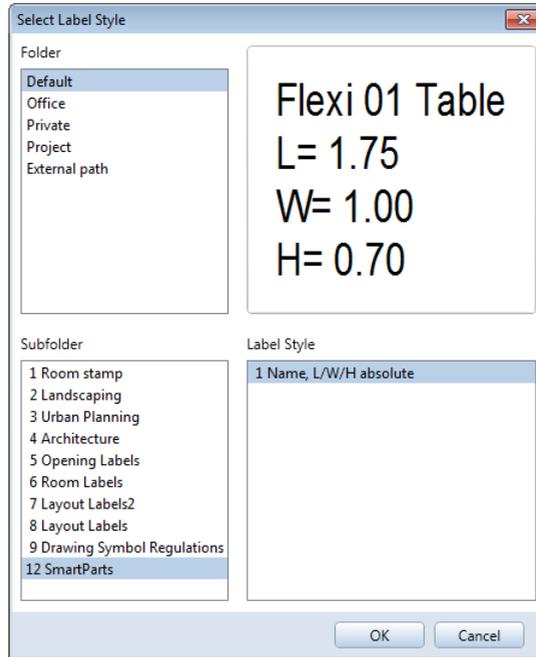
- 1 Open the shortcut menu of the Flexi 01 table at top left and select the  Label tool.



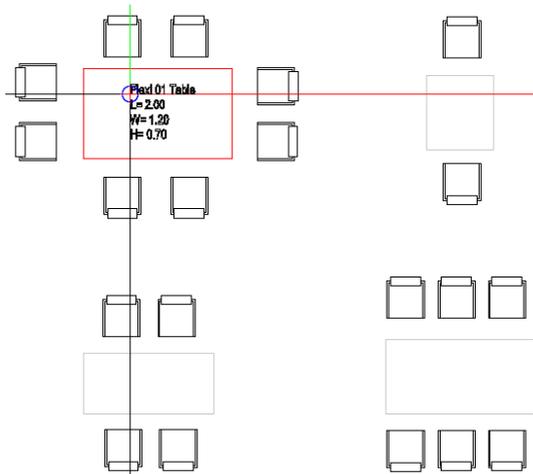
- 2 Click  Label Style and then click in the box below Label style.



- 3 In the **Default** folder, select subfolder **12 SmartPart** and label style **1**.



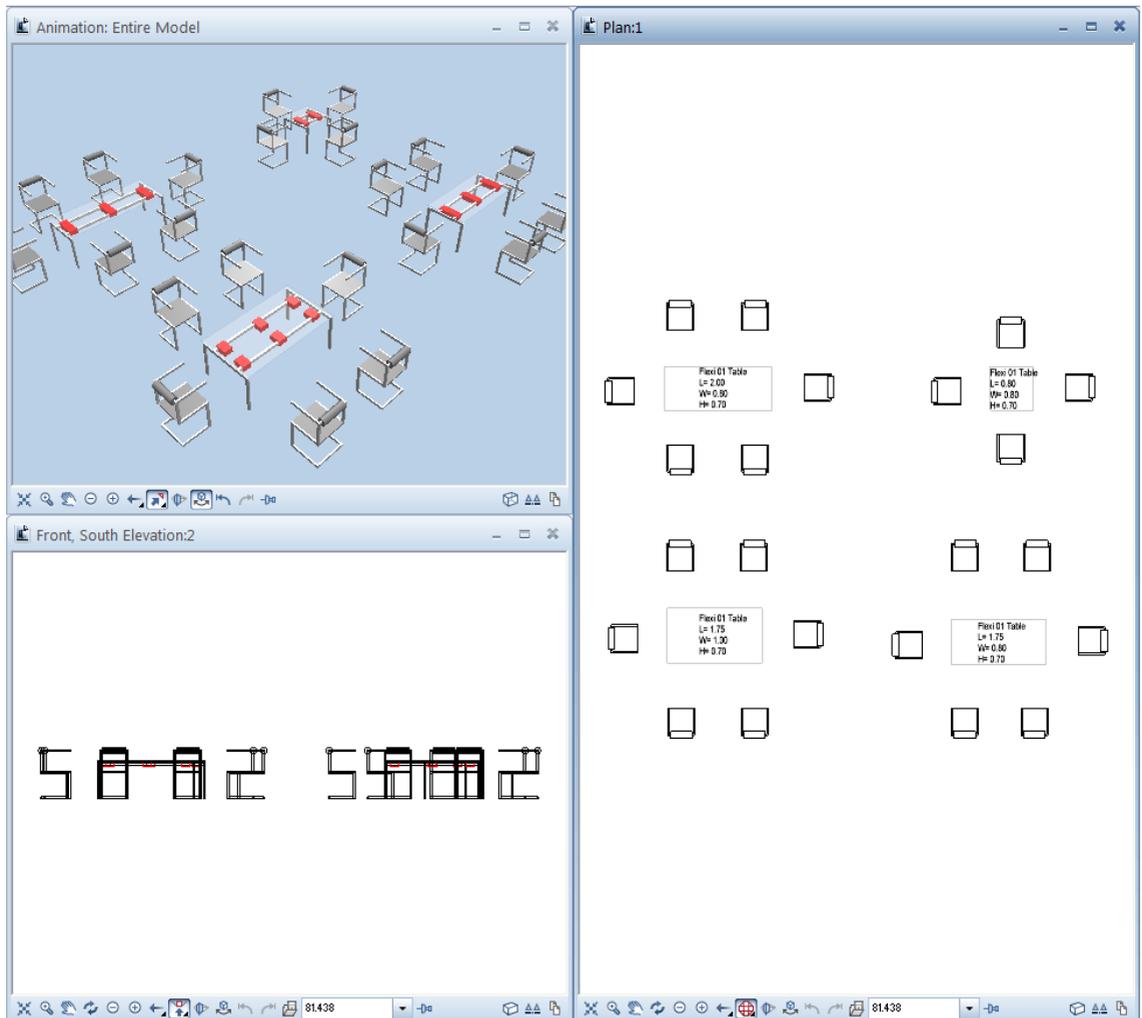
- 4 Click **OK** to confirm your selection.
- 5 Place the label in the selected SmartPart in plan view.



The labels style displays the name of the SmartPart and its length, width and height.

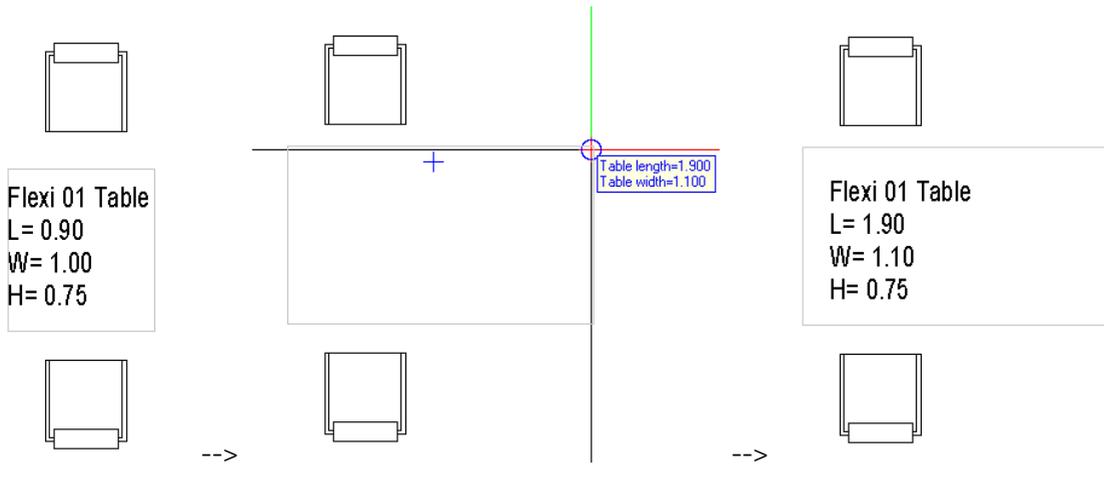
- 6 Now label the other three tables yourself.

The result might look like this:



Note: As you have used a label style to label the SmartPart, the label of the Flexi 01 table is always up-to-date even when you modify the dimensions of the table.

For example:



Index

- A
- additional tools 25
- C
- commands
 - BOX 45, 53, 61, 66
 - COLOR 94, 99
 - CYLIND 121
 - END 66, 75, 80
 - ENDIF 80
 - GOSUB 66
 - I_DIALOG 104
 - I_INFIELD 104
 - I_OUTFIELD 104
 - I_PAGE 104
 - I_SEPARATOR 104
 - IF...THEN 80
 - MATERIAL 94
 - PLACE 75, 80
 - RANGE 84
 - RECT2 99
 - REF_HANDLES 45
 - RESTORE 53, 61, 66, 75, 80
 - RETURN 66
 - TRANS 45, 53, 61, 66, 75, 80
 - VALUES 84
- copying, moving elements
 - between documents... 88
- creating project 5
 - basic settings 8
- creating your own SmartPart
 - analyzing SmartParts 135, 138
 - assigning surfaces 89, 94, 96
 - connectors 72, 77
 - cross braces 61, 65
 - defining dialog box using
 - scripts 89, 104, 115
 - defining parameters using
 - scripts 84
 - graphic representation with
 - dimensions 42
 - if condition 80, 81
 - plan view 99, 103
 - resource 73, 75
 - saving SmartParts 88, 116
 - table leg 53, 59
 - table top 45, 52
- G
- get from library 16, 116, 135
- L
- label style 141
- R
- reference box 31, 45
- report 138
- S
- SmartPart
 - default dialog box 10
 - definition 2
 - get from library 16, 116, 135
 - inserting 10, 16, 24
 - labeling 141
 - modifying 10, 19, 24
 - shortcut menu 10
 - where to find 3
- SmartPart editor 30
 - 2D script tab 39
 - 3D script tab 40
 - adding parameters 45, 66, 89
 - definition 2
 - dialog script tab 38
 - forming groups 89
 - master script tab 35
 - overview tab 31
 - parameter script tab 37
 - parameters tab 33
 - resources tab 41
 - understanding scripts 29
 - variables 53
- surface 4
- T

- tools 4, 25
 - creating SmartParts 45
 - inserting SmartParts 135
 - modifying SmartParts using scripts 61, 66, 73, 89, 104
- tools in the script editor
 - 3D objects 73
 - checking, formatting scripts 45, 53, 61, 66, 75, 80, 84, 89, 94, 99, 104
 - resetting parameters 45
 - running scripts 45, 53, 61, 66, 75, 80, 84, 89, 94, 99, 104

W

- write to library 116