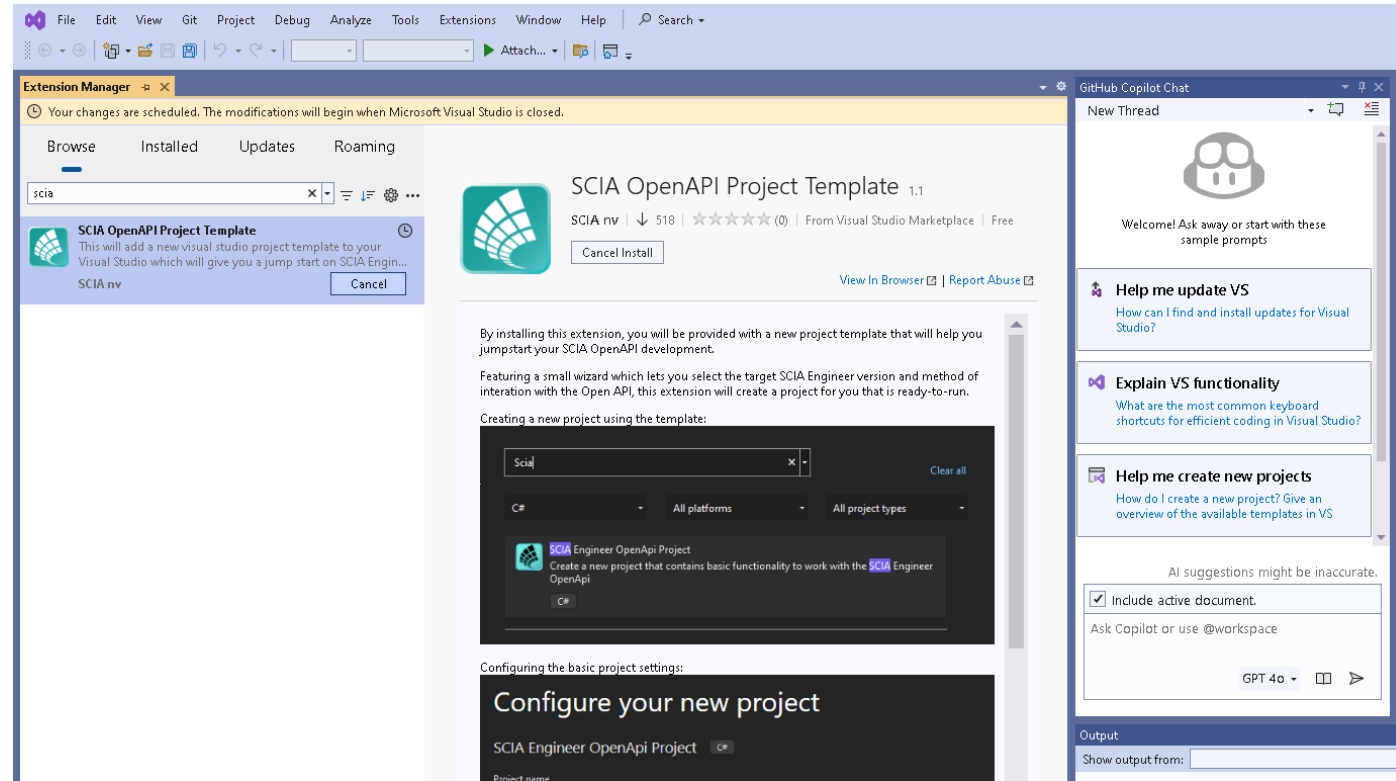


Information Technology in Design of Steel Structural Framework (Structural Analysis) using SCIA OpenAPI libraries

Jiří Mareš
2025

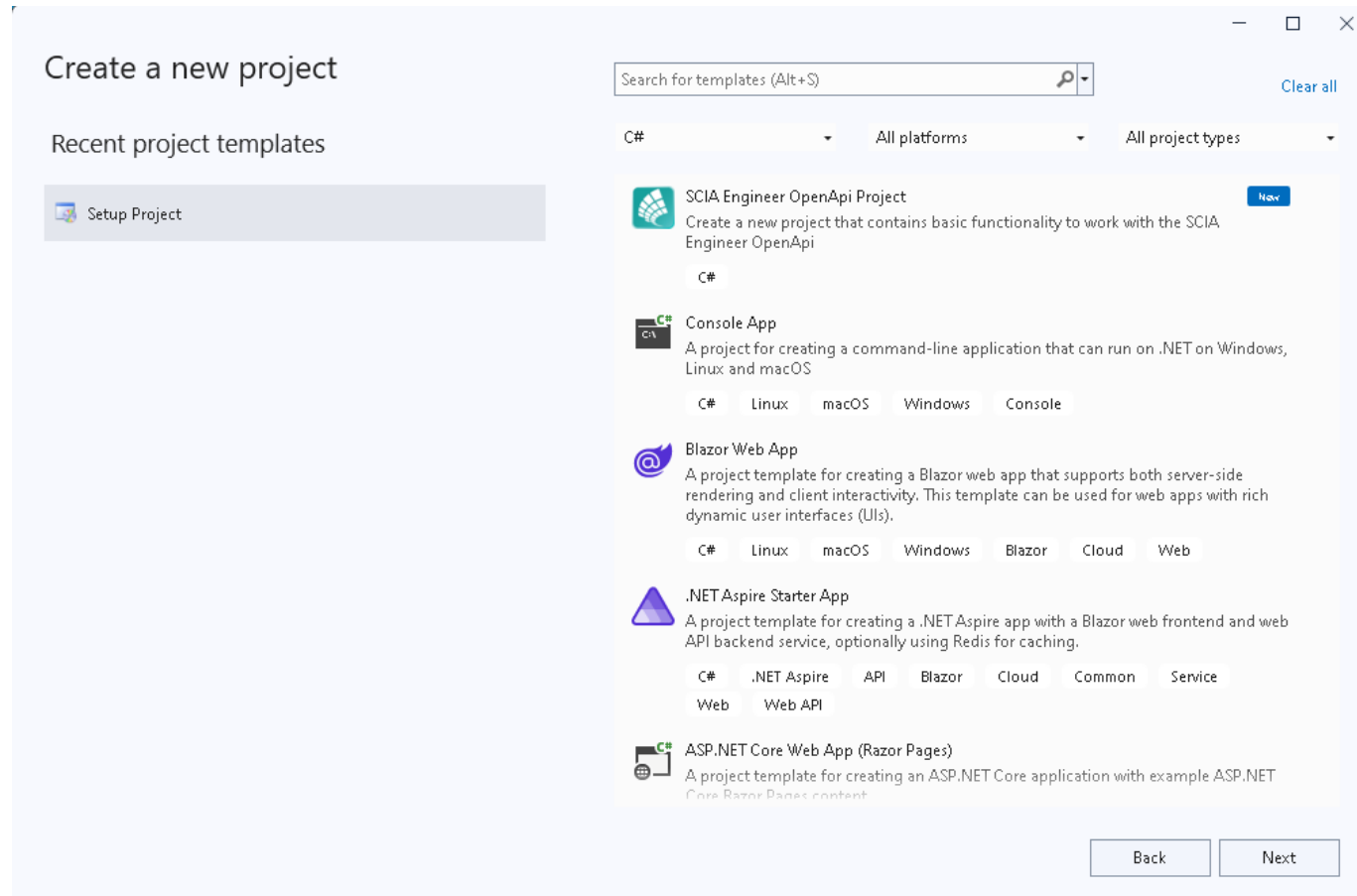
Installation of necessary development environment based on SCIA OpenAPI (Windows 11, Visual Studio 2022, SCIA Engineer 24.0)

- Install SCIA OpenAPI Template in your Visual Studio Environment
- After the above extension is installed open the VS again



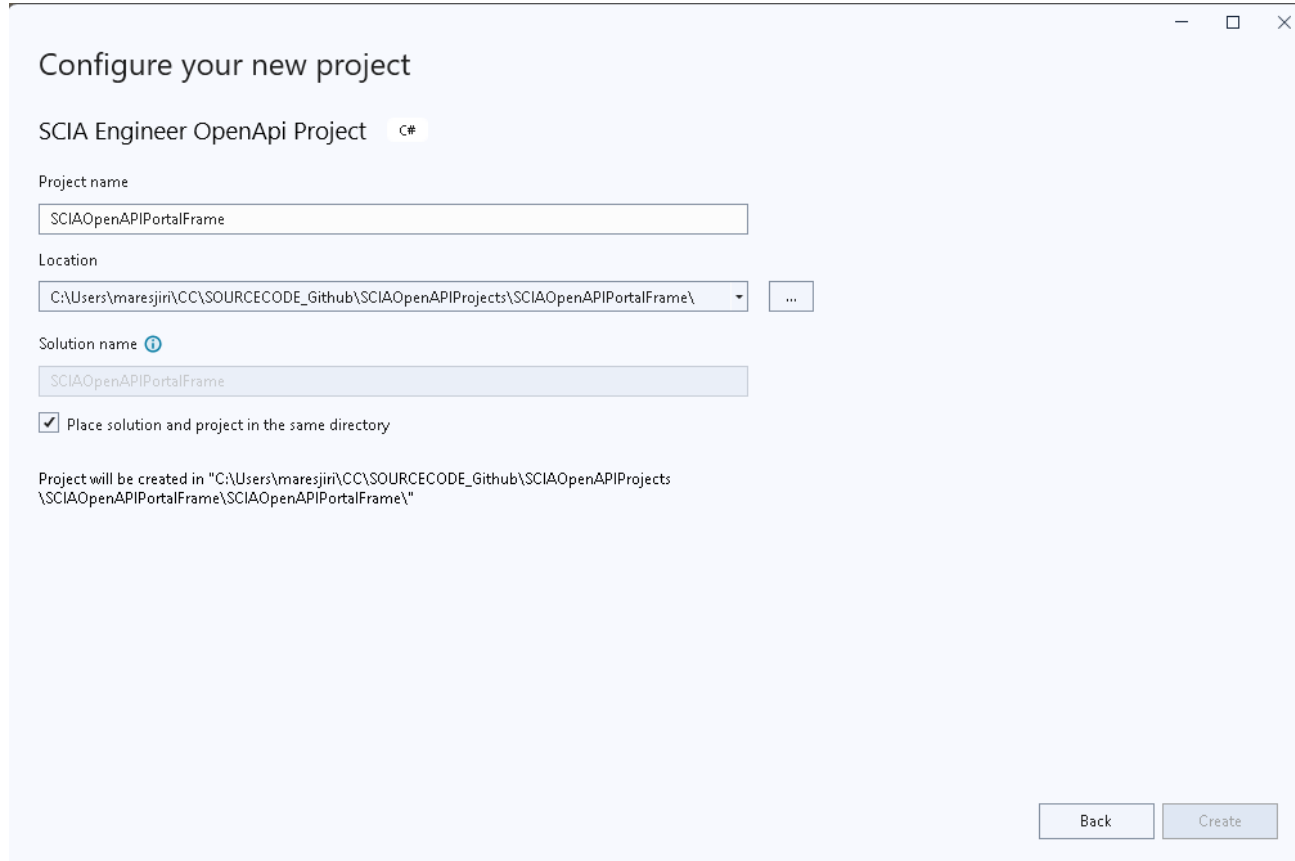
Installation of necessary development environment based on SCIA OpenAPI (Windows 11, Visual Studio 2022, SCIA Engineer 24.0)

- After the above extension is installed open the VS again and run 'Create a new project' using the SCIA template



Installation of necessary development environment based on SCIA OpenAPI (Windows 11, Visual Studio 2022, SCIA Engineer 24.0)

- Setup the name and location of your project



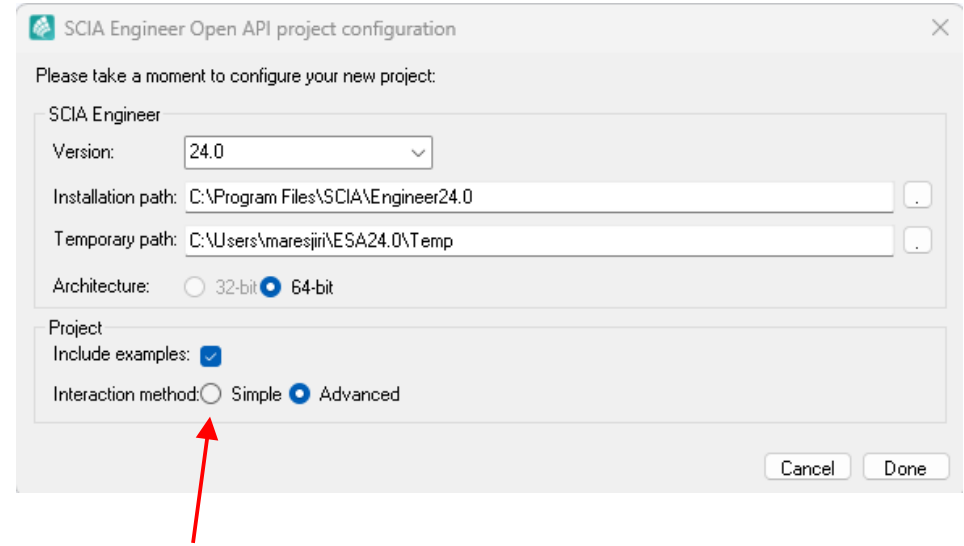
The screenshot shows the 'Configure your new project' dialog box in Visual Studio 2022. The dialog is titled 'Configure your new project' and has a close button in the top right corner. The main content area is light blue and contains the following fields and options:

- Project name:** A text box containing 'SCIAOpenAPIPortalFrame'.
- Location:** A dropdown menu showing 'C:\Users\maresjiri\CC\SOURCECODE_Github\SCIAOpenAPIProjects\SCIAOpenAPIPortalFrame\' with a '...' button to the right.
- Solution name:** A text box containing 'SCIAOpenAPIPortalFrame'.
- Place solution and project in the same directory:** A checkbox that is checked.
- Project will be created in:** A text box showing the full path: 'C:\Users\maresjiri\CC\SOURCECODE_Github\SCIAOpenAPIProjects\SCIAOpenAPIPortalFrame\SCIAOpenAPIPortalFrame\'.

At the bottom right, there are two buttons: 'Back' and 'Create'.

Instalace vývojového prostředí založeném na SCIA OpenAPI (Windows 11, Visual Studio 2022, SCIA Engineer 24.0)

- Choose your SCIA environment
- ‘Simple’ is for basic OpenAPI based project
- ‘Advanced’ utilizes also ADM module, which is more complex
- Let’s select ‘Simple’
- On hitting ‘Done’ button new project in VS is created and linked to your SCIA installation



Installation of necessary development environment based on SCIA OpenAPI (Windows 11, Visual Studio 2022, SCIA Engineer 24.0)

- OpenAPI documentation can be found here:
<https://help.scia.net/api/>

SCIA Engineer OpenAPI 24.0.3015

The screenshot displays the SCIA Engineer OpenAPI documentation interface. The top navigation bar includes tabs for 'Main Page', 'Packages', 'Classes', and 'Files'. The left sidebar shows a tree view of the API structure, with 'OpenAPI' expanded and 'Structure' selected. The 'CreateBeam' method is highlighted in the sidebar. The main content area shows the details for 'CreateBeam()' and 'CreateCombination()'. The 'CreateBeam()' section includes the signature 'bool SCIA.OpenAPI.Structure.CreateBeam (Beam Beam)', a description 'Create new beam node in the Structure', parameters 'Beam provide any Beam', and returns 'true if operation succeeded, false if failed'. The 'CreateCombination()' section includes the signature 'bool SCIA.OpenAPI.Structure.CreateCombination (Combination combination)', a description 'Create new combination in the Structure', parameters 'combination provide any Combination', and returns.

Main Page **Packages** **Classes** **Files**

OpenAPI

- Models
- Results
- ResultsCalculation
- StructureModelDefinition
- Utils
- ApiGuid
- ApiGuidArr
- Environment
- EsaProject
- Structure
 - CreateAdmObject
 - CreateBeam**
 - CreateCombination
 - CreateCrossSection
 - CreateCrossSection
 - CreateLineLoad
 - CreateLineLoad
 - CreateLineSupport
 - CreateLoadCase
 - CreateLoadGroup
 - CreateMaterial
 - CreateNode

CreateBeam()

bool SCIA.OpenAPI.Structure.CreateBeam (**Beam** Beam)

Create new beam node in the **Structure**

Parameters

Beam provide any Beam

Returns

true if operation succeeded, false if failed

CreateCombination()

bool SCIA.OpenAPI.Structure.CreateCombination (**Combination** combination)

Create new combination in the **Structure**

Parameters

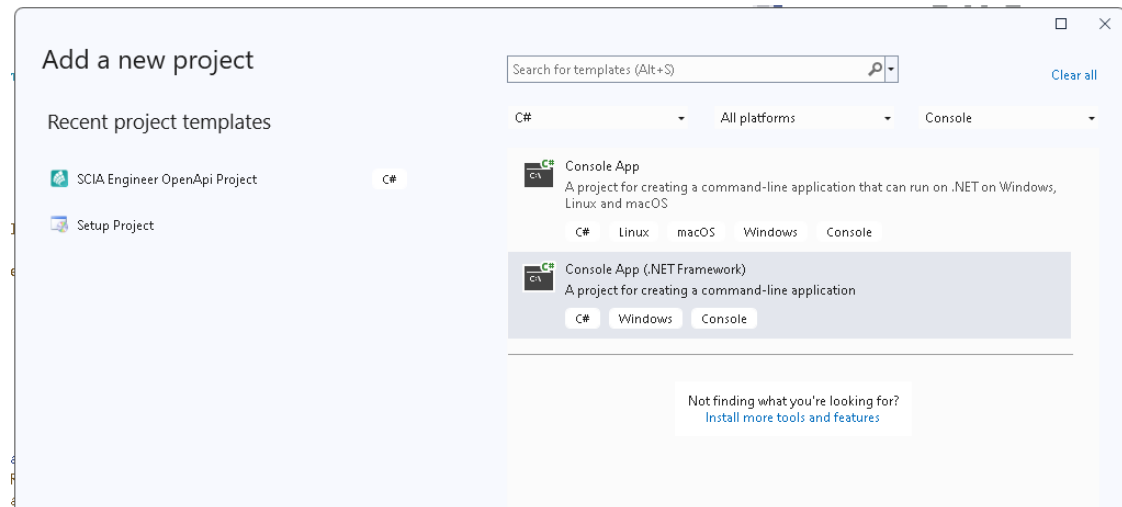
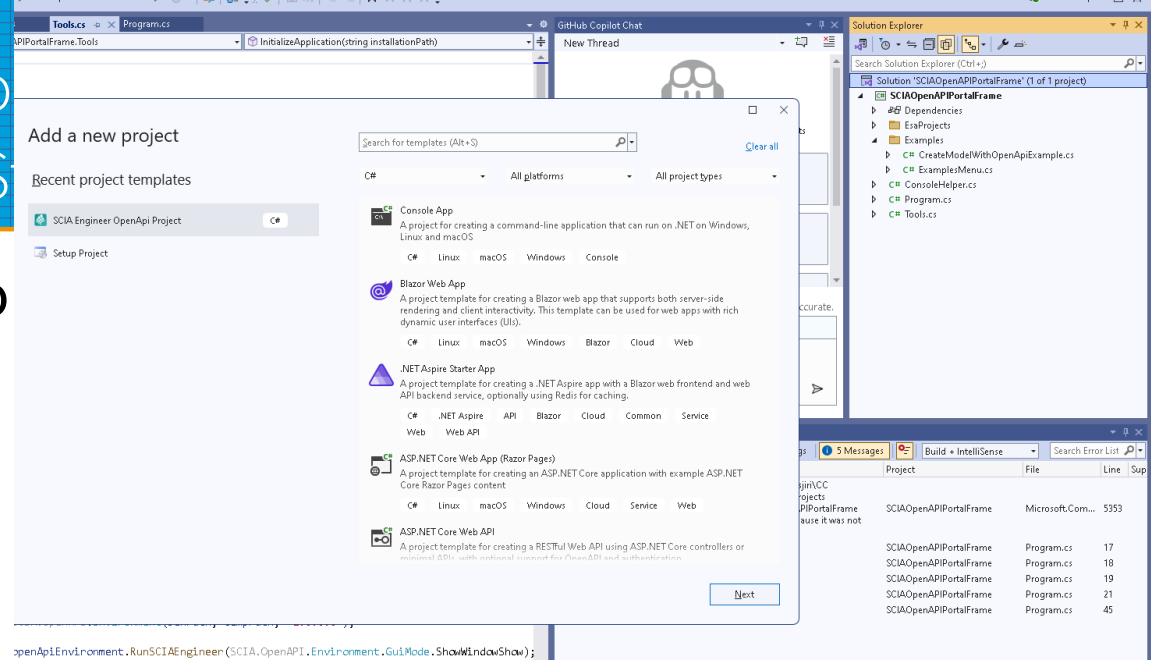
combination provide any Combination

Returns

SCIA OpenAPI Structure

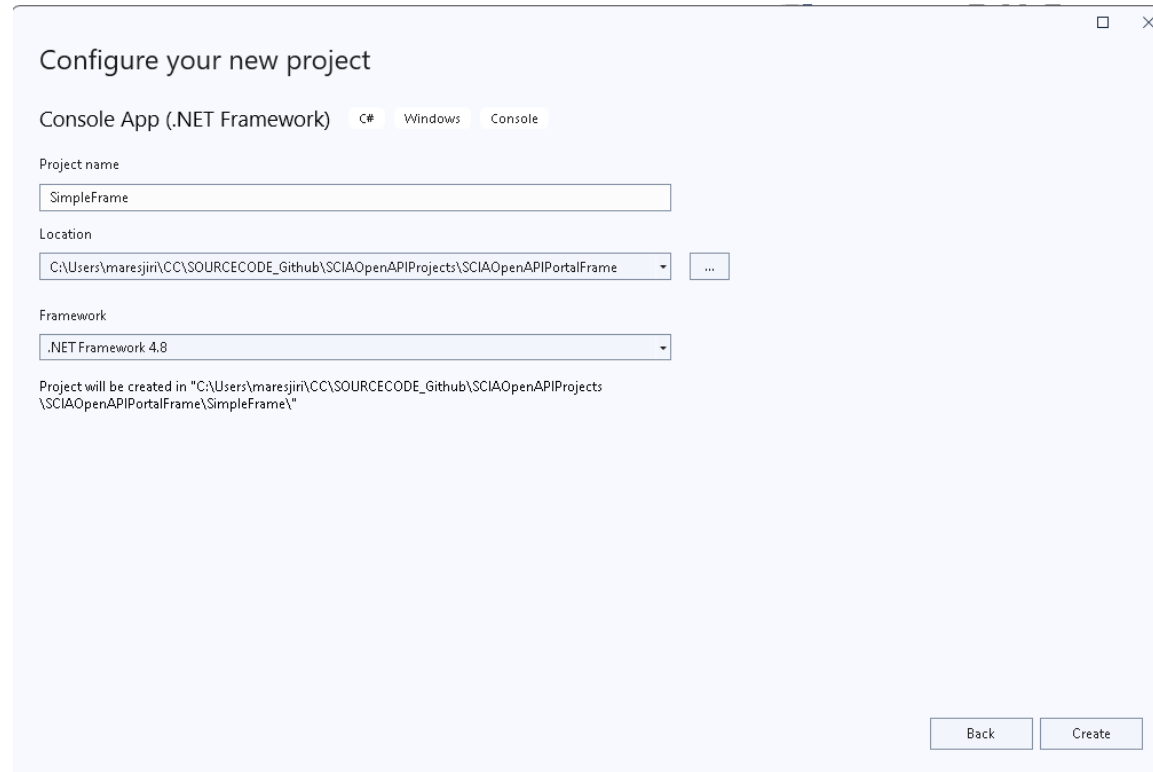
Installation of necessary develop OpenAPI (Windows 11, Visual S

- In Solution Explorer, right click on 'Solution' and do 'Add New Item'
- Choose C# and 'Console'



Installation of necessary development environment based on SCIA OpenAPI (Windows 11, Visual Studio 2022, SCIA Engineer 24.0)

- Change name of the project
- And choose framework version



The screenshot shows the 'Configure your new project' dialog box in Visual Studio 2022. The dialog is titled 'Configure your new project' and has a close button in the top right corner. Below the title, there are three tabs: 'Console App (.NET Framework)', 'C#', 'Windows', and 'Console'. The 'Console App (.NET Framework)' tab is selected. The 'Project name' field contains the text 'SimpleFrame'. The 'Location' field shows a file path: 'C:\Users\maresjiri\CC\SOURCECODE_Github\SCIAOpenAPIProjects\SCIAOpenAPIPortalFrame', with a dropdown arrow and a button with three dots to the right. The 'Framework' dropdown menu is set to '.NET Framework 4.8'. At the bottom, a message states: 'Project will be created in "C:\Users\maresjiri\CC\SOURCECODE_Github\SCIAOpenAPIProjects\SCIAOpenAPIPortalFrame\SimpleFrame\"'. At the bottom right, there are two buttons: 'Back' and 'Create'.

Configure your new project

Console App (.NET Framework) C# Windows Console

Project name

SimpleFrame

Location

C:\Users\maresjiri\CC\SOURCECODE_Github\SCIAOpenAPIProjects\SCIAOpenAPIPortalFrame ...

Framework

.NET Framework 4.8

Project will be created in "C:\Users\maresjiri\CC\SOURCECODE_Github\SCIAOpenAPIProjects\SCIAOpenAPIPortalFrame\SimpleFrame"

Back Create

Instalation of necessary development environment based on SCIA OpenAPI (Windows 11, Visual Studio 2022, SCIA Engineer 24.0)

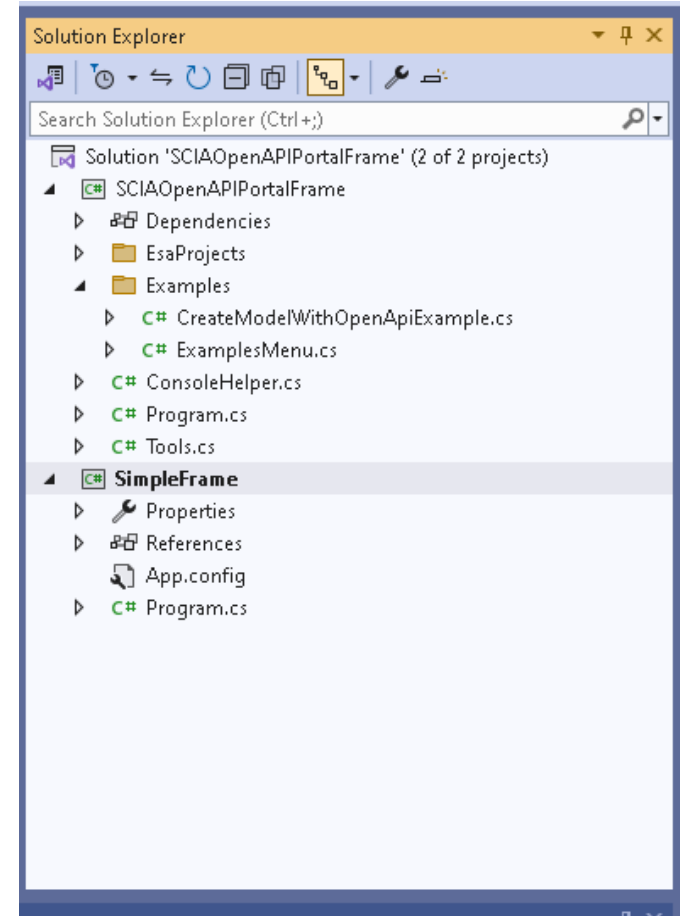
- Main procedure will be generated



```
1  using System;
2  using System.Collections.Generic;
3  using System.Linq;
4  using System.Text;
5  using System.Threading.Tasks;
6
7  namespace SimpleFrame
8  {
9      internal class Program
10     {
11         static void Main(string[] args)
12         {
13         }
14     }
15 }
16
```

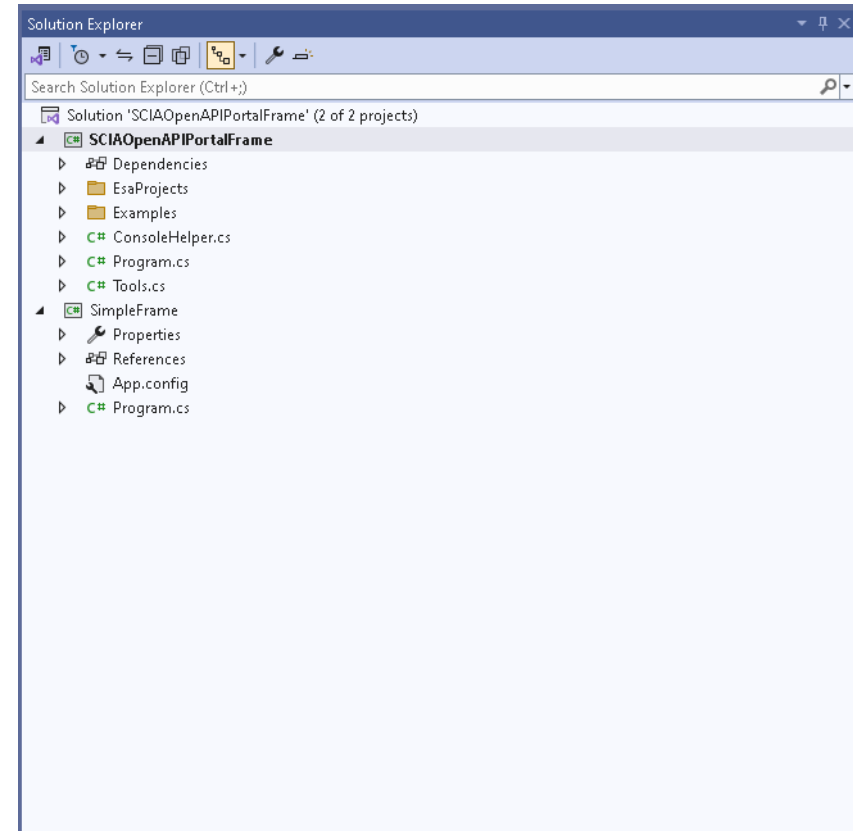
Installation of necessary development environment based on SCIA OpenAPI (Windows 11, Visual Studio 2022, SCIA Engineer 24.0)

- In Solution Explorer, right click newly created project and select 'Set as startup project'
- The project name will be highlighted in bold font



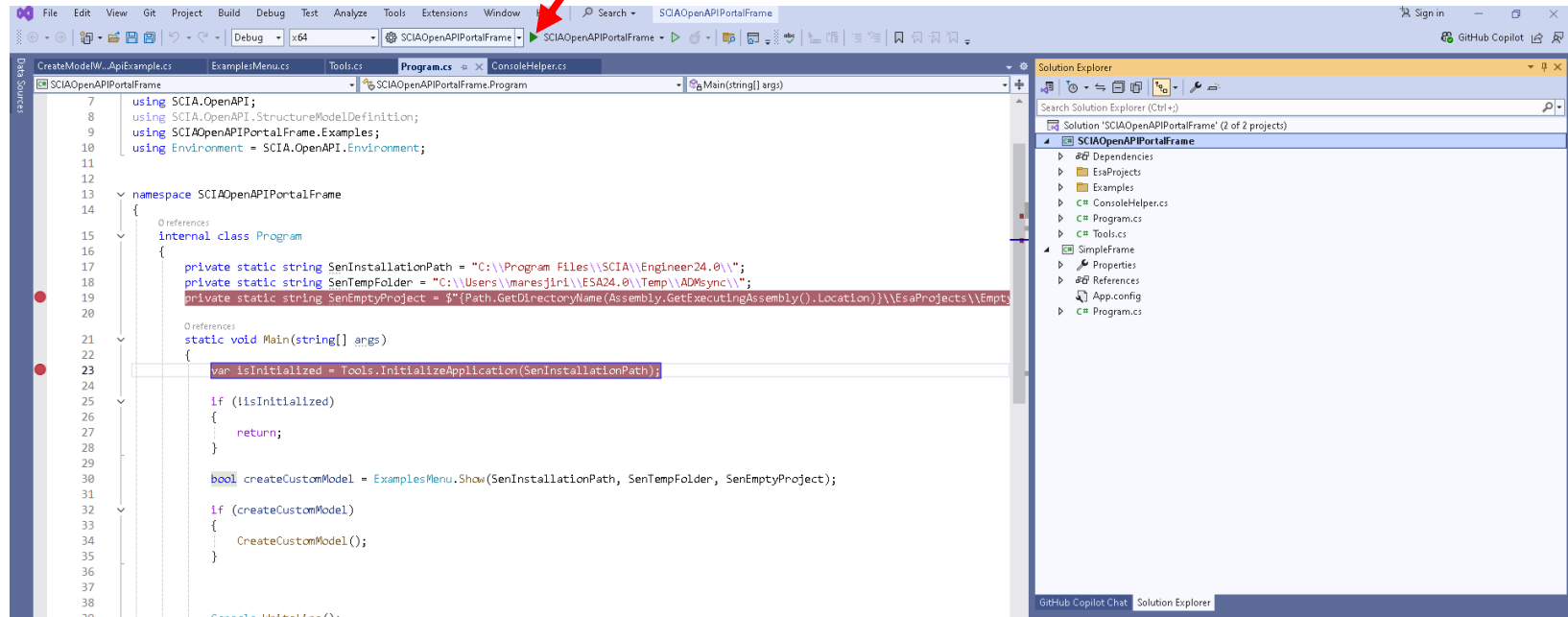
Installation of necessary development environment based on SCIA OpenAPI (Windows 11, Visual Studio 2022, SCIA Engineer 24.0)

- Now, select SCIAOpenAPIPortalFrame as a startup project



Installation of necessary development environment based on SCIA OpenAPI (Windows 11, Visual Studio 2022, SCIA Engineer 24.0)

- From menu in Visual Studio Click on green triangle to run the project



Installation of necessary development environment based on SCIA OpenAPI (Windows 11, Visual Studio 2022, SCIA Engineer 24.0)

- Program entry point is in

Program.cs file in M

Placing a breakpoint

(click on the line ar

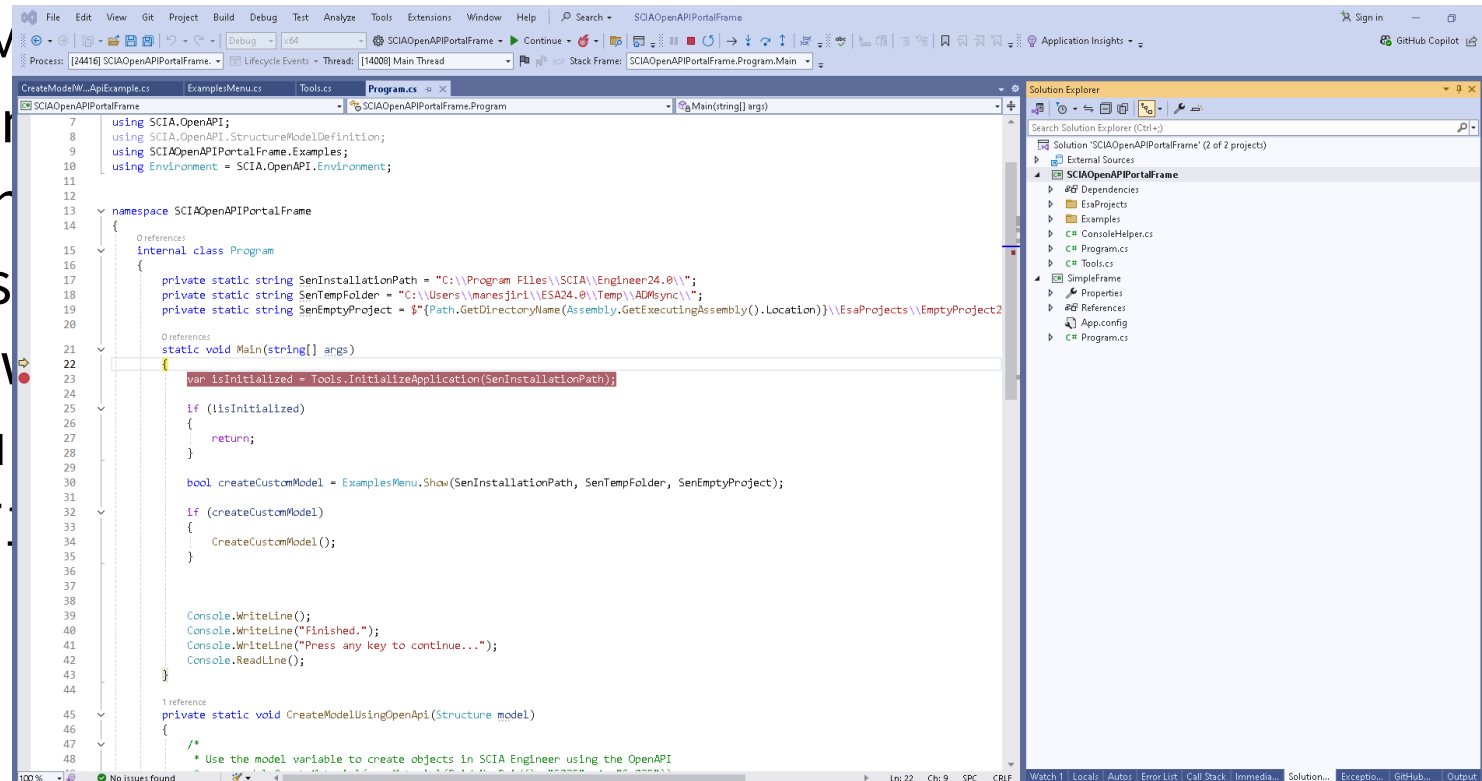
cause program to s

- Pressing F5 or F11 w

the code. F5 will ru

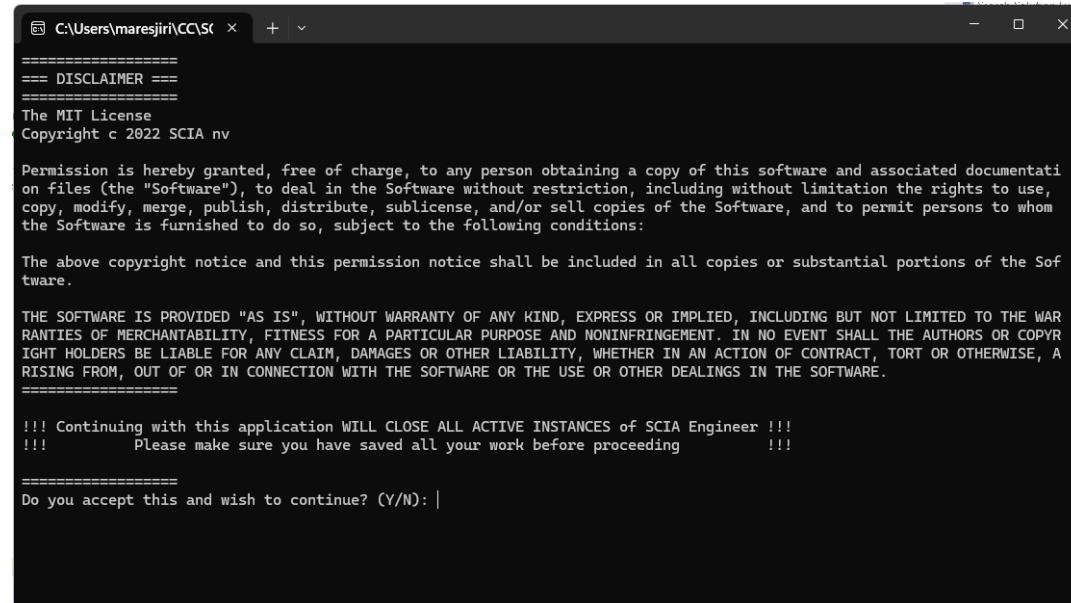
next break point, F

line.



Instalation of necessary development environment based on SCIA OpenAPI (Windows 11, Visual Studio 2022, SCIA Engineer 24.0)

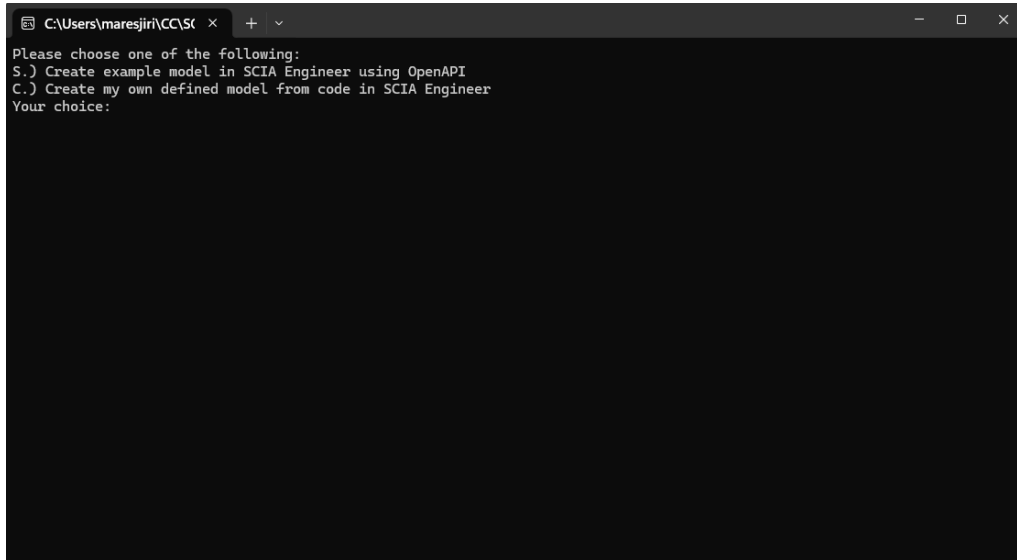
- Pressing F5 will progress program further and Console will be shown asking Y/N for the license
- Press Y and Enter



```
=====  
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=====  
The MIT License  
Copyright c 2022 SCIA nv  
  
Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentati  
on files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use,  
copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom  
the Software is furnished to do so, subject to the following conditions:  
  
The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Sof  
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THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WAR  
RANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYR  
IGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, A  
RISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.  
=====  
  
!!! Continuing with this application WILL CLOSE ALL ACTIVE INSTANCES of SCIA Engineer !!!  
!!! Please make sure you have saved all your work before proceeding !!!  
  
=====  
Do you accept this and wish to continue? (Y/N): |
```

Installation of necessary development environment based on SCIA OpenAPI (Windows 11, Visual Studio 2022, SCIA Engineer 24.0)

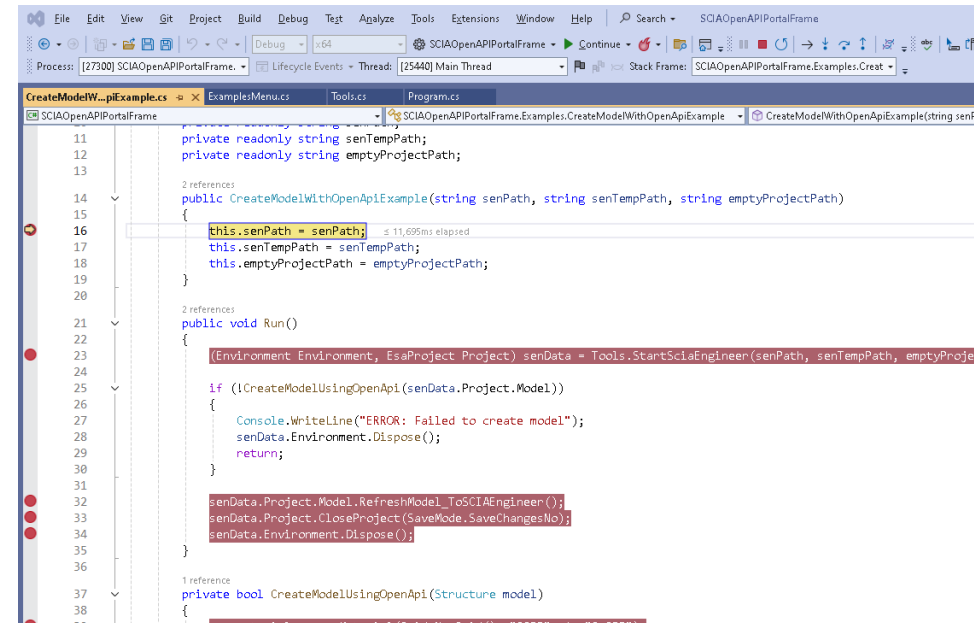
- Program will progress to the next screen with a choice
- Select 'S' and press Enter, program will be creating a simple model using OpenAPI



```
C:\Users\maresjiri\CC\SCIA>
Please choose one of the following:
S.) Create example model in SCIA Engineer using OpenAPI
C.) Create my own defined model from code in SCIA Engineer
Your choice:
```

Installation of necessary development environment based on SCIA OpenAPI (Windows 11, Visual Studio 2022, SCIA Engineer 24.0)

- Place breakpoints to lines as per the Figure and proceed (F5 or F11)
- In 'Run' procedure 'StartSciaEngineer' is launched...



Installation of necessary development environment based on SCIA OpenAPI (Windows 11, Visual Studio 2022, SCIA Engineer 24.0)

- You should see SCIA Splash Screen...
- Accept Student license (if shown)

