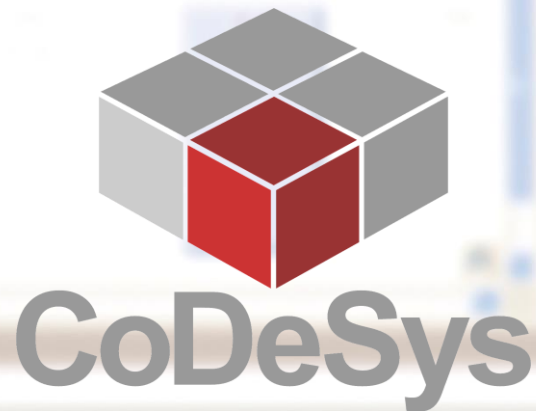
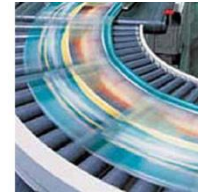


Visualization: Simple Elements



We software Automation.



Visualization: Simple Elements

This training shows you how to use simple visualization elements in CoDeSys.

Introduction

After this module you will be able to ...

- configure simple visualization elements
- use static properties
- use dynamic properties
- display texts
- display values
- configure value changes
- display pictures
- configure this: [Documents\Solution.avi](#)

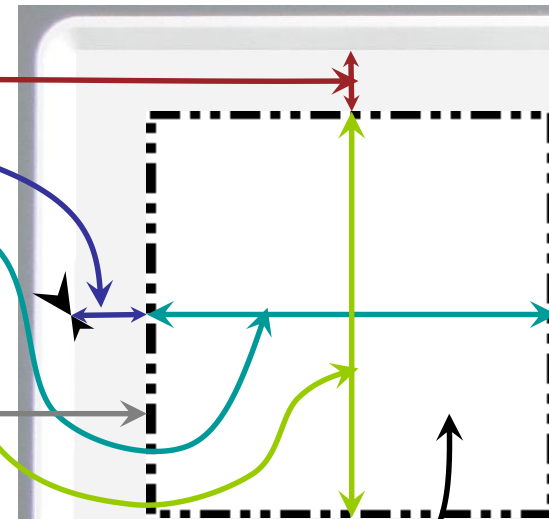


Static properties





Properties

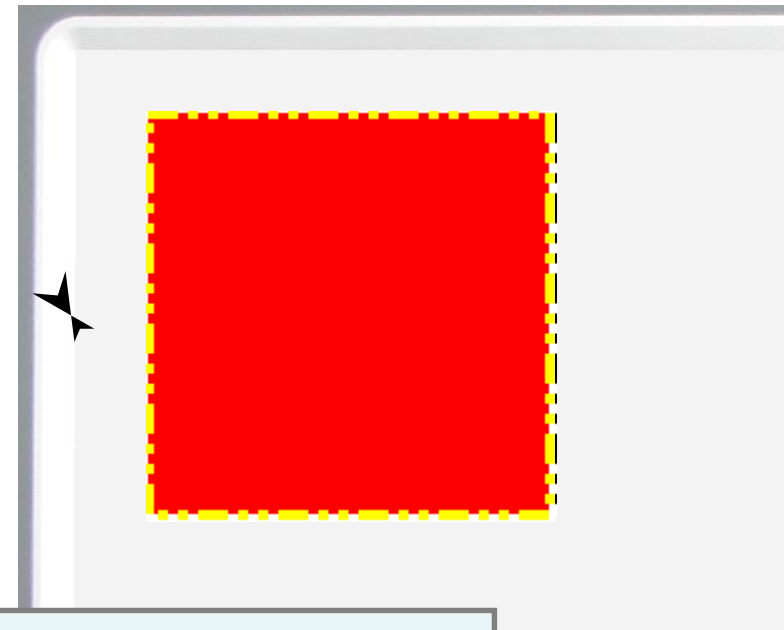
Filter | Sort by | Sort order

Property	Value
Position	
X	10
Y	10
Width	200
Height	200
Center	
X	380
Y	254
Colors	
Normalstate	
Framecolor	Black
Fillcolor	White
Alarmstate	
Framecolor	Yellow
Fillcolor	250; 0; 0
Elementlook	
Linewidth	5
Fillattributes	BS_SOLID
Frameattributes	PS_DASHDOTDOT



Dynamic properties (Toggle Color)

Properties				
Filter		Sort by	Sort order	
Property	Value			
+	Absolute movement			
+	Center			
-	Color variables			
+	Alarmstate			
+	Normalstate			
	ToggleColor	PLC_PRG.xBlink		
-	Colors			
-	Alarmstate			
	Fillcolor		250; 0; 0	
	Framecolor		Yellow	
-	Normalstate			
	Fillcolor		White	
	Framecolor		Black	



Expression is **false** or empty:
Normal state colors are shown.

Expression is **true**:
Alarm state colors are shown.

Do some practice

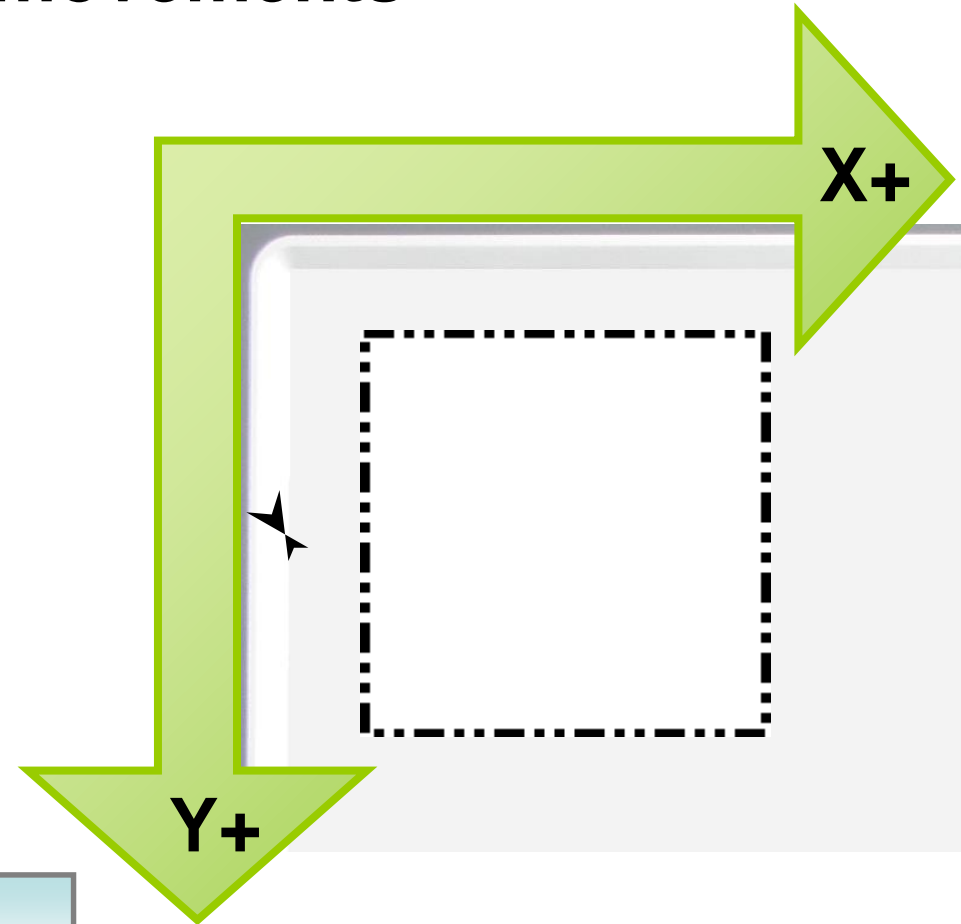
Exercise 1

- Use the project SimpleElements_All_Exercise.project.
- Create an object (rectangle) on the visualization screen.
- Configure colour toggling depending on the boolean variable PLC_PRG.xblink



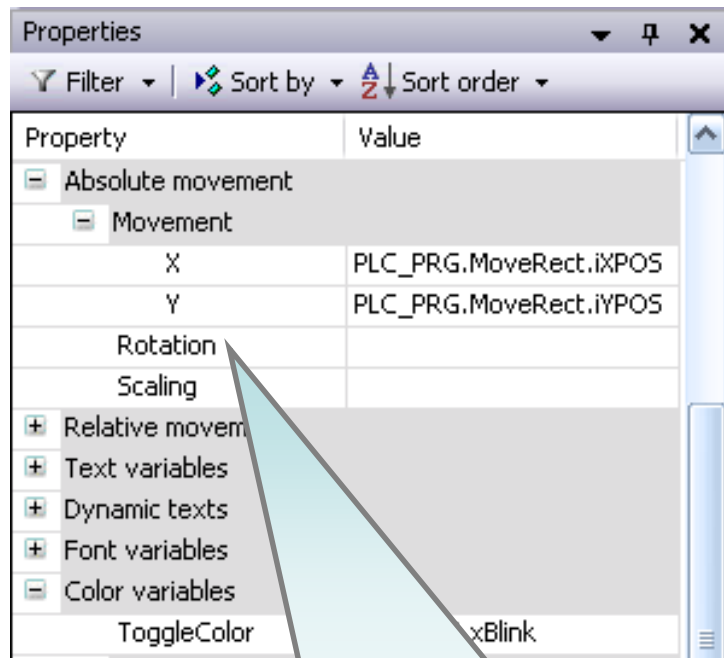
Dynamic properties - movements

Properties	
Filter	Sort by Sort order
Property Value	
[-] Absolute movement	
[-] Movement	
X	PLC_PRG.MoveRect.ixPOS
Y	PLC_PRG.MoveRect.iyPOS
Rotation	
Scaling	
[+] Relative movement	
[+] Text variables	
[+] Dynamic texts	
[+] Font variables	
[-] Color variables	
ToggleColor	PLC_PRG.xBlink

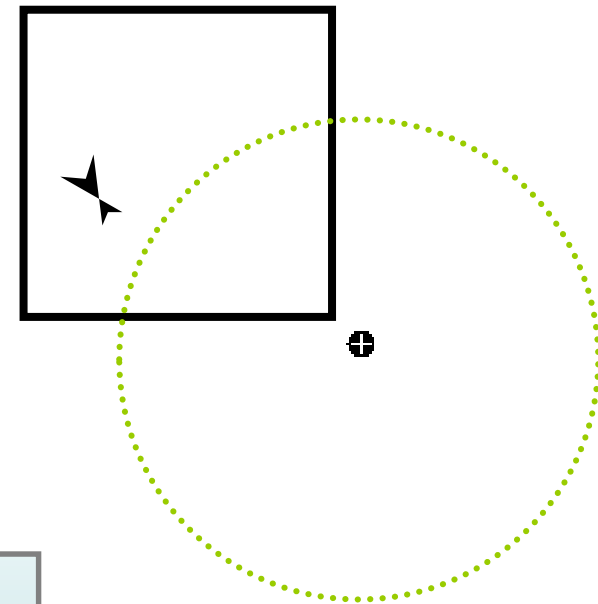


'Absolute movement' moves, rotates and scales the **whole** object.

Dynamic properties - movements

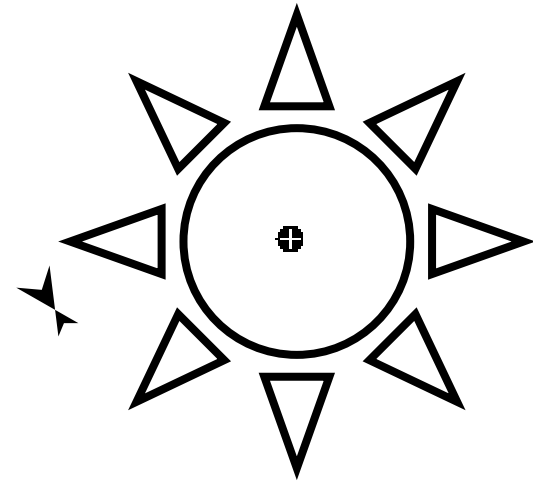


Most objects have the property 'Rotation'.
The object's position can rotate around a defined center point. The center is the black dot with the white cross inside.



Dynamic properties - movements

Properties	
Filter Sort by Sort order	
Absolute movement	
Movement	
X	
Y	
Rotation	
Scaling	
Interior rotation	PLC_PRG.Rotation.iRota...



Objects (polygon and polyline) with the property 'Interior rotation' can rotate around their centers marked by the black dot.

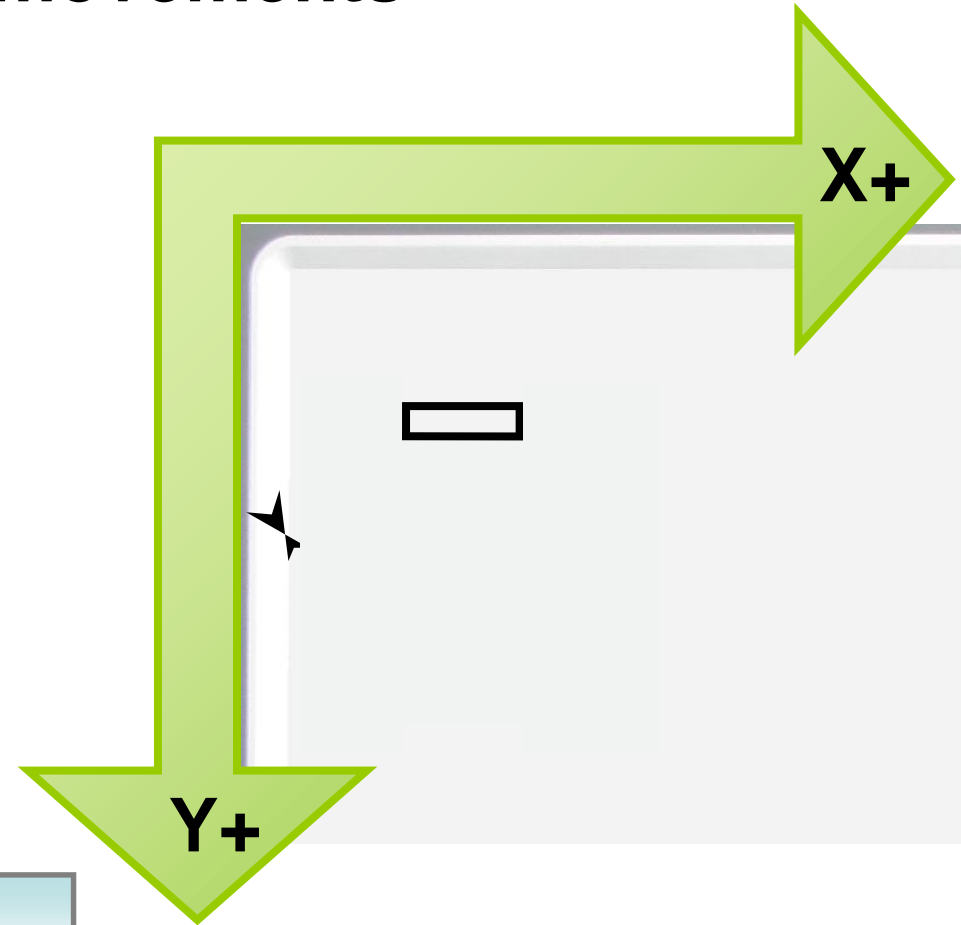
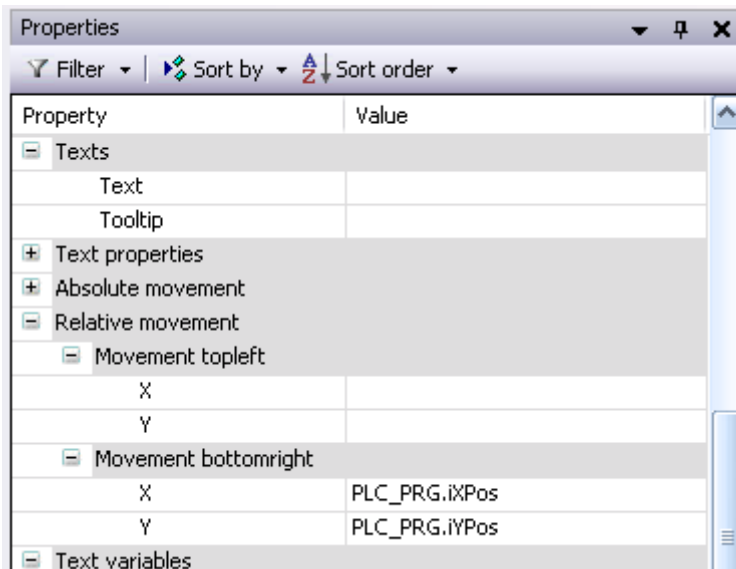
Do some practice

Exercise 2

- Use the result project from Exercise 1.
- Have the rectangle move in X and Y direction by using the variables: PLC_PRG.rXPOS and PLC_PRG.rYPOS
- Create another rectangle and use PLC_PRG.iRotation to rotate it around a centerpoint outside the object
- Create a triangle and rotate it by using the variable PLC_PRG.iRotation
 - Try different positions of the center point



Dynamic properties - movements



'Relative movement' moves the edges thus scaling up or down the object.

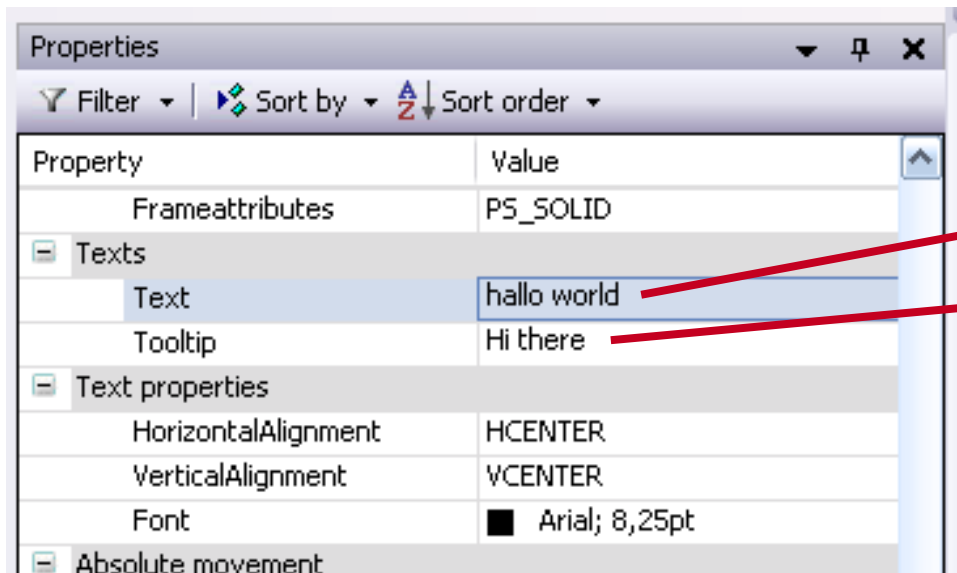
Do some practice

Exercise 3

- Use the result project from Exercise 2.
- Create a new rectangle and use the relative movement for the bottom right corner (use PLC_PRG.rXPos and PLC_PRG.rYPos).



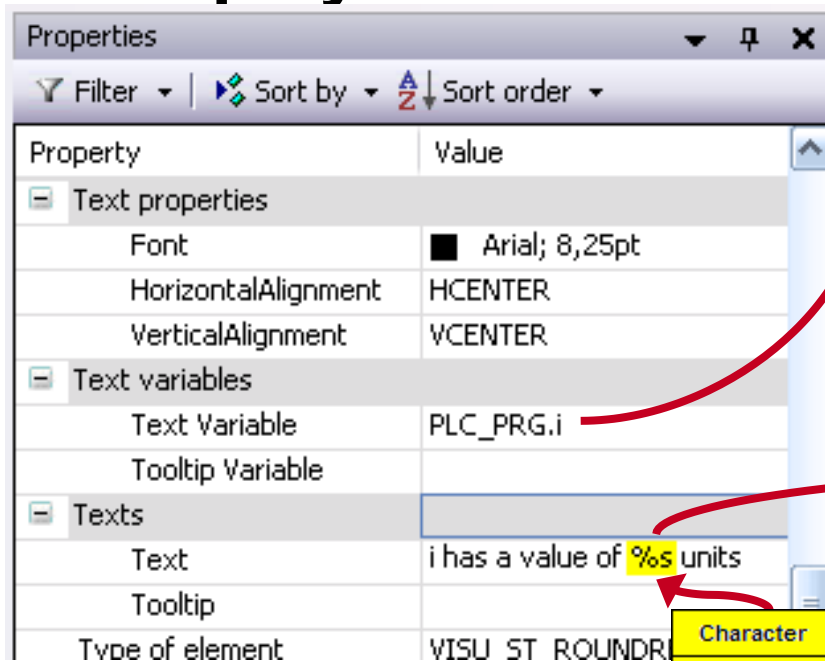
Display static texts



Both texts are automatically added to the GlobalTextList

GlobalTextList	
ID	Default
0	hello world
1	hi there

Display value



The screenshot shows the 'Properties' window with the following sections:

- Text properties:**
 - Font: Arial; 8,25pt
 - HorizontalAlignment: HCENTER
 - VerticalAlignment: VCENTER
- Text variables:**
 - Text Variable: PLC_PRG.i
 - Tooltip Variable:
- Texts:**
 - Text: i has a value of %s units
 - Tooltip:
- Type of element:** VISU ST ROUND

i has a value of 640 units

In online mode the format string is replaced by the value

i has a value of %s units

Character	Argument / Output as
d,i	Decimal number
b	Binary number
o	Unsigned octal number (without leading zero)
x	Unsigned hexadecimal number (without leading 0x)
u	Unsigned decimal number
c	Single character
s	String: This location in online mode will be replaced by the value of the variable
f	REAL-values; syntax: %<alignment><minimal width>.<accuracy> f The alignment is defined by a minus-sign (left aligned) or a plus-sign (right aligned) at the comma (default: 6); see example below.



Do some practice

Exercise 4

- Use the result project from Exercise 3.
- Create a new rectangle. Enter a text in 'Texts-Text' and a different one in 'Texts-Tooltip'
- Create a new rectangle. Enter a text with an included format string and connect a variable in 'Text variables' – 'Text Variable' (try different format strings).

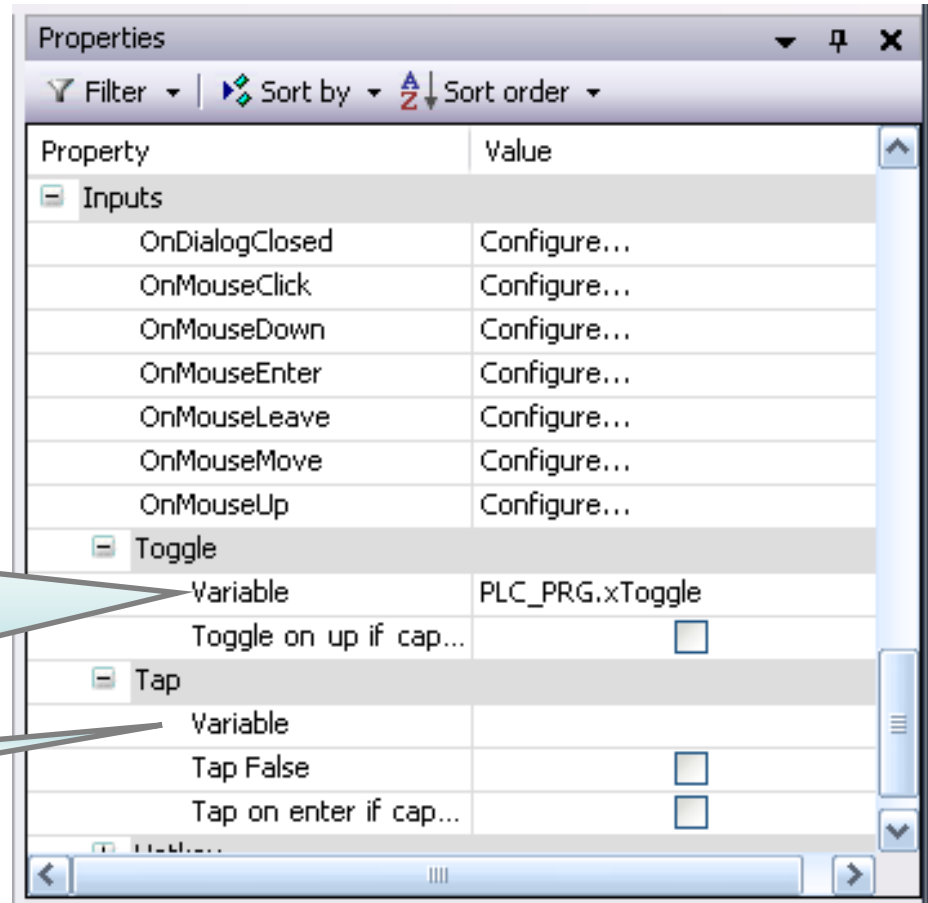


Toggle/Tap boolean values

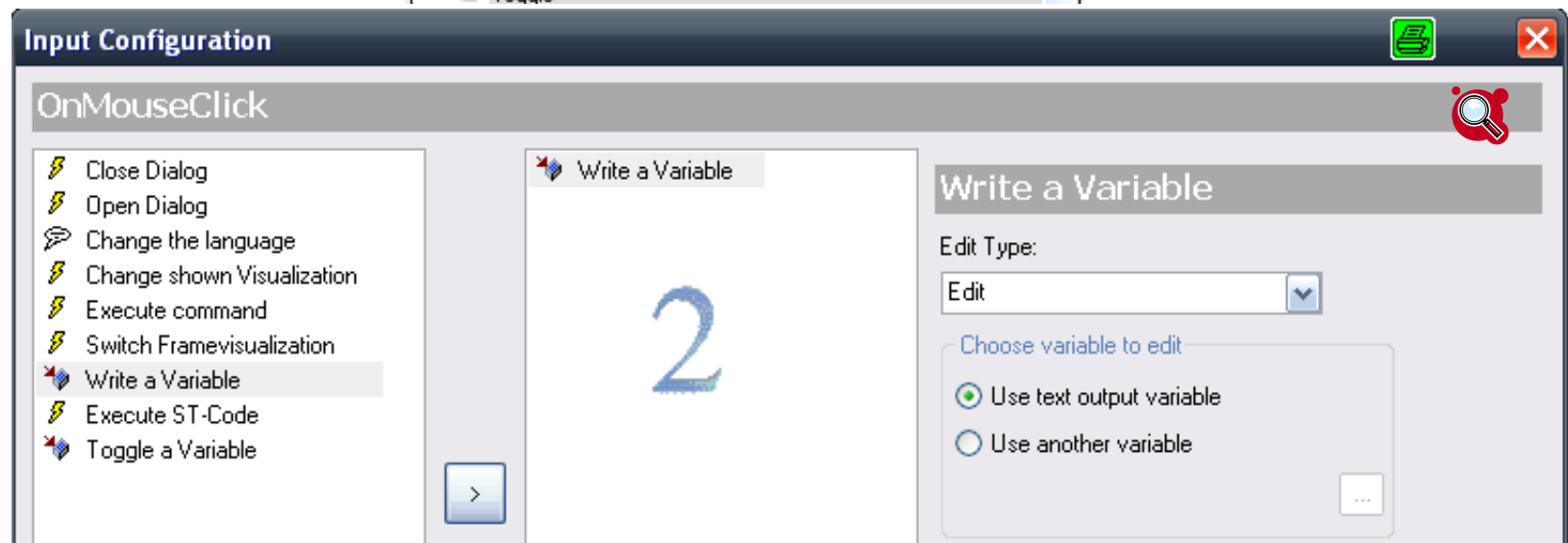
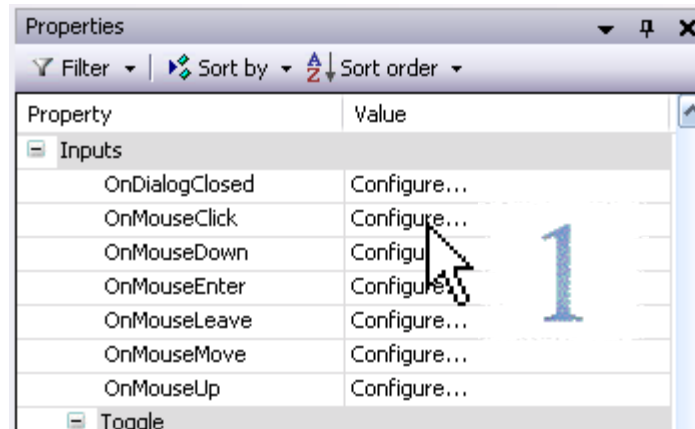


In most visualization objects, you can change boolean values. Just connect the variable you want to change here


or here.



Change values – by keyboard



Change values – by numpad / keypad


Library Manager

Name
System_VisuElems = VisuElems, 3.3.2.0 (System)
System_VisuElemMeter = VisuElemMeter, 3.3.2.0 (System)
System_VisuElemsWinControls = VisuElemsWinControls, 3.3.2.0 (System)
System_VisuElemTrace = VisuElemTrace, 3.3.2.0 (System)
System_VisuInputs = VisuInputs, 3.3.2.0 (System)
VisuDialogs, 3.3.2.0 (System)

Library Manager in POUs

VisuElemMeter	
VisuElemsWinControls	
VisuElemTrace	
VisuInputs	
VisuDialogs	3.3.2.0

1

Input Configuration

OnMouseClicked

- Close Dialog
- Open Dialog
- Change the language
- Change shown Visualization
- Execute command
- Switch Framevisualization
- Write a Variable
- Execute ST-Code
- Toggle a Variable

Write a Variable

2

Write a Variable

Edit Type:

VisuDialogs.Numpad

Edit

VisuDialogs.Keypad

VisuDialogs.Numpad

☐ Use text output variable

☐ Use another variable

Do some practice

Exercise 5

- Use the result project from Exercise 4.
- Use an object to toggle PLC_PRG.xToggle.
- Use another object to tap PLC_PRG.xTap.
- Enable the editing of the displayed variable PLC_PRG.ri .
- Copy the rectangle and configure the editing PLC_PRG.ri by numpad.

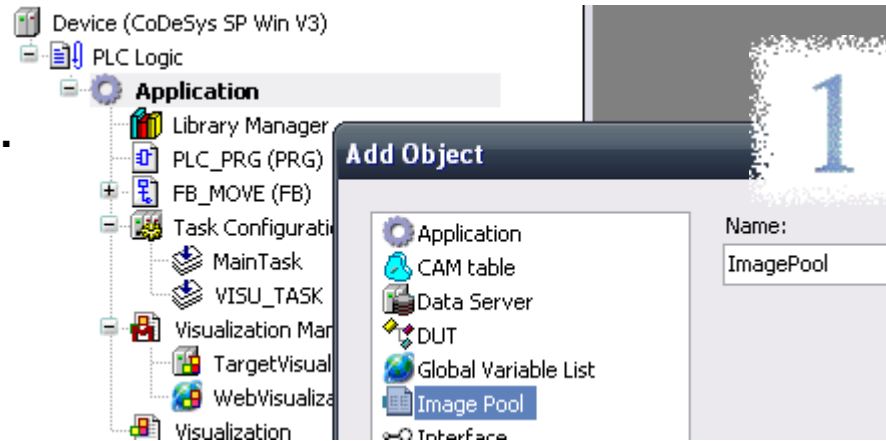



Display pictures

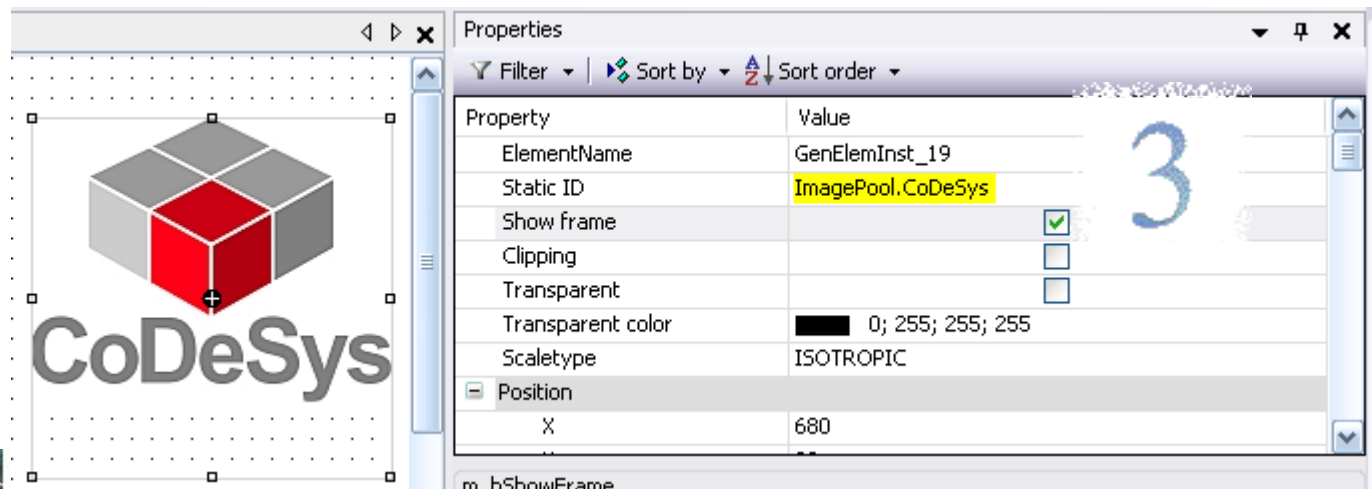
1. Add at least one Image Pool.
2. Refer to the image or include it in the Image Pool
→ now accessible by ID.
3. Use the ID to add the image to the visualization

(best practice:

<ImagePoolName>.<ID>)



ID	File name	Image
CoDeSys	D:\Schulung\CoDeSys V3 Schulung\Modules\VISU\Docu...	



Display pictures / scaling and clipping

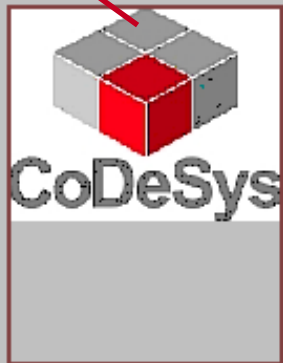
Aspect
ratio is
kept

Image is
fitted to the
frame

Original
size of
image is
displayed

Parts
outside the
frame are
invisible

SCALETYPES and CLIPPING for pictures and frames



ISOTROPIC

ANISOTROPIC

FIXED

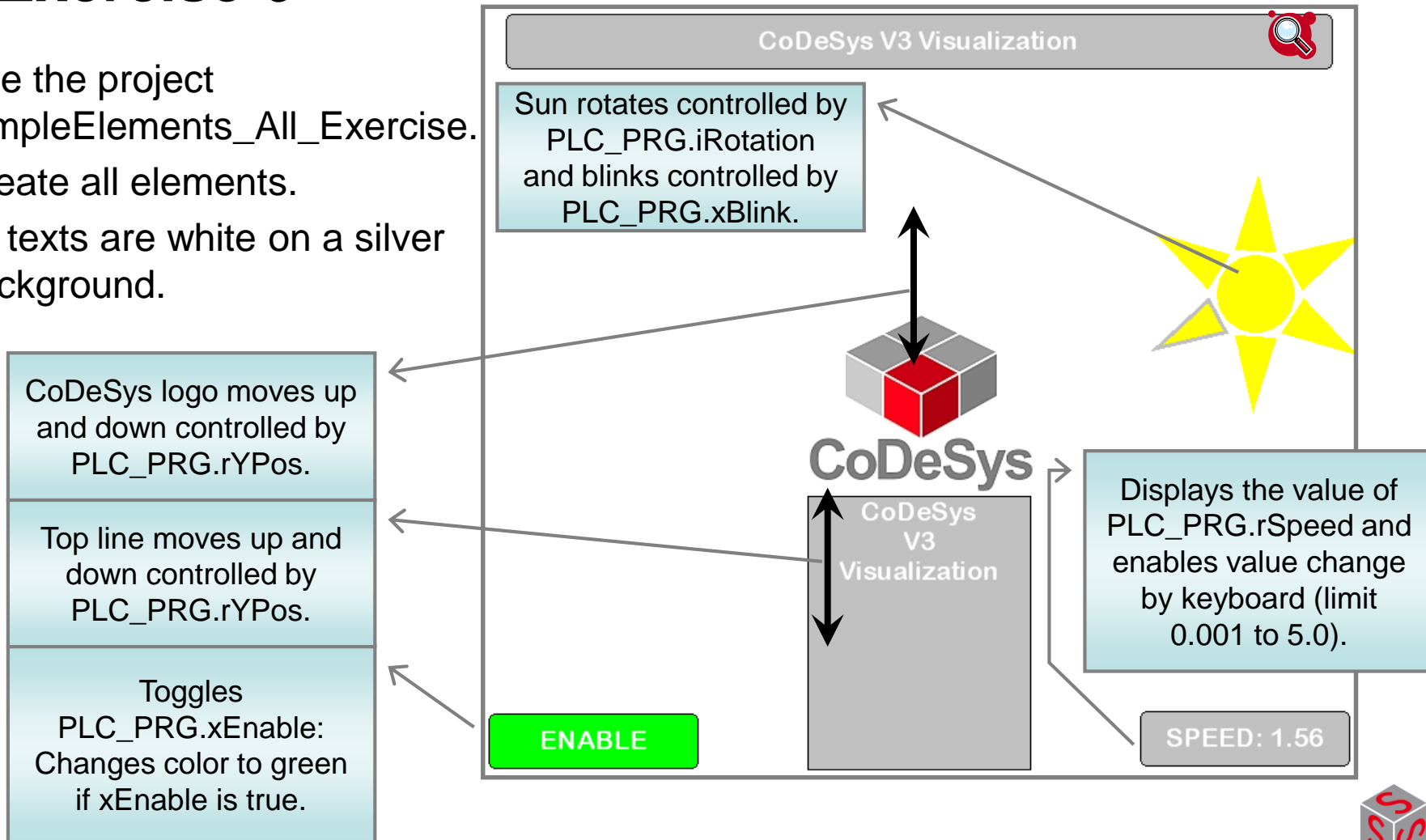
FIXED
+ Clipping

Properties	
Filter	Sort by Sort order
Property	Value
ElementName	GenElemInst_1
Static ID	ImagePool.CoDeSys
Show frame	<input checked="" type="checkbox"/>
Clipping	<input type="checkbox"/>
Transparent	<input type="checkbox"/>
Transparent color	0; 255; 255; 255
Scaletype	ISOTROPIC
Position	ISOTROPIC
X	ANISOTROPIC
Y	FIXED

Do some practice

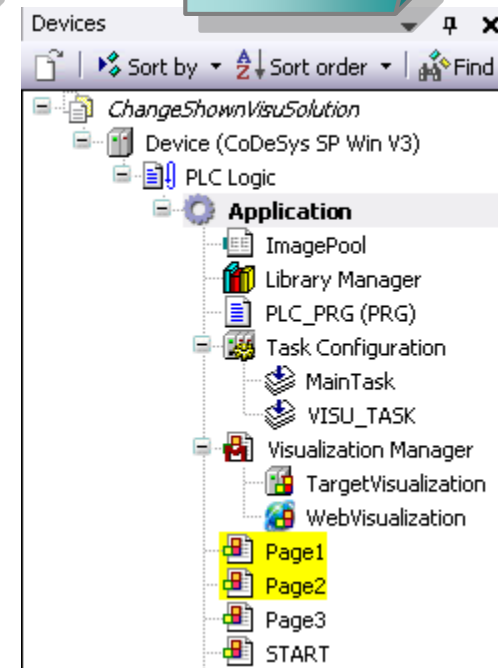
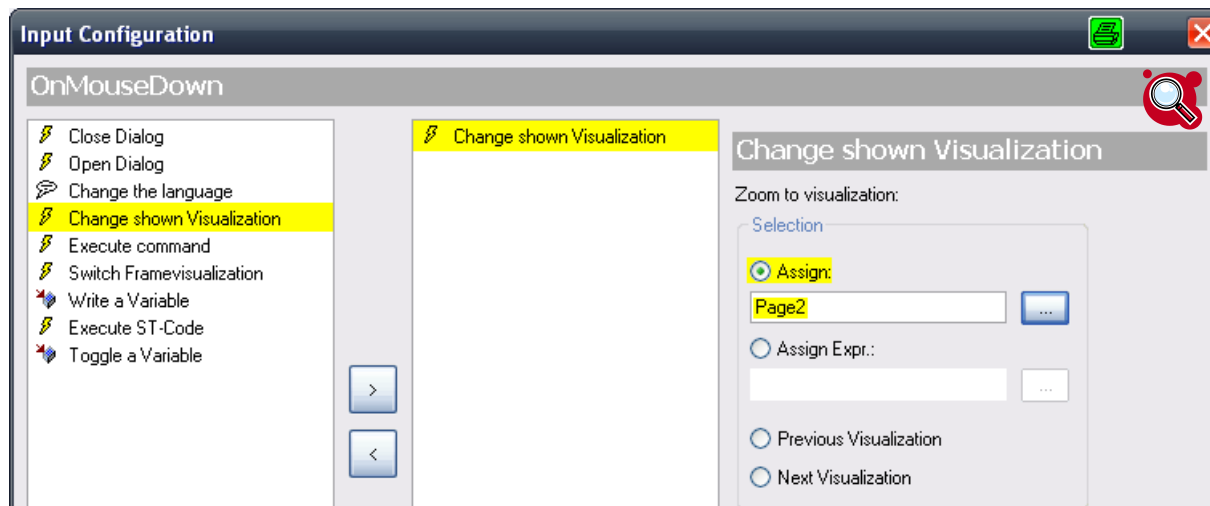
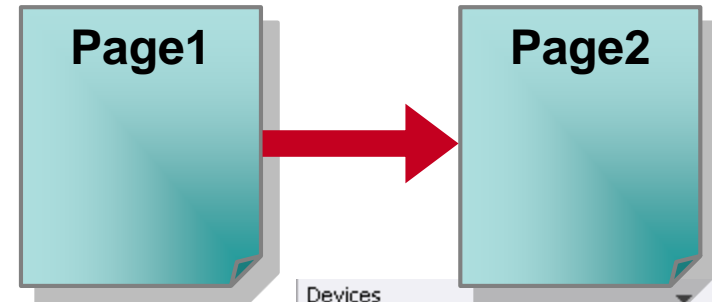
Exercise 6

- Use the project SimpleElements_All_Exercise.
- Create all elements.
- All texts are white on a silver background.



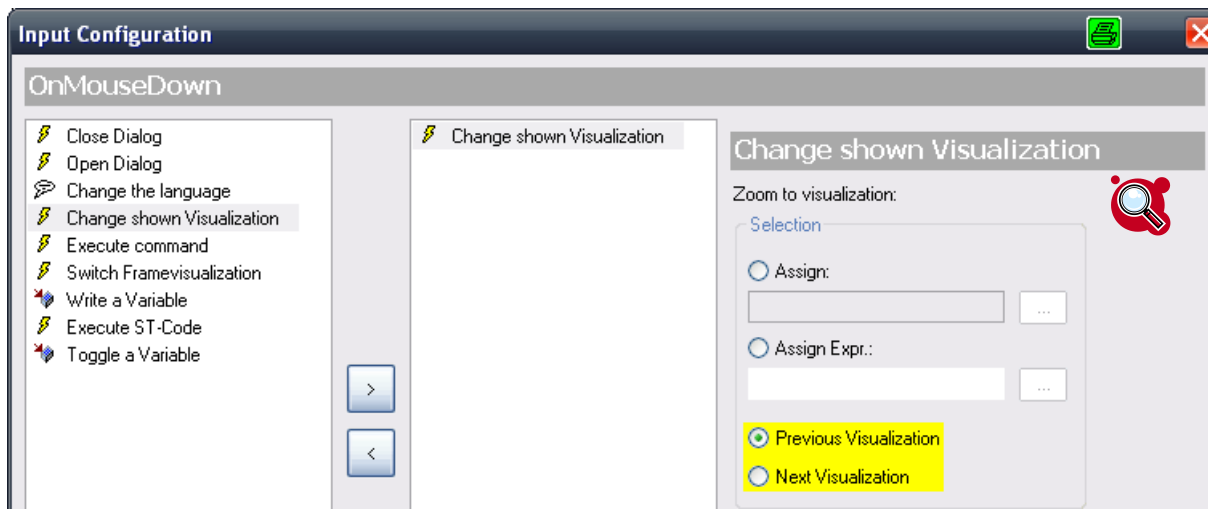
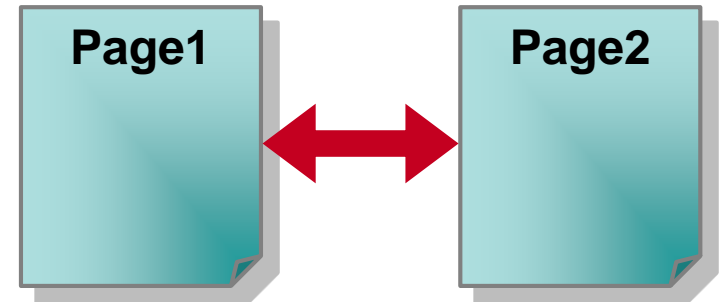
Multiple Pages – Change Shown Visualization

- Use the 'Change shown visualization' command to change between visualizations.
- You can change to a specified 'Page' by assignment.



Multiple Pages – Change Shown Visualization

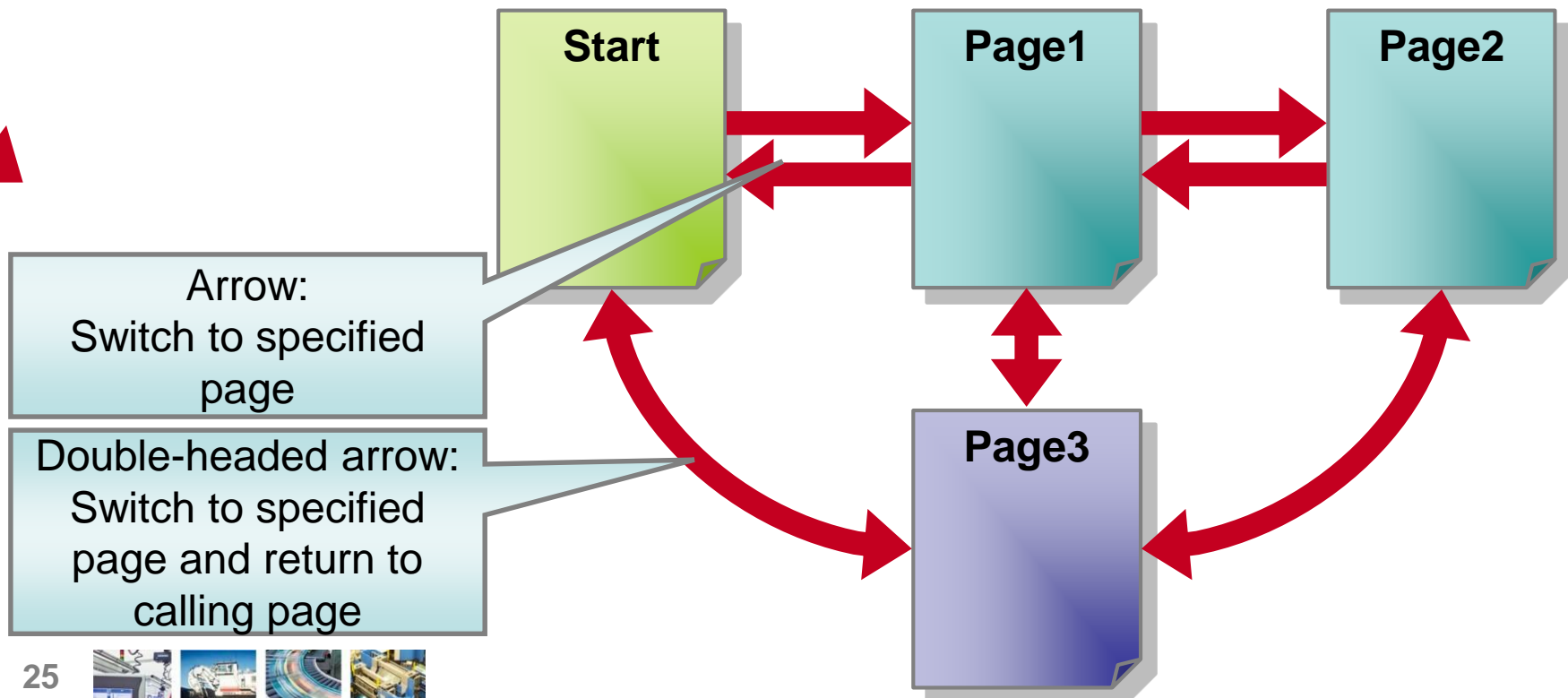
- The page changes are recorded
→ you can step to the previous and next 'Page'



Do some practice

Exercise 7

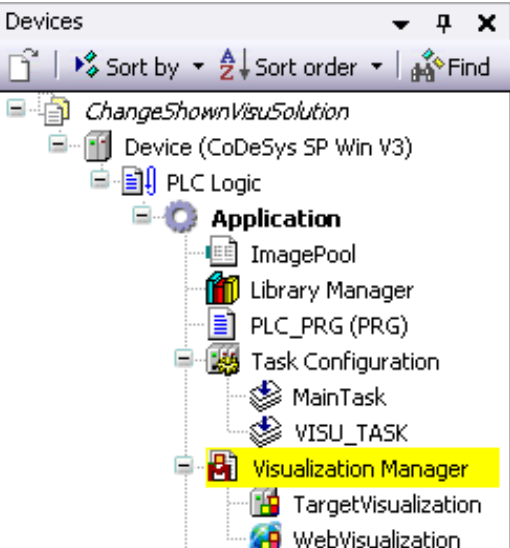
- Use the project 'ChangeShownVisuExercise'.
- Create the following navigation structure by configuring the input actions of the buttons.

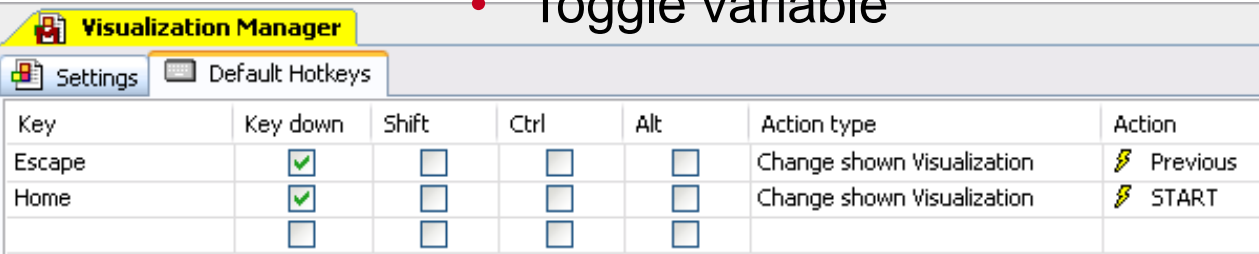


Keyboard configuration

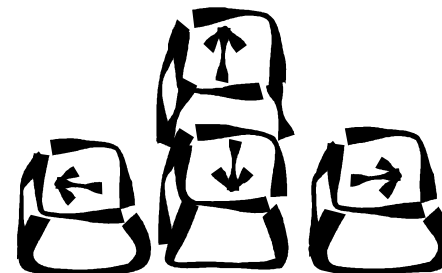
- Hotkeys valid for all visualizations in the whole application can be defined.
- Possible action types:
 - Change shown visualization
 - Change language
 - Close dialog
 - Execute command
 - Execute ST-Code
 - Open dialog
 - Toggle variable





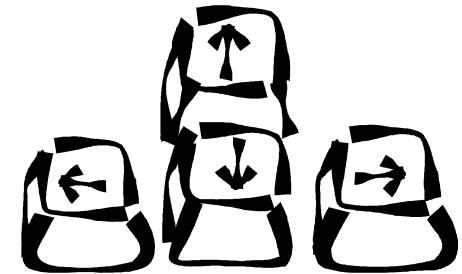


Key	Key down	Shift	Ctrl	Alt	Action type	Action
Escape	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Change shown Visualization	⚡ Previous
Home	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Change shown Visualization	⚡ START
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		



Keyboard configuration

- Keys just for one visualization
- Additional possible action types:
 - Execute mouse event (only down and up)
 - Change frame visualization
 - Write a variable






Devices


Sort by ▾ Sort order ▾ Find

- ChangeShownVisuSolution
 - Device (CoDeSys SP Win V3)
 - PLC Logic
 - Application
 - ImagePool
 - Library Manager
 - PLC_PRG (PRG)
 - Task Configuration
 - Visualization Manager
 - Page1
 - Page2
 - Page3
 - START

Page1

Interface Editor Hotkeys Configuration Elementlist

Key	Key down	Shift	Ctrl	Alt	Action type	Action	Element ID
Left	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Execute mouse event		#1
Down	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Execute mouse event		#5
Right	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Execute mouse event		#2
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

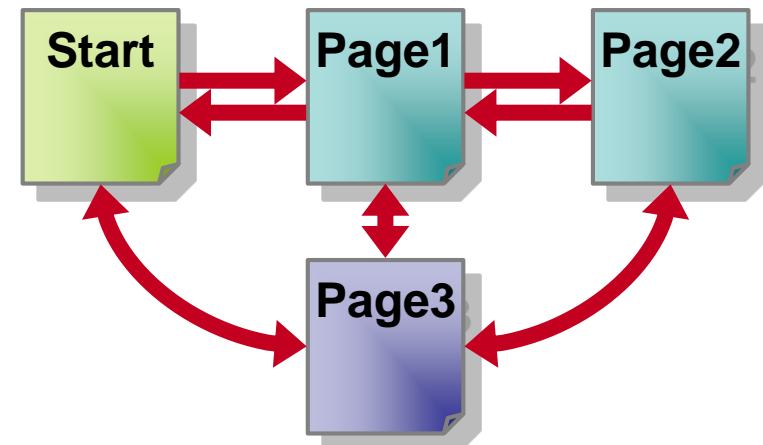
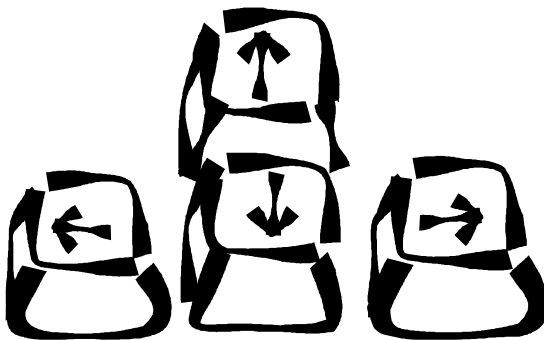


Page 1

Do some practice

Exercise 8

- Use the result project from Exercise 7.
- Configure the cursor keys on your keyboard to initiate the commands assigned to the buttons.
- Configure the ESCAPE key to always to the previous page.
- Configure the HOME key to change to Page1.



Summary: CoDeSys allows you...

- the simple and easy creation of visualizations
- direct access to all variables in the application
- to change the displayed values with just a few mouse clicks
- to work with multiple pages (visualizations)
- to navigate between the pages
 - absolute navigation
 - relative navigation (previous/next)
- to configure your keyboard according to your needs