Challenge 06: IDE App

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Let’s Start!

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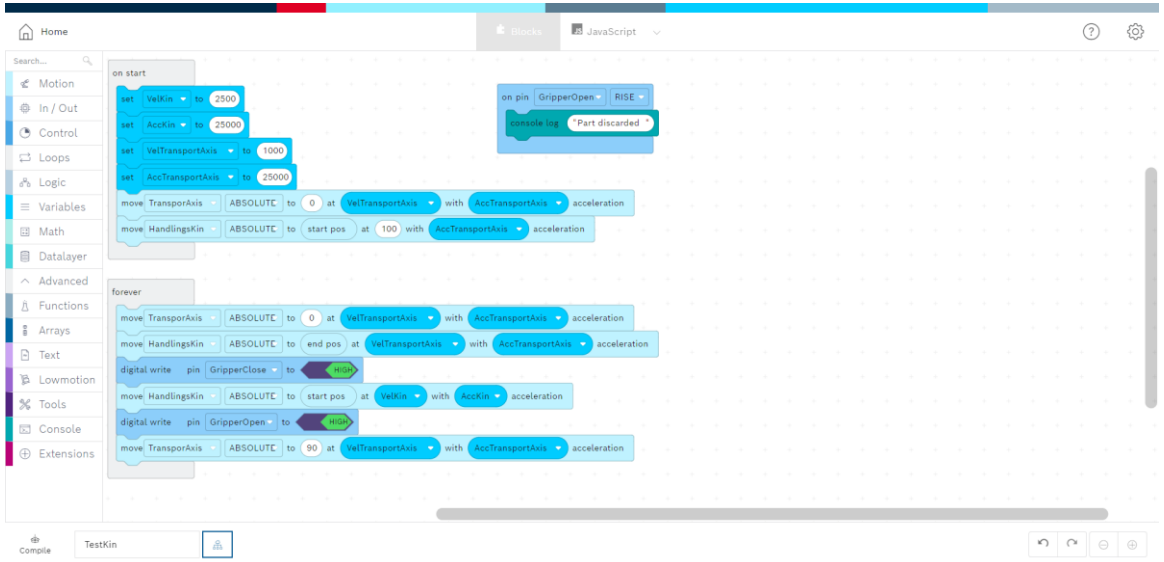
Inform

General information

Integrated Development Environment is referred to as **IDE**. It is a piece of software that gives programmers all the tools and functionality they need to write, edit, test, and debug code. IDEs provide a cohesive and unified environment that is intended to expedite the development process.

ctrlX AUTOMATION – IDE App (Visual Coding)

By using **Visual Coding**, the programmer does not have to deal with the specifics of the programming language, such as syntax, but intuitively uses predefined program elements, e.g. for variable handling, program loops, control instructions or motion commands. By assembling the building blocks via drag & drop and their parameterization, the program flow is successively created. The actual program code in Python or JavaScript is created automatically in the background.



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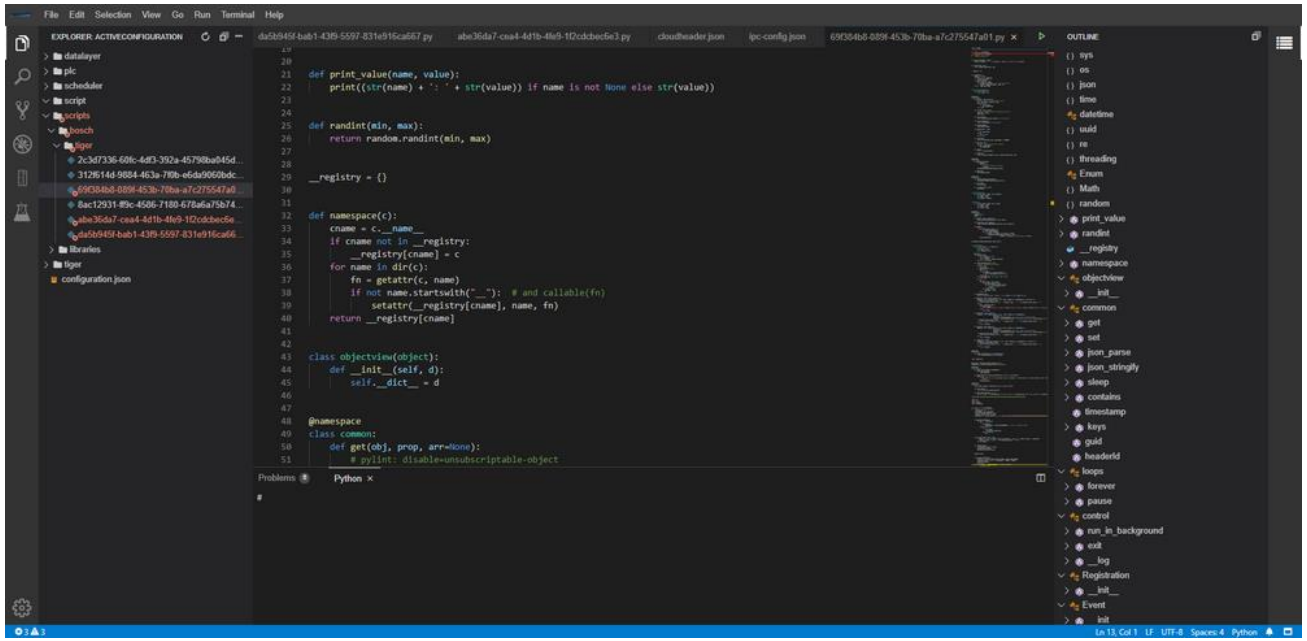
Introduction to

ctrlX AUTOMATION – IDE App (Textual Coding)

Textual Coding represents a web-based development environment (code editor, console, debugging, etc.) with native ctrlX CORE connectivity. It can be used to create Python scripts or edit files in the active solution.



Information about the ctrlX IDE App can

- ctrlX IDE App | ctrlX AUTOMATION Community
- ctrlX IDE App | Application Manual

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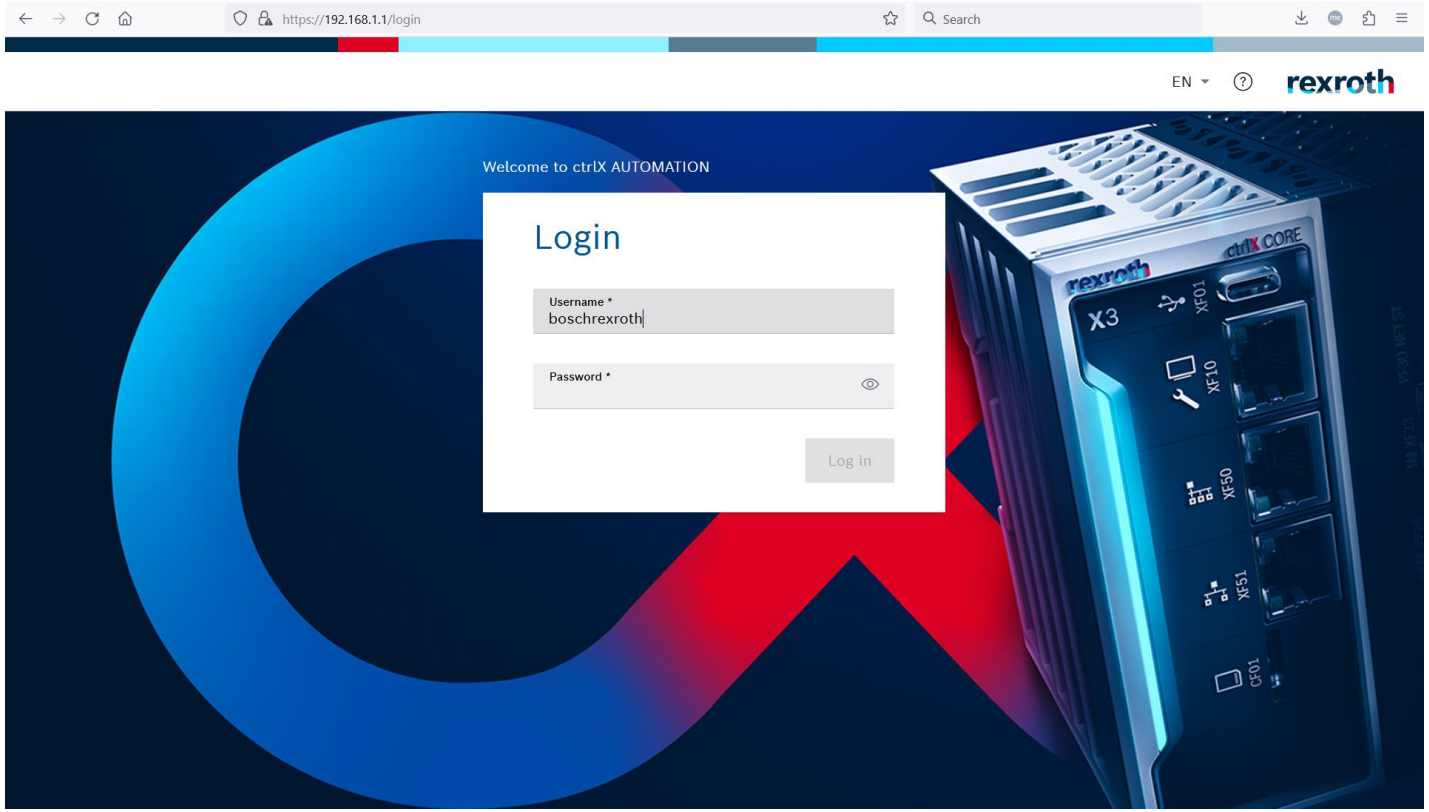
Challenge 06: ctrlX IDE App | Setting up Visual Coding

Steps

1. Login into the ctrlX web-based user interface. Enter the Login details (Username: boschrexroth, Password: B0schrexroth).

ctrlX Web-Based User Interface – Login Page



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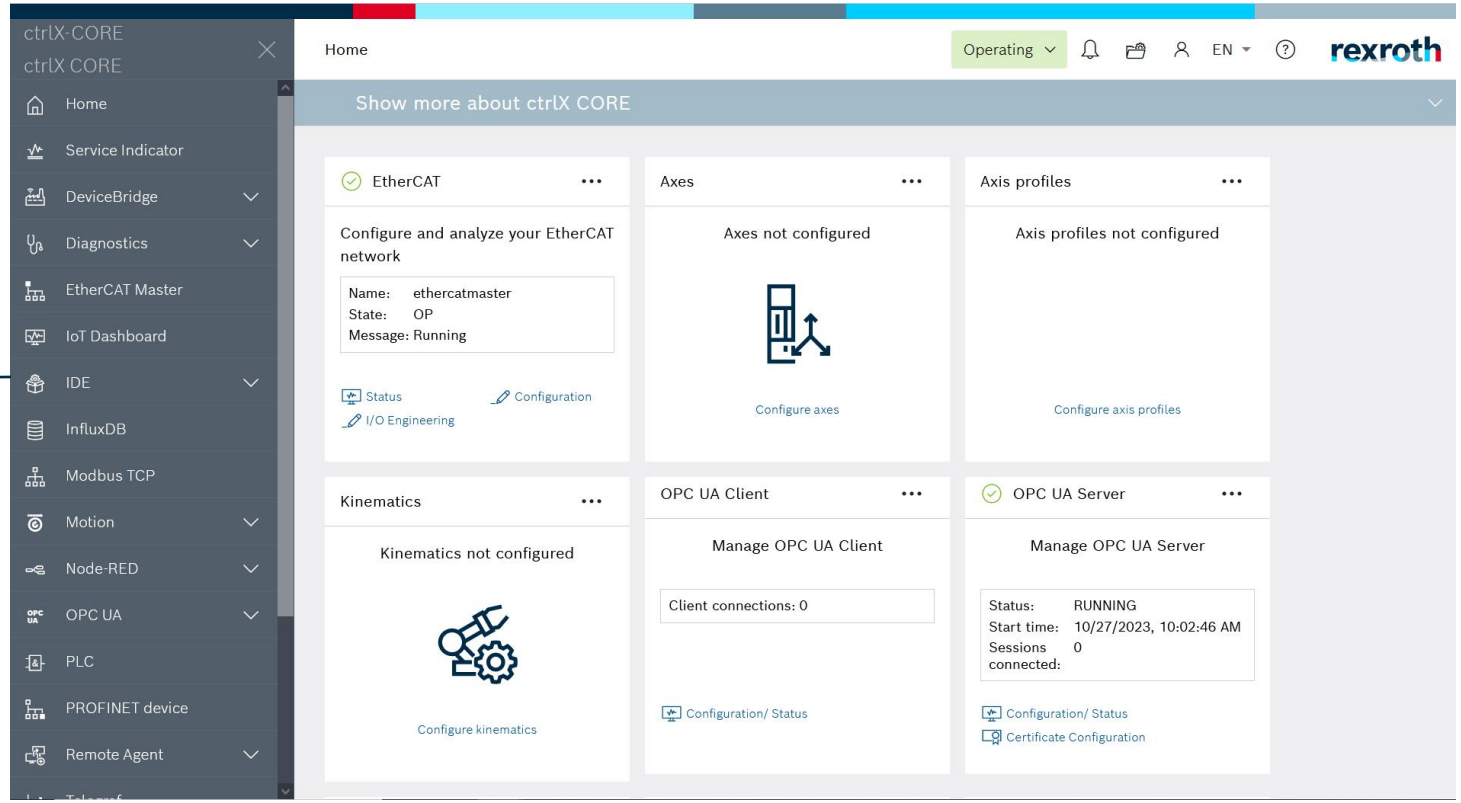
Steps

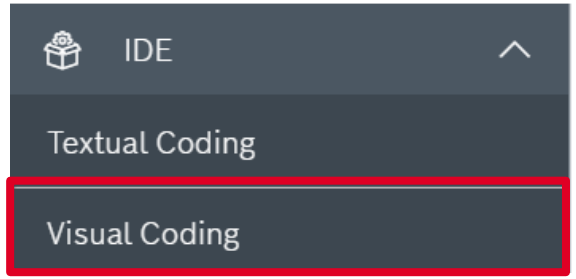
2. Open your ctrlX CORE Web Interface, click on IDE, then click on ‘Visual Coding’.

ctrlX Web-Based User Interface – Home Page

1. Click on the IDE App



2. Click on Visual Coding



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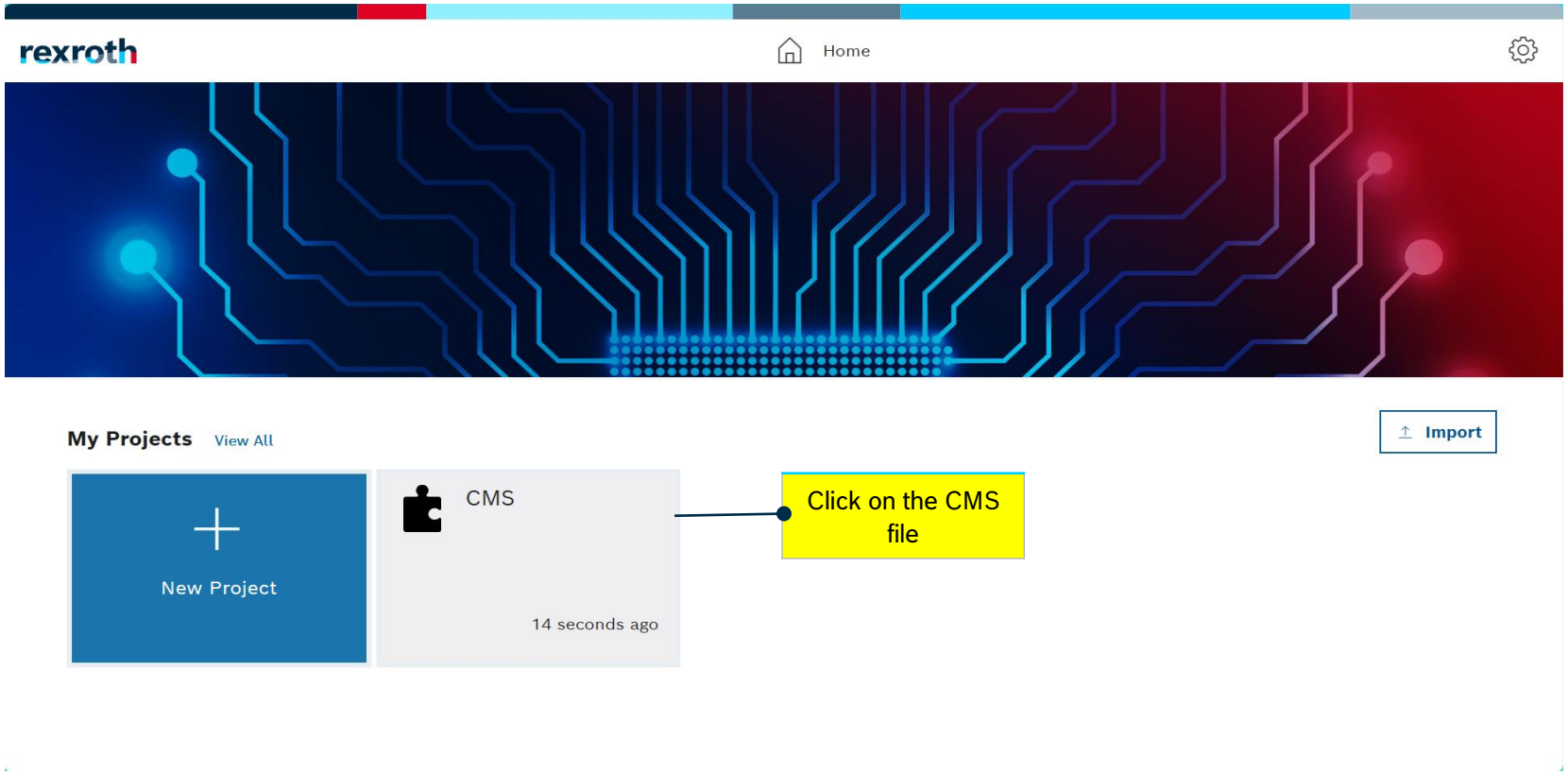
Steps

3. On the same tab, the Visual Coding home page will pop up. Then, please click on CMS (Cartesian Multi-axis Systems) file.

ctrlX IDE App – Visual Coding Home Page



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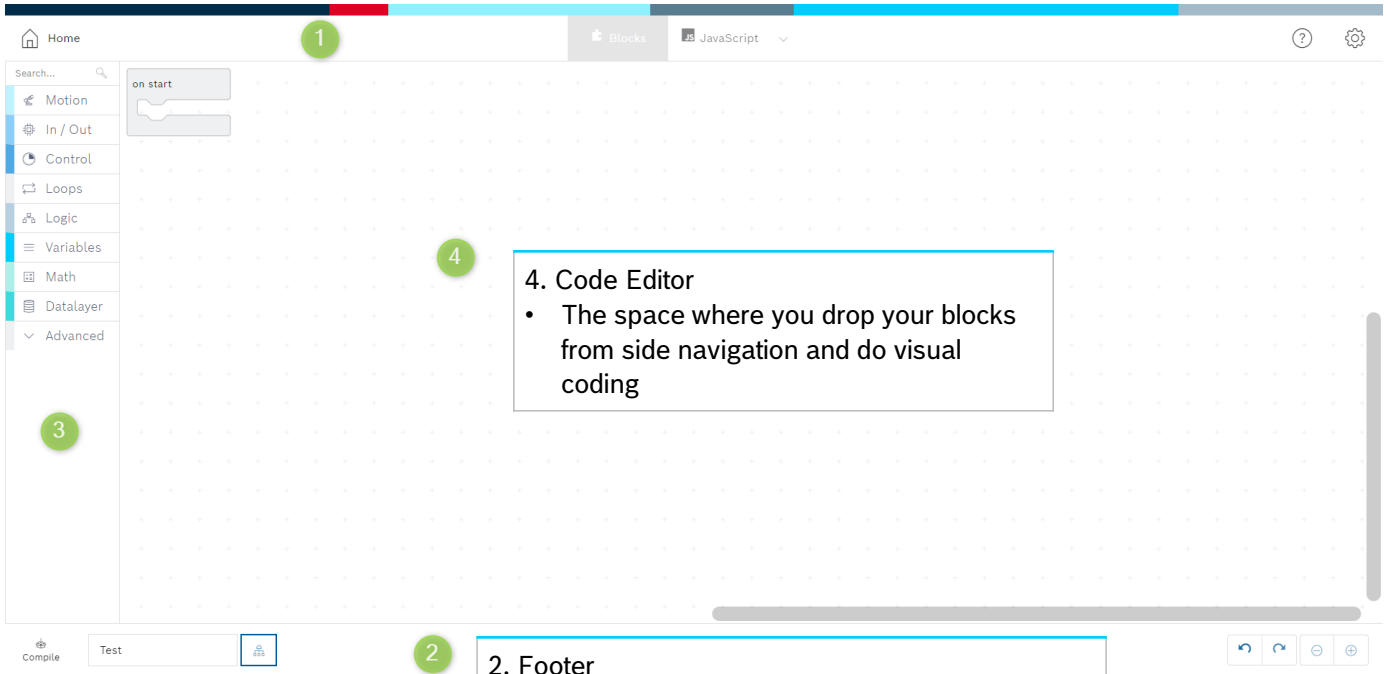
Steps

4. Here is the Visual Coding Interface, the space where you will do blockly programming.

ctrlX IDE App – Visual Coding Interface

1. Header
- Editor Switching for changing the block programming <-> python <-> Javascript



3. Side Navigation
- The toolbox at the side navigation is divided into several group
- Each group contains several blocks for graphical programming

4. Code Editor
- The space where you drop your blocks from side navigation and do visual coding

2. Footer
- Compile Button to compile the project
- Start Button to execute the created project

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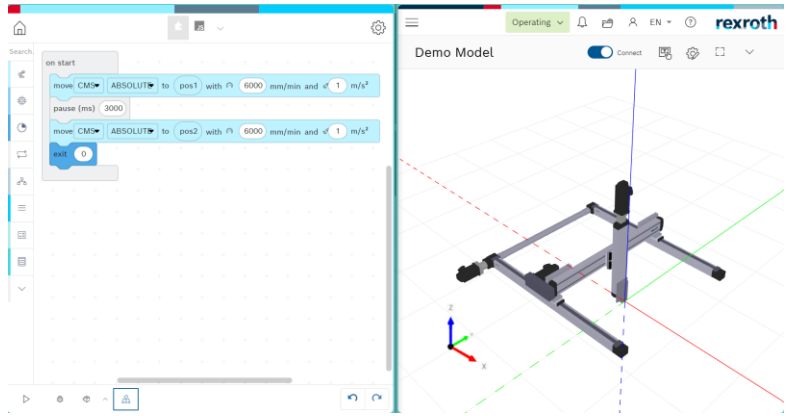
Task 01

Challenge 06: ctrlX IDE App | Task 01



Description

After you have configured the CMS by adding some axes in Motion App Challenge, you want the flexibility of controlling the CMS by using a “Low-Code” language such as the “Block” programming. You still have not configured your Axis on Motion group inside the Visual Coding. Your task is to make the program running on position 1 and position 2 without stop.

Position 1:

Axis_X = 400mm, Axis_Y = -400mm, Axis_Z = 0mm

Position 2:

Axis_X = 300mm, Axis_Y = 200mm, Axis_Z = 50mm

Task

This task will test your understanding on controlling your cartesian robot which is CMS using Visual Coding

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Challenge 06: ctrlX IDE App | Task 01

Safety instructions for the project exercise

In order to ensure the operational capability and to identify the possible hazards of machines and systems, the safety regulations must be observed before and during the order execution.

The ctrlX CORE may only be operated in technically perfect condition. The intended use, performance data and operating conditions may not be changed. No protective devices/components may be deactivated.

In case of emergency, failure or other irregularities:

- Before connecting or disconnecting any electrical components, ensure that the power to the ctrlX CORE unit and associated equipment is turned off.

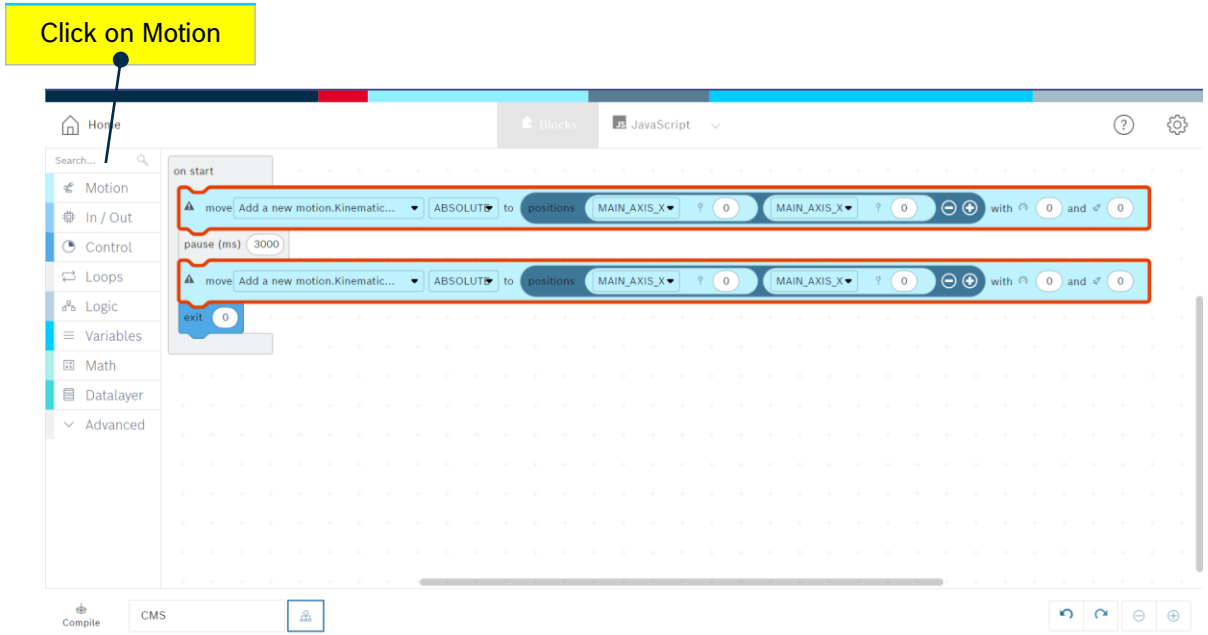
Challenge 06: ctrlX IDE App | Task 01

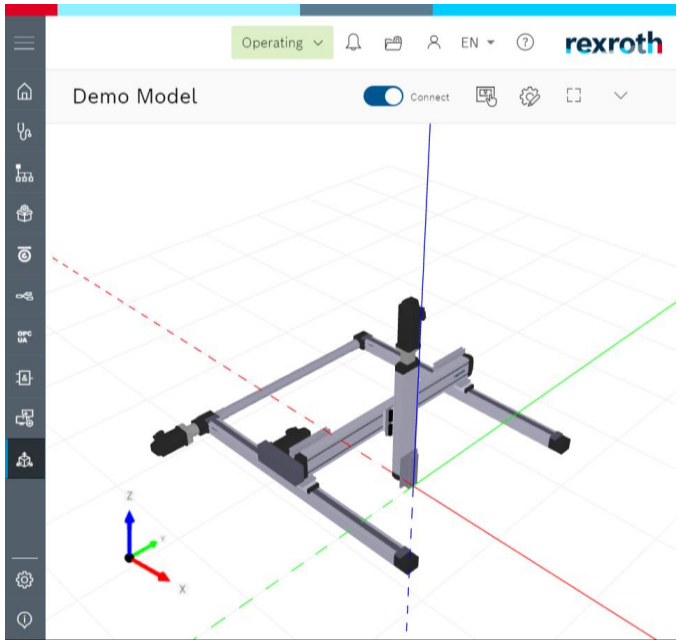
Steps

5. After you click on the CMS file, it already include with a template programming without any configuration yet.

Solve the issues in a Block Programming

- The block programming has errors when the red line outline show on the block.
- You need to move the CMS (which is the Demo Model) after configured the motion group. Now, please click on Motion.





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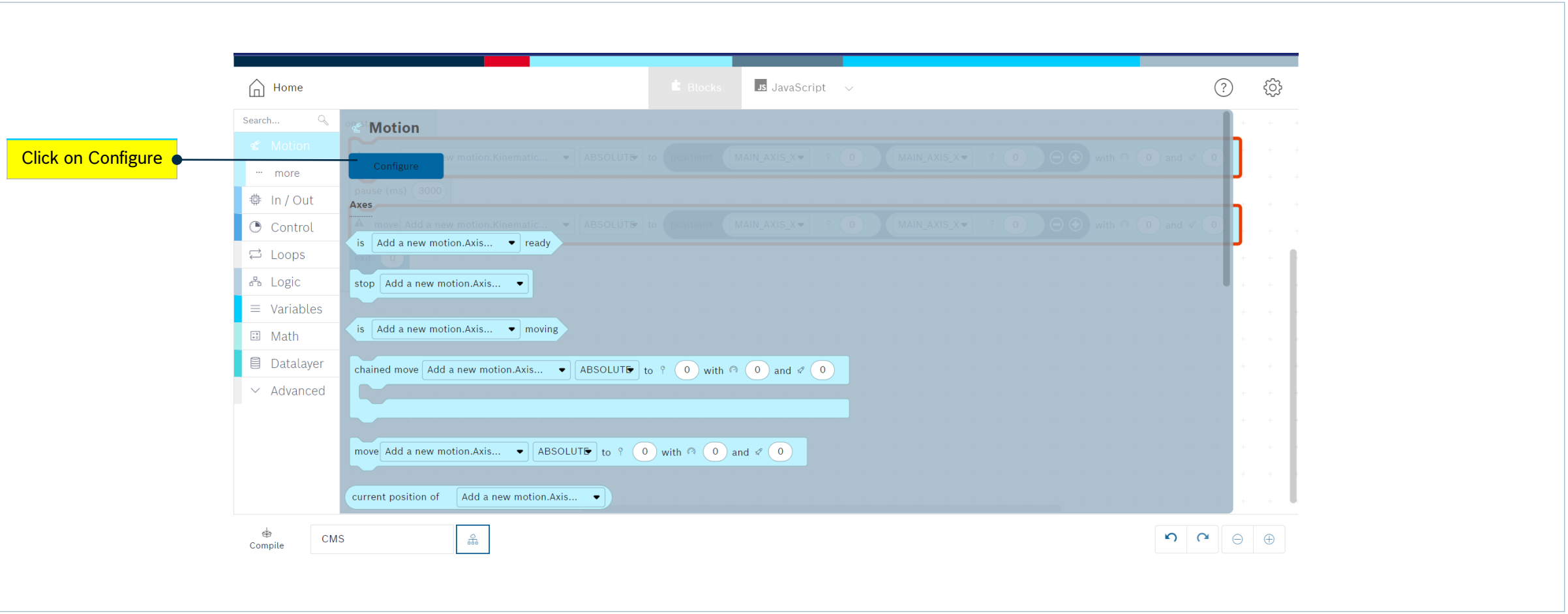
Steps

6. Here you can see the blocks inside the Motion group, now please click on Configure.



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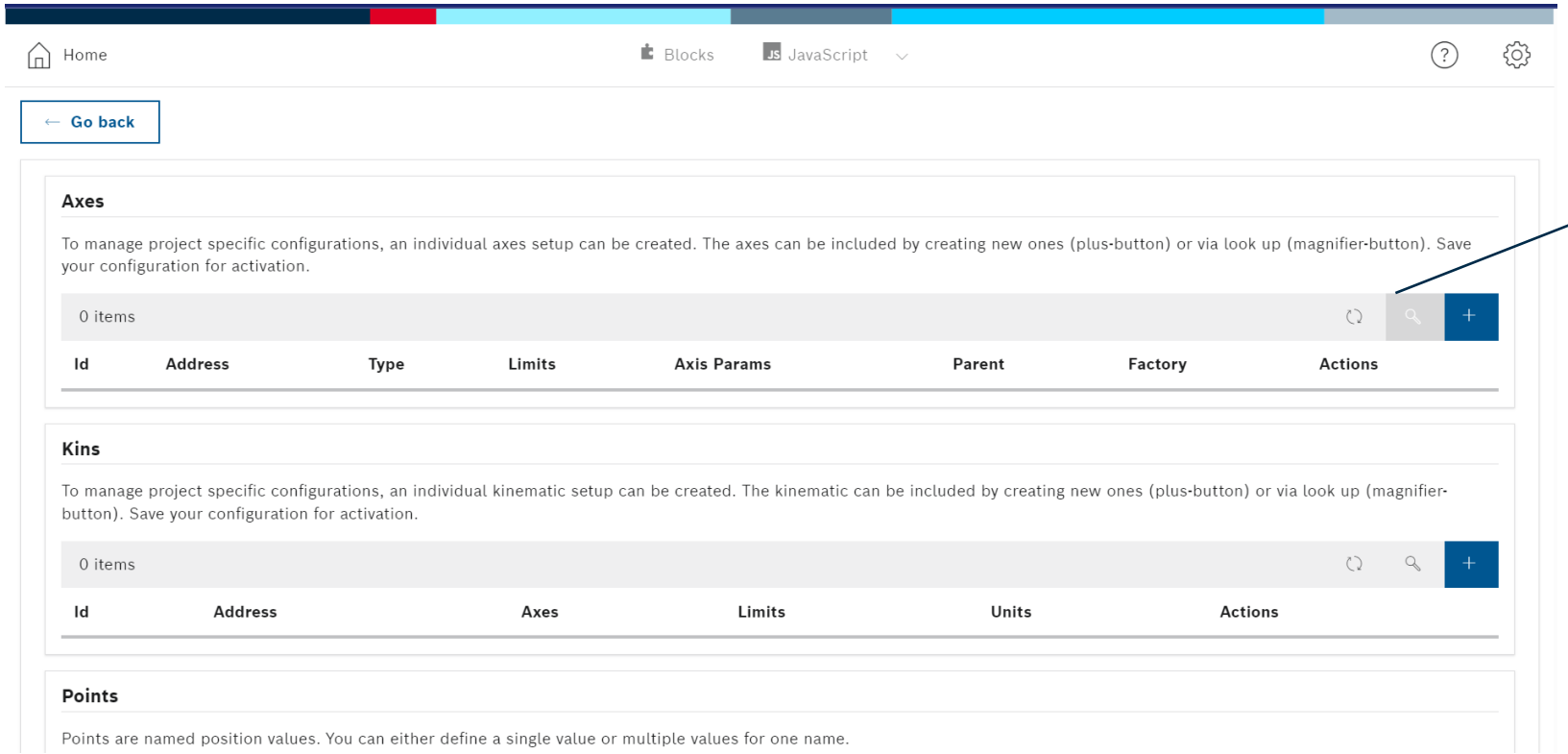
Steps

7. From this page, you can search your previous Motion axes configuration.



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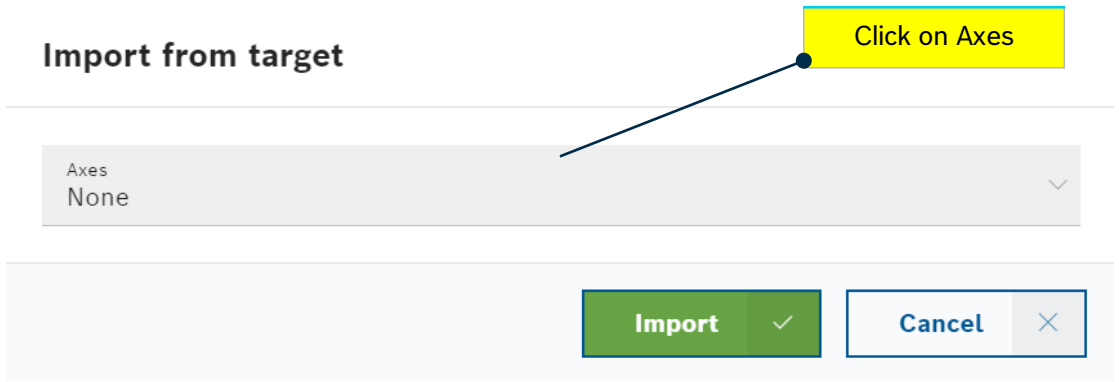
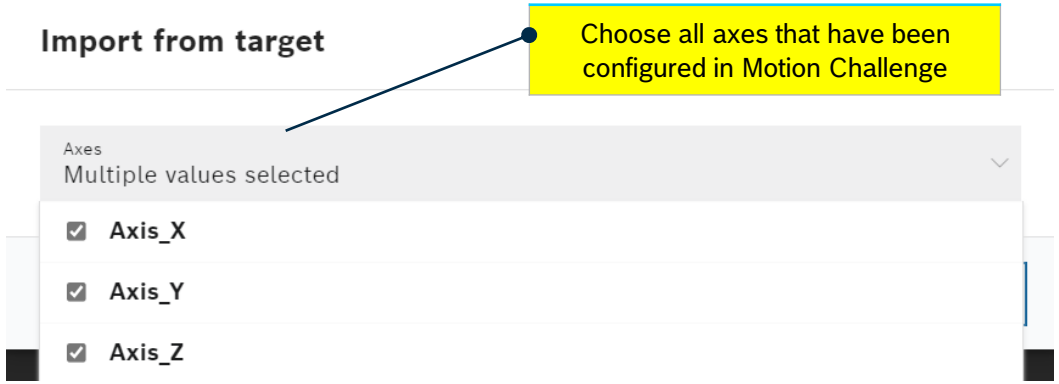
Steps

8. Click on the axes and import all axes which are Axis_X, Axis_Y and Axis_Z.





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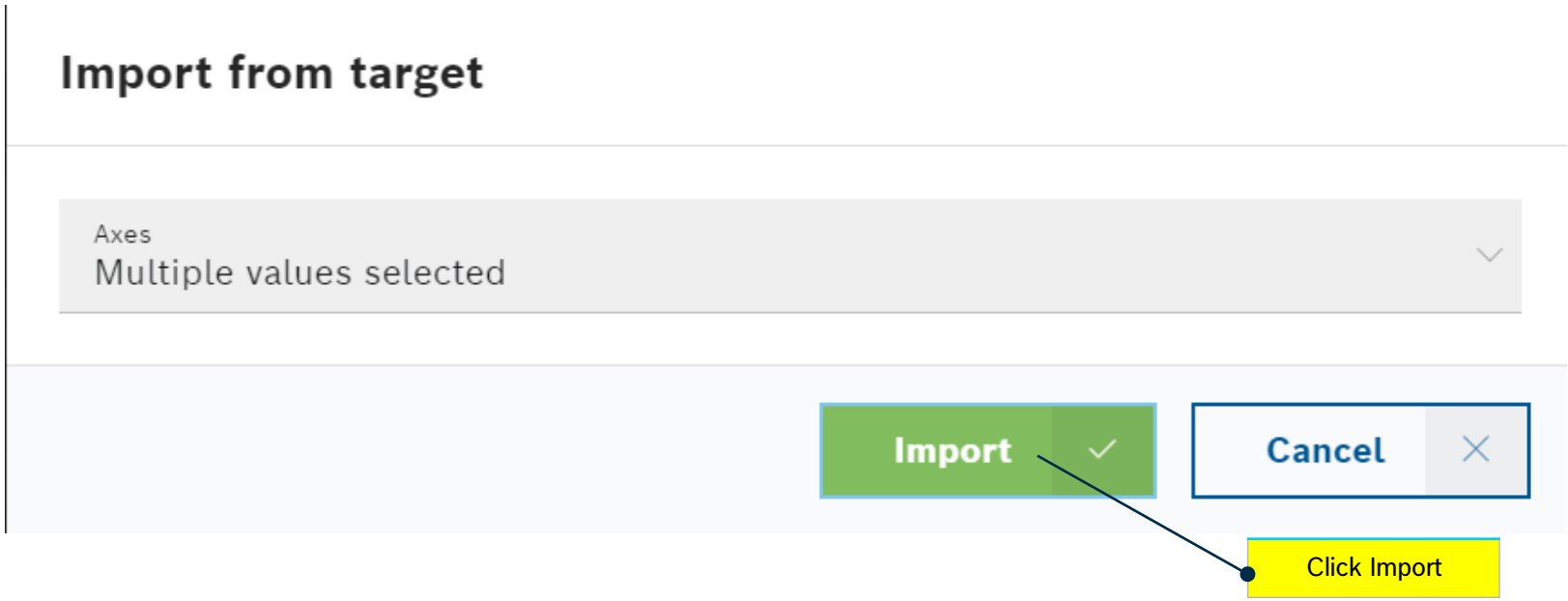
Steps

9. Then, please click Import.



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Steps

10. You can see your previous axes that have been imported, now let's search for our CMS which we can do it in Kinematics (Kins). Click on Search icon.

Id	Address	Type	Limits	Axis Params	Parent	Factory	Actions
Axis_X	Axis_X	0	{"position":{"min":-1000,"max":1000,"unit":"mm"},"velocity":{"min":-6000,"max":6000,"unit":"mm/min"},"acceleration":{"min":-100,"max":100,"unit":"m/s^2"},"torque":{"min":0,"max":100,"unit":"Nm"}}	{"x":0,"y":0,"z":0,"xr":0,"yr":0,"zr":0}	undefined	undefined	
Axis_Y	Axis_Y	0	{"position":{"min":-1000,"max":1000,"unit":"mm"},"velocity":{"min":-6000,"max":6000,"unit":"mm/min"},"acceleration":{"min":-100,"max":100,"unit":"m/s^2"},"torque":{"min":0,"max":100,"unit":"Nm"}}	{"x":0,"y":0,"z":0,"xr":0,"yr":0,"zr":0}	undefined	undefined	
Axis_Z	Axis_Z	0	{"position":{"min":-1000,"max":1000,"unit":"mm"},"velocity":{"min":-6000,"max":6000,"unit":"mm/min"},"acceleration":{"min":-100,"max":100,"unit":"m/s^2"},"torque":{"min":0,"max":100,"unit":"Nm"}}	{"x":0,"y":0,"z":0,"xr":0,"yr":0,"zr":0}	undefined	undefined	

Kins

To manage project specific configurations, an individual kinematic setup can be created. The kinematic can be included by creating new ones (plus-button) or via look up (magnifier-button). Save your configuration for activation.

0 items

Id	Address	Axes	Limits	Units	Actions

Points

Points are named position values. You can either define a single value or multiple values for one name.

0 items

Id	Reference	Positions	Actions

Click on Search Icon

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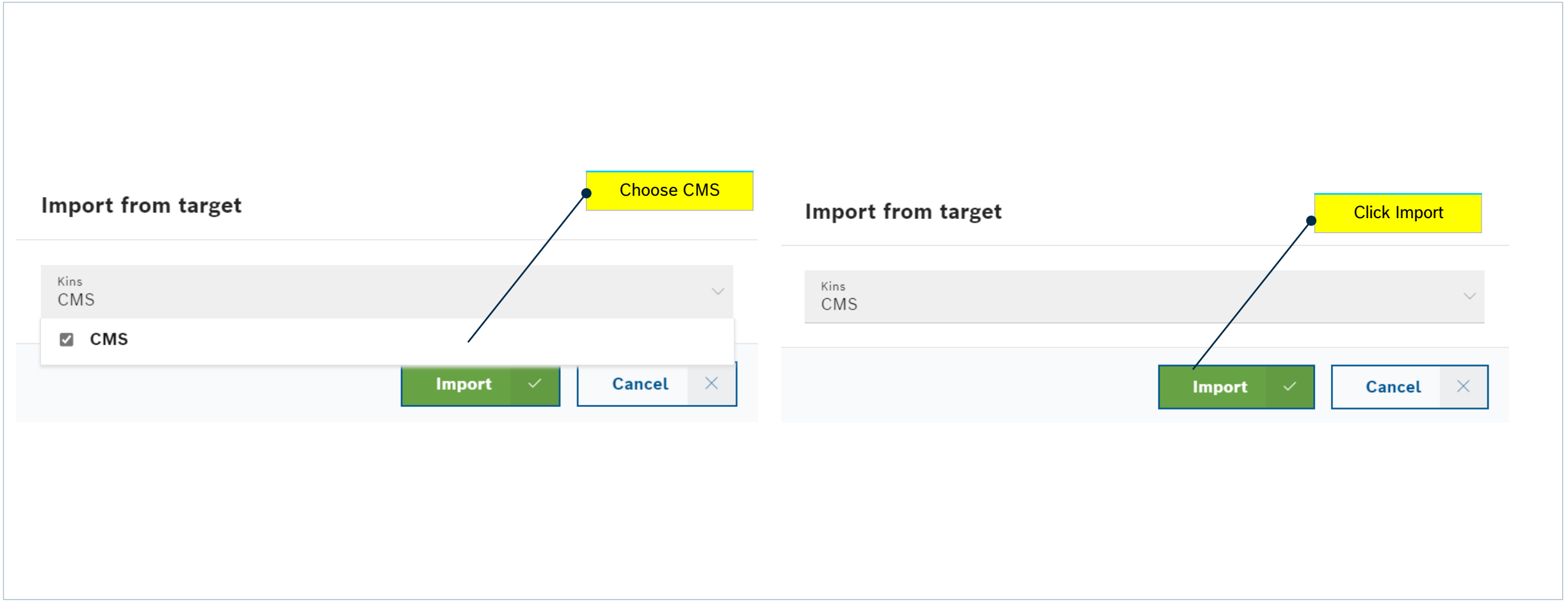
Steps

11. Choose the CMS and click Import.



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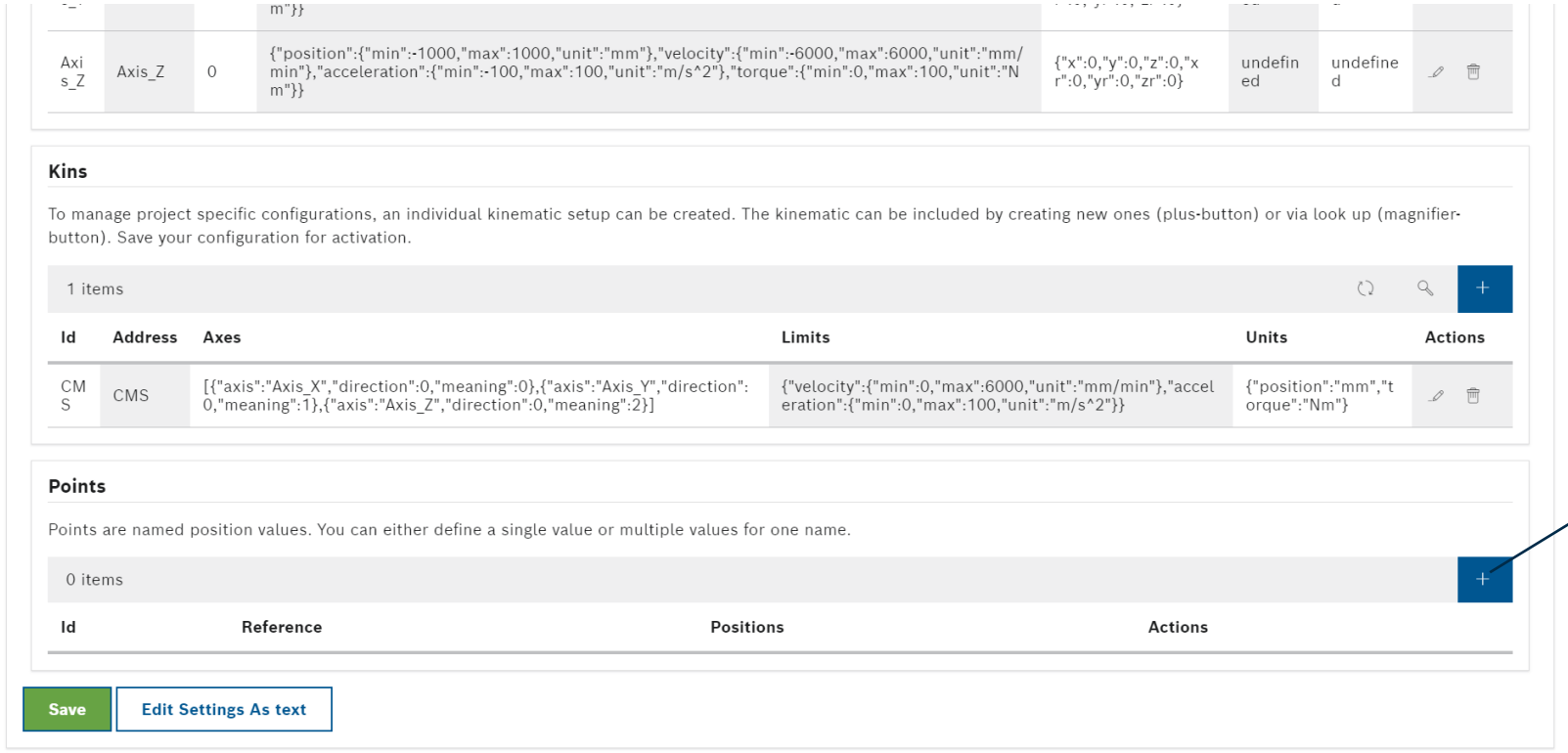
Steps

12. From here, you can see your previous Kins which is CMS that has been imported. Now, lets create our Position 1. Please click on '+'.



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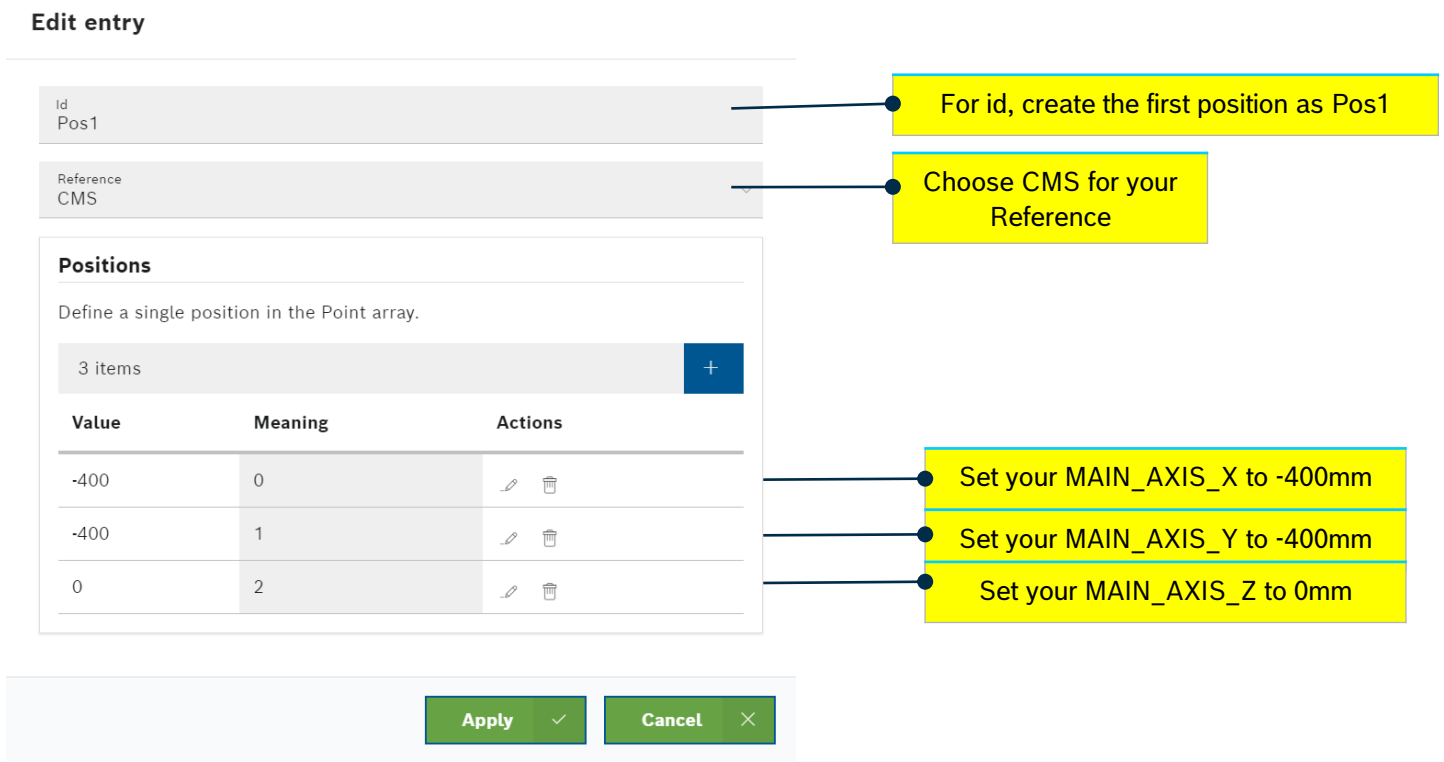
Steps

13. By following the instruction vertically, please type ‘Pos1’ as your id, ‘CMS’ as your reference, set MAIN_AXIS_X to -400mm, MAIN_AXIS_Y to -400mm and MAIN_AXIS_Z to 0mm. Then, click ‘Apply’.



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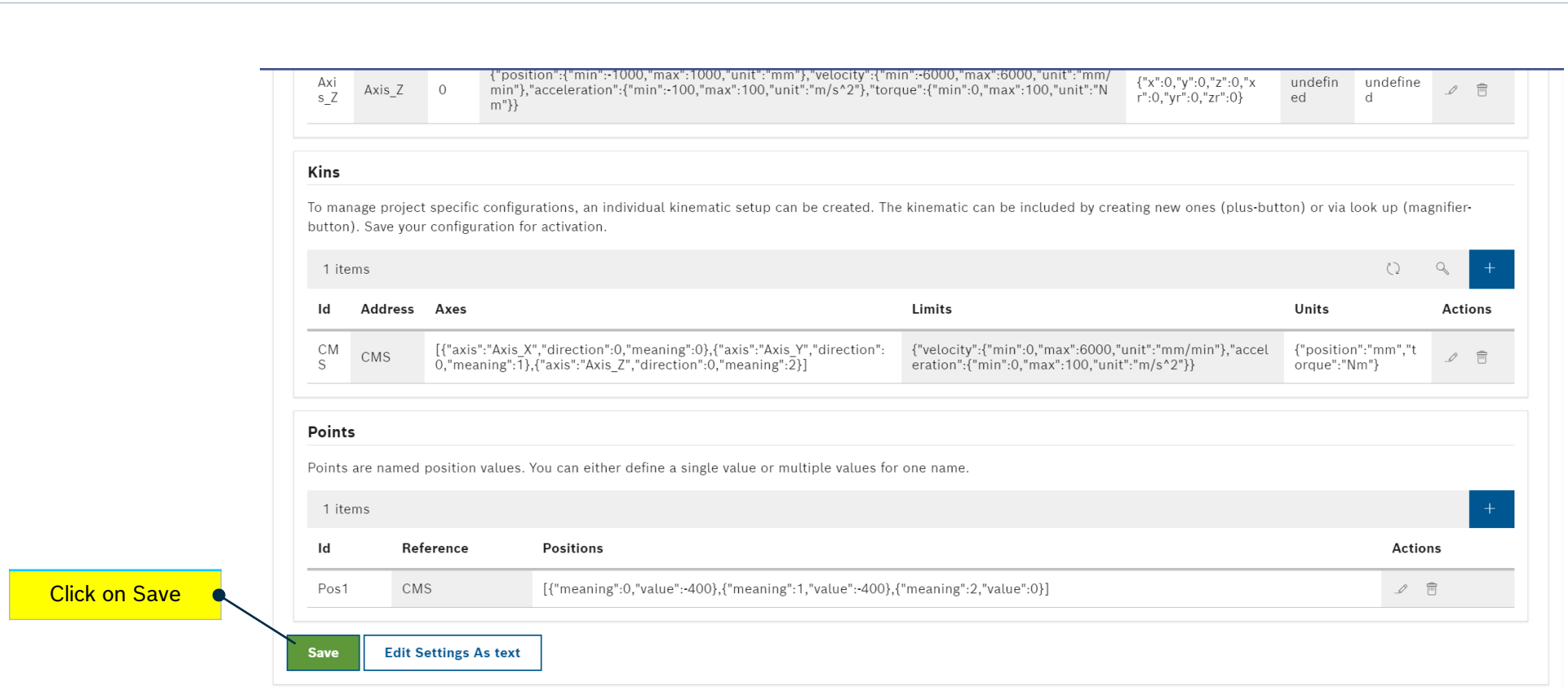
Steps

14. After finish add axes, CMS as our Kinematics and created Position 1, please click on save.



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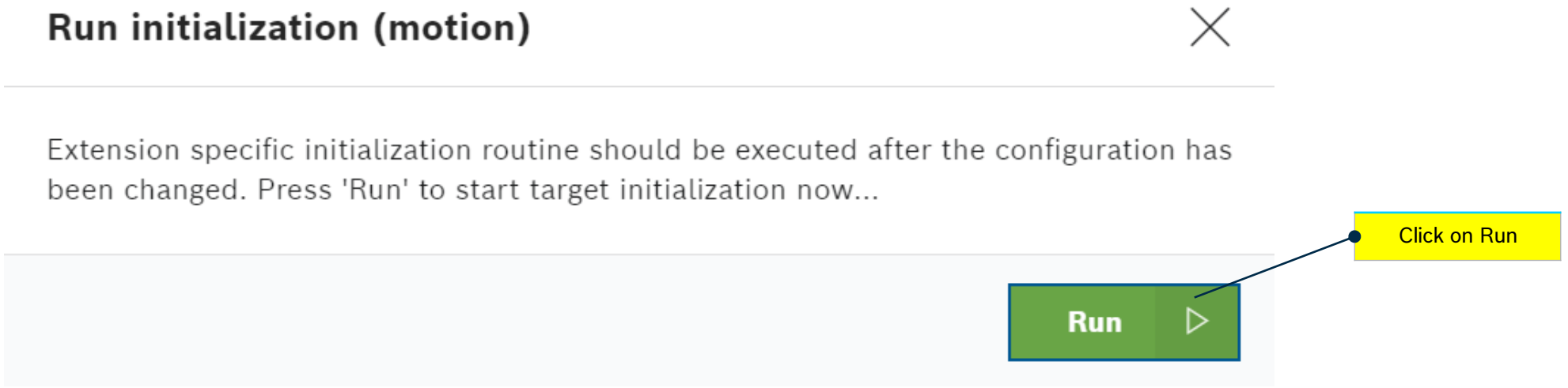
Steps

15. Please click on Run ▷ to run the initialization for motion.



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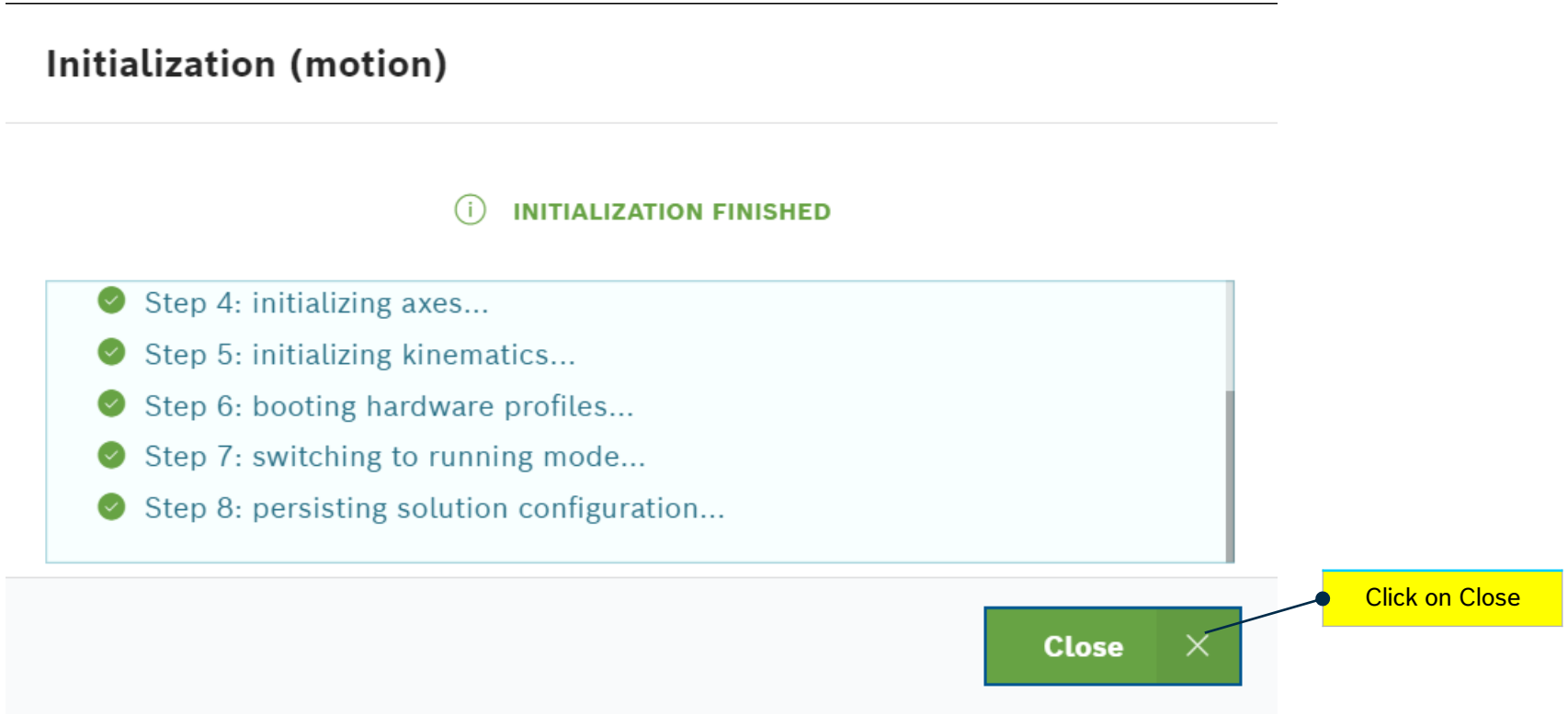
Steps

16. Please wait until the initialization finished, then click on Close.



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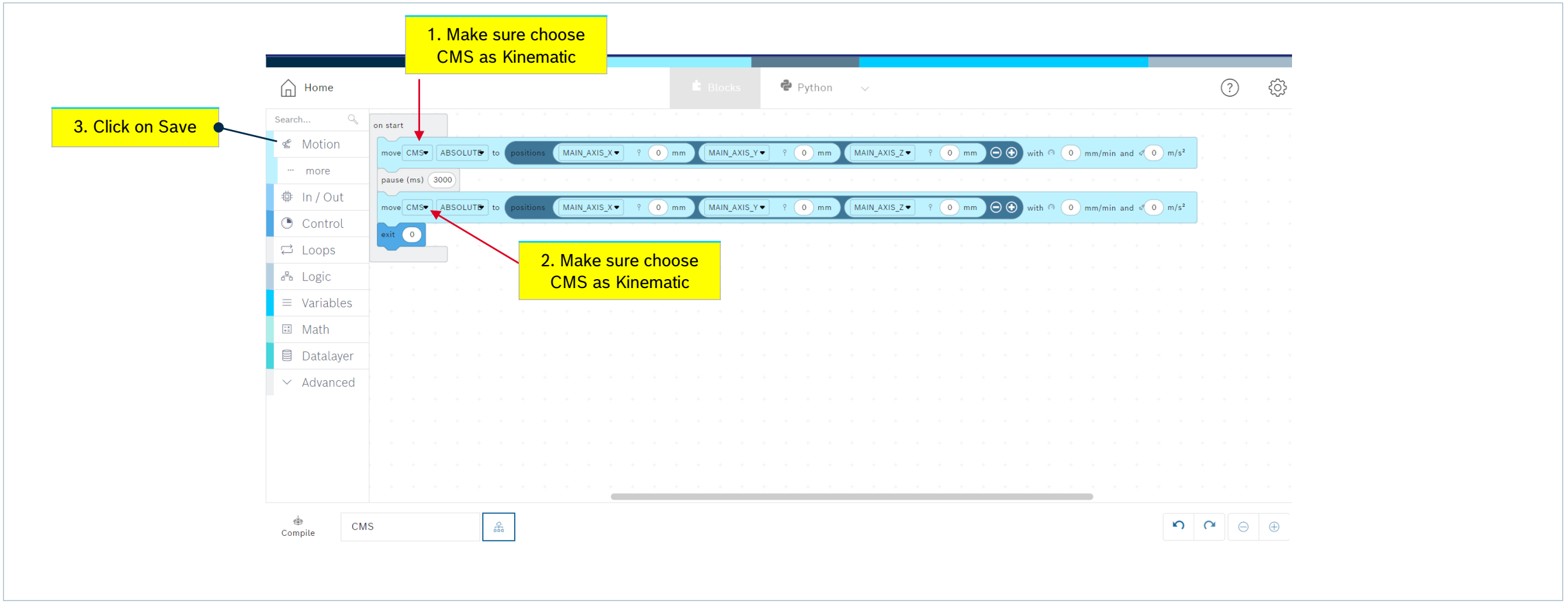
Steps

17. Now, you will be back to your Visual Coding Interface, please make sure you choose CMS as your Kinematic. Then click on Motion to add your Position 1.



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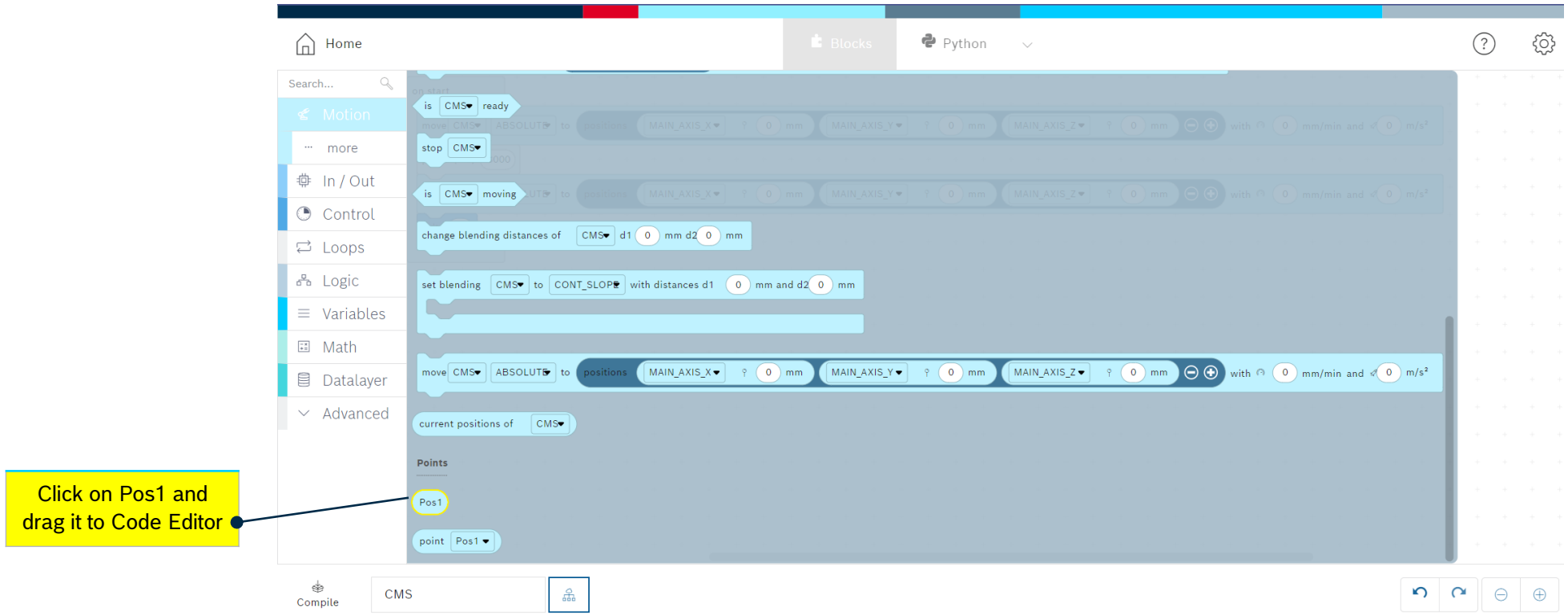
Steps

18. Scroll until you can find the Pos1, then please drag it to the Code Editor.



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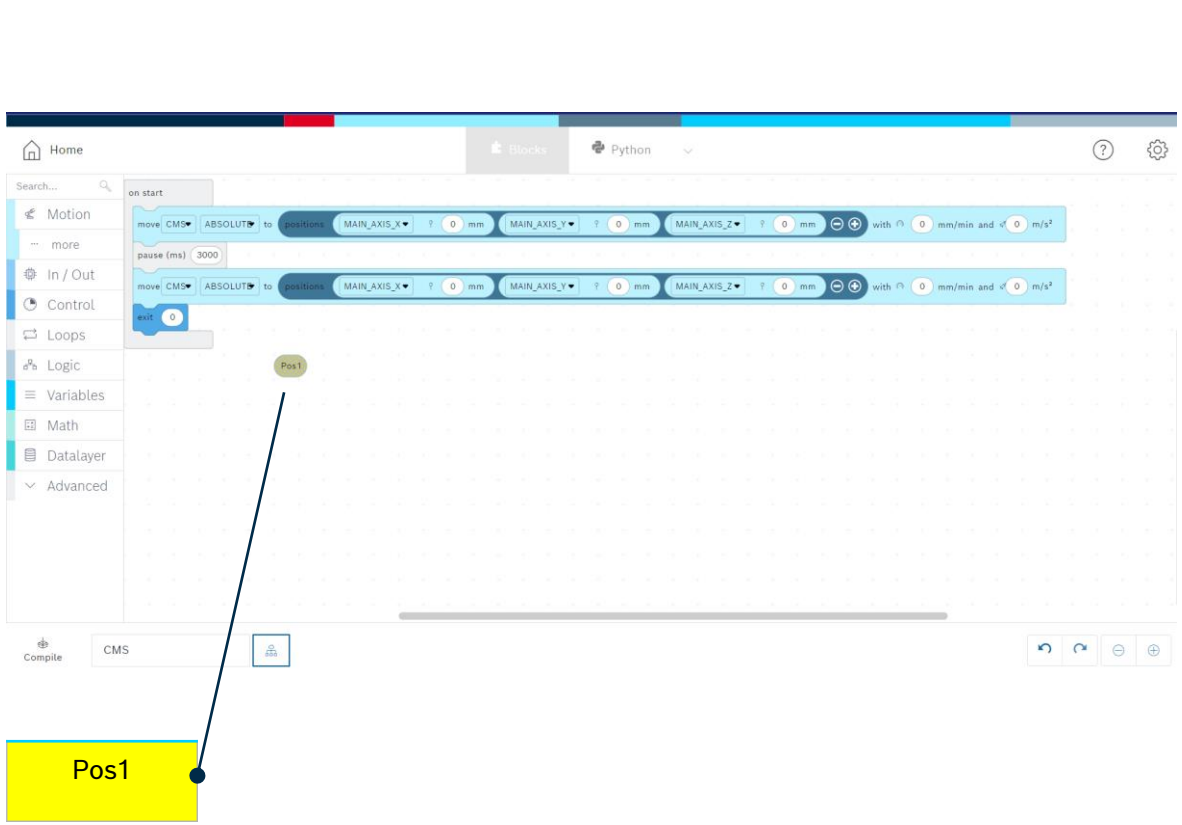
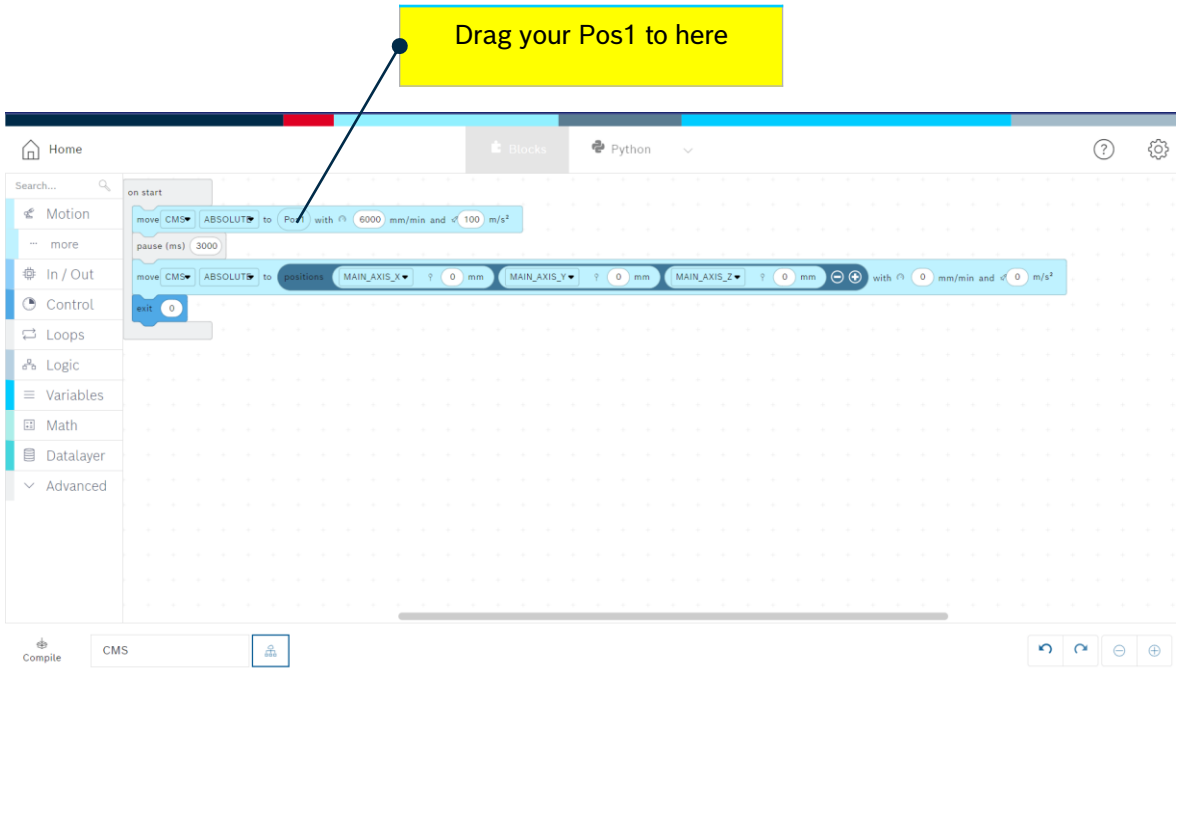
Steps

19. Please drag your Pos1 to the Move block.





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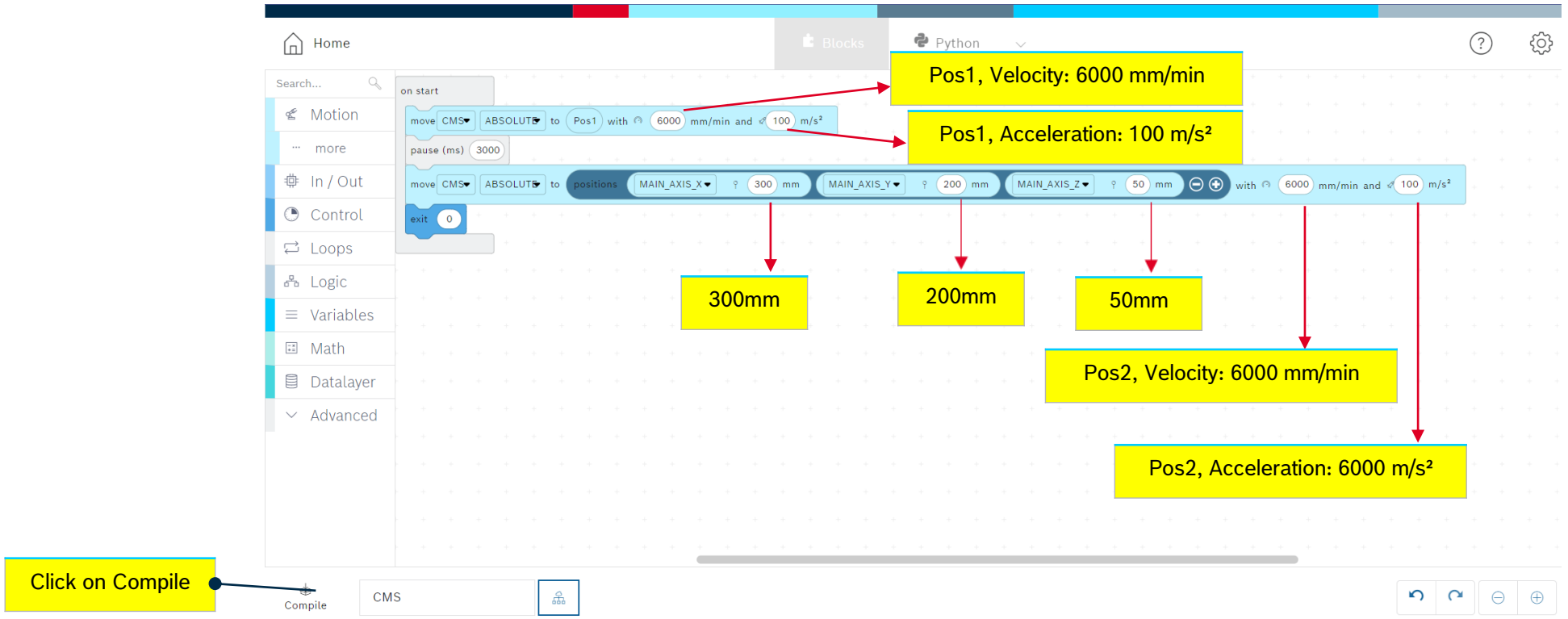
Steps

20. Please set the distance, velocity and acceleration of Pos1 and Pos2 correctly.



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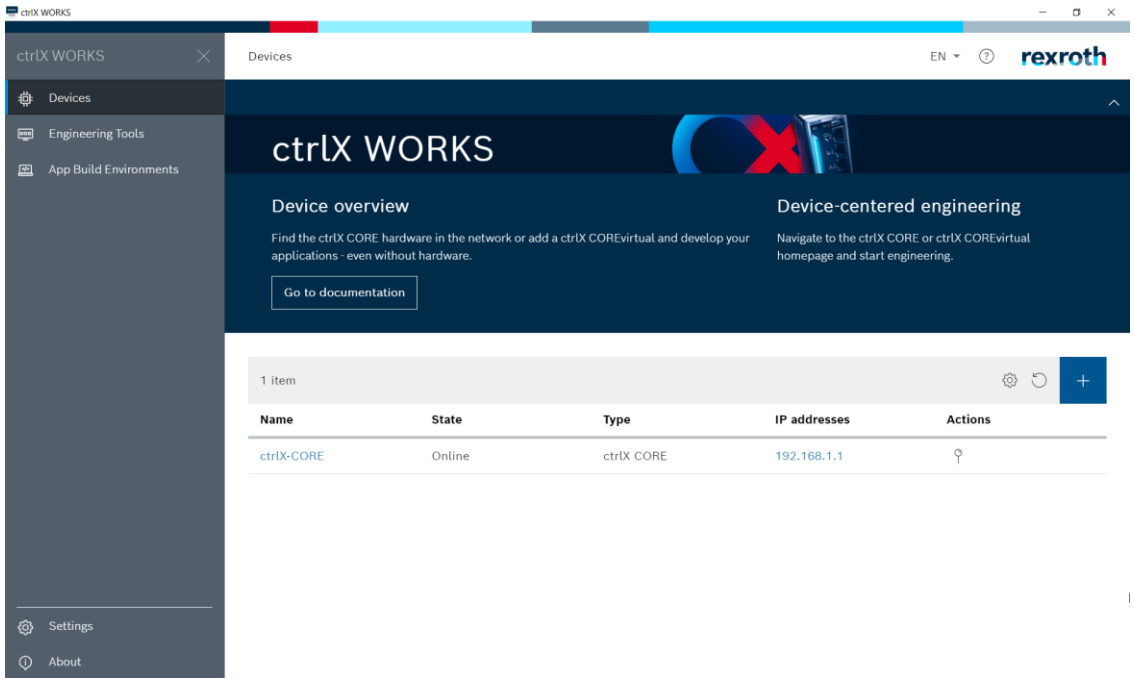
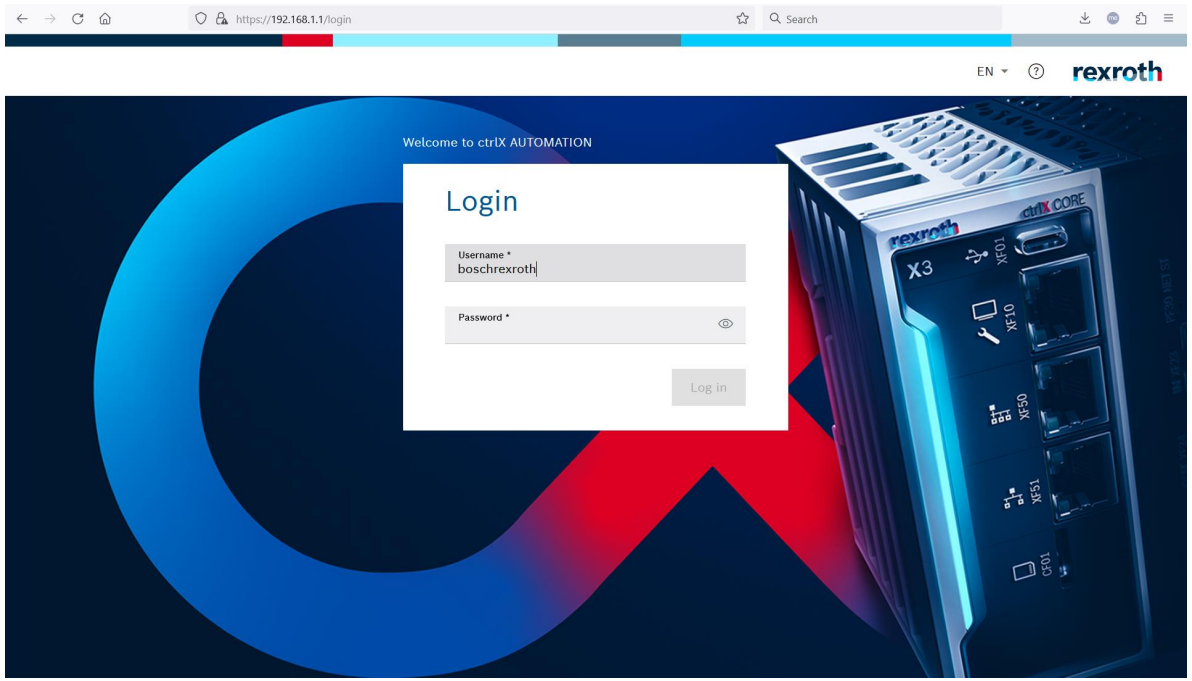
Steps

21. Now, we want to open 3D Viewer, please go back to ctrlX WORKS and log in again on a new tab.





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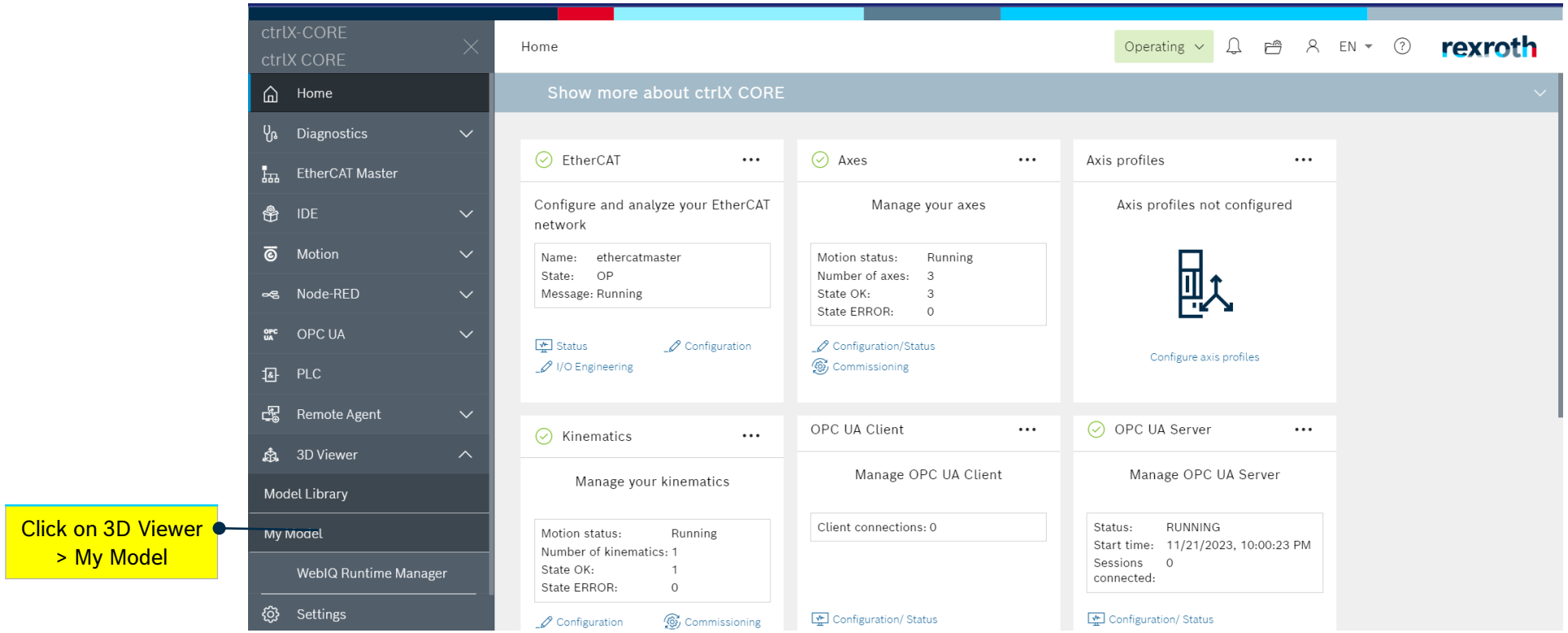
Steps

22. Click on 3D Viewer → My Model.



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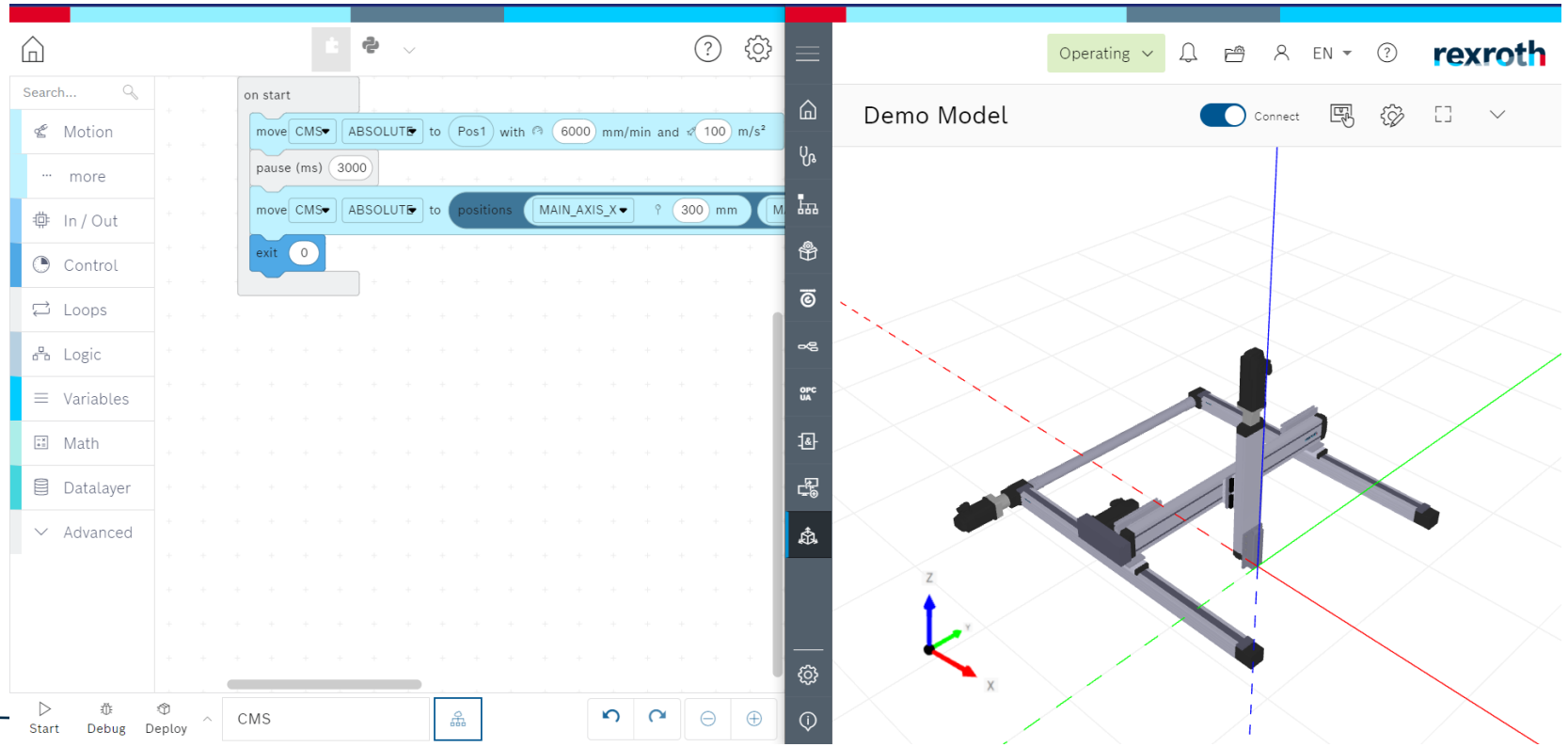
Steps

23. Please split the screen like this. On the lest side is our Visual Coding and on the right side is our CMS from 3D Viewer. Then, click on Start Icon.



Click on Start

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Steps

24. For Task 1, you need to solve the issues that exists in “**CMS**” in the IDE App – Visual Coding to make it work. Follow the steps below:

Do it yourself

- Configure a point for Position 2 as Pos2
- Please do a loop for the whole visual coding, hence it will not stop.

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Steps

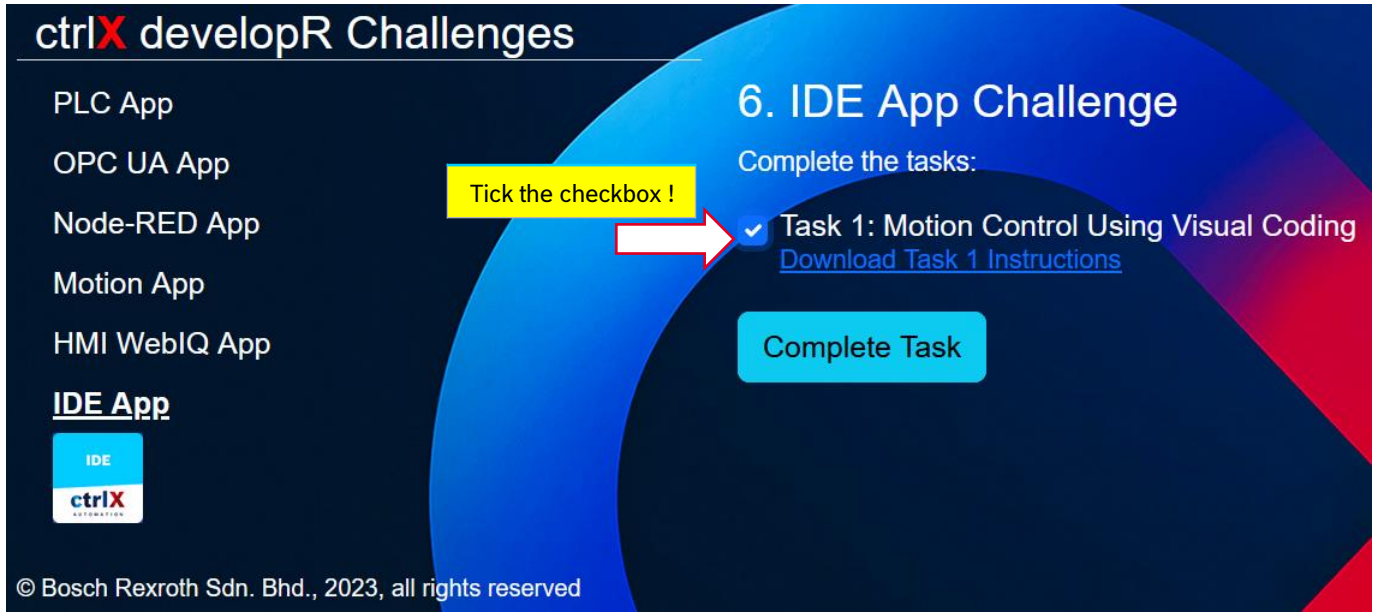
Once you have completed Task 1, follow the steps below.

How to complete Task 1 IDE App

- You can test your solution against the Task description
- Once it satisfies the requirements, confirm that you have completed the task by informing the available instructor for verification
- In the ctrlX developR challenge website, under the IDE App challenge section, tick [✓] the Task 1 checkbox

Congratulations, you've completed the task!

Follow the next step to complete the challenge!



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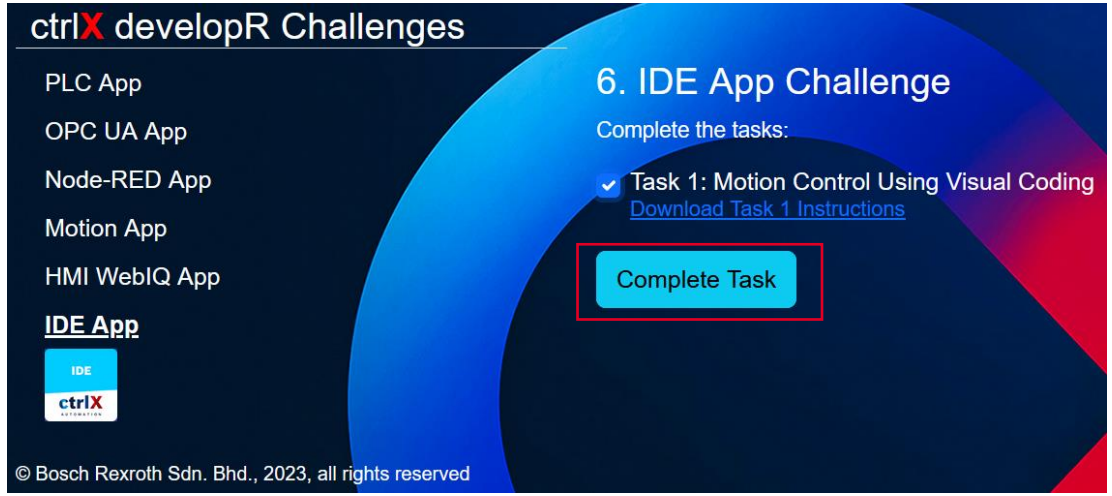
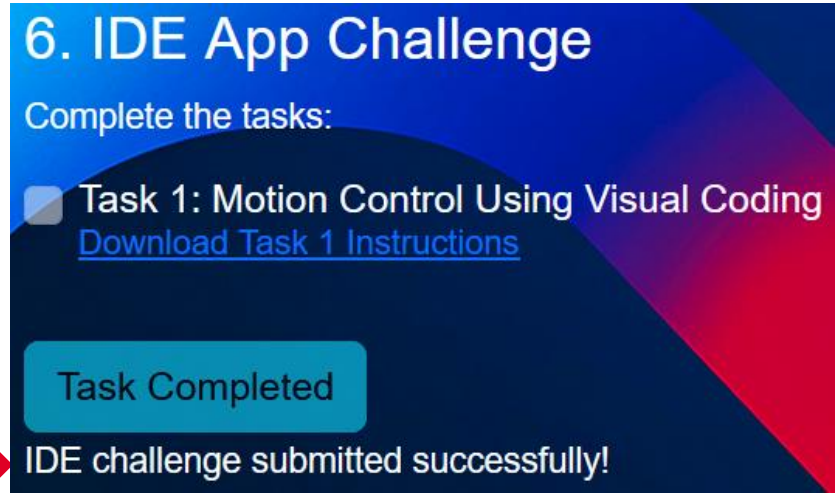
Steps

Once you have completed Task 1, follow the steps below.

How to complete the IDE App Challenge

- Finally, click on the "**Complete Task**" button





- Once pressed, the button text will change to "Task Completed" and you will be notified with a message that the challenge has been successfully submitted.
- By pressing the "Complete Task" button, the duration it takes for the team to complete the challenge will be automatically submitted.
- Submission only can be done once per challenge.

Congratulations, you've successfully completed the IDE App challenge! Wunderbar!

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