Challenge 01: PLC App

Task 02

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Challenge 01: ctrlX PLC App | Task 02

Description

In a chemical processing plant, a tank needs to be filled with liquid. A motor-pump system starts to run after a Start button is pressed. During the operation, a green light should blink once every second and a buzzer should provide an audible signal every second when the system starts. Once the Stop button is pressed, a red light should indicate its status.

Task

This task will test your understanding on timer functions in PLC programming. Solve the problem in the Ladder Logic Diagram (LD) in the CtrlX Core PLC to accomplish this task. Ensure that the timing is accurate. Use appropriate symbols and connections.

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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.

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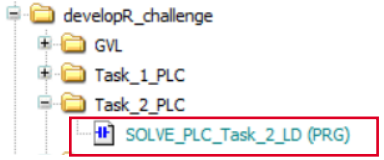
Steps

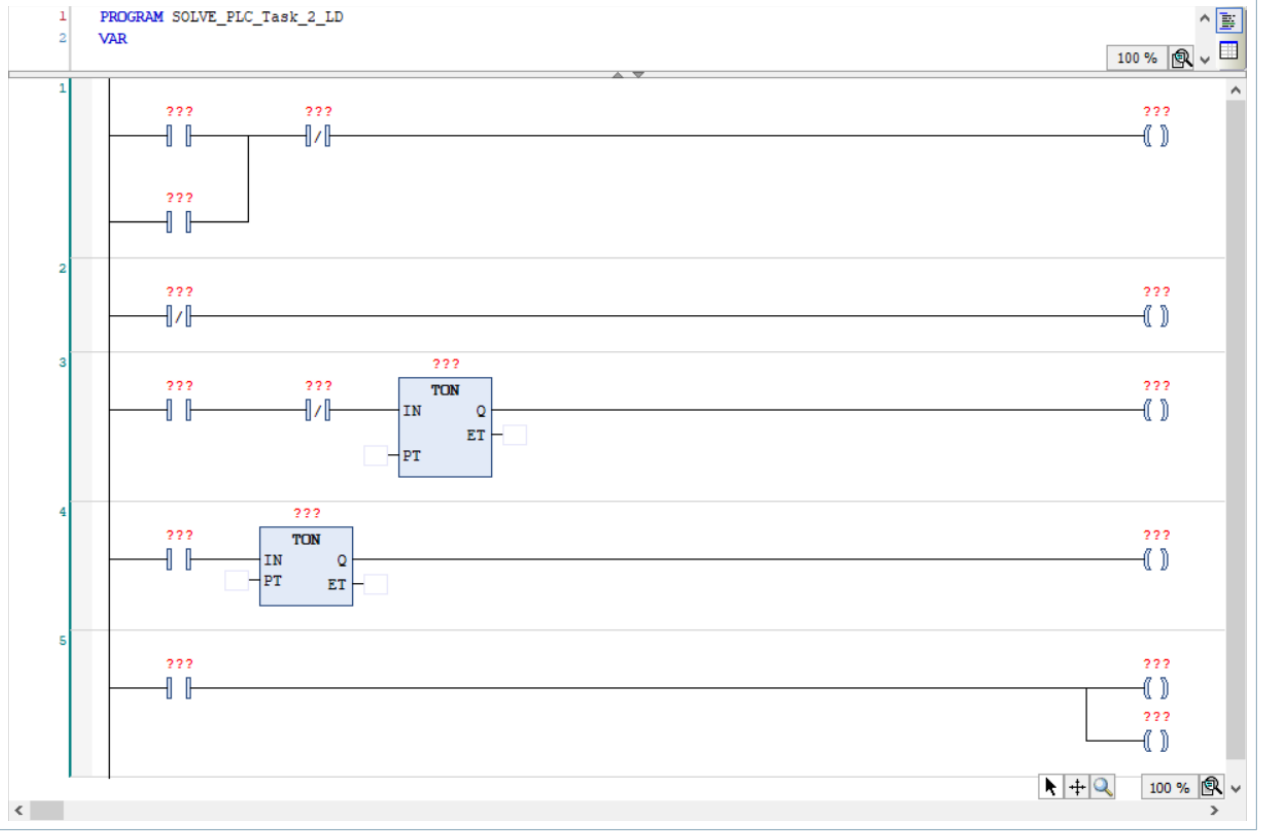
1. The task to be completed is located inside the “**developR_challenge**” folder in the Device tree.

Where to find Task 2 PLC Program (POU)

- The POU for Task 2 is located inside “**Task_2_PLC**” folder



- Open the “**SOLVE_PLC_Task_2_LD (PRG)**”
- This will open a POU editor (right photo)
- The PLC program is created with Ladder Logic Diagram (LD) language based on IEC 61131-3 standard developed by the International Electrotechnical Commission (IEC).
- The PLC program however is not in working condition and requires your help to solve it.
- Use the correct Input and Output variables in the **GVL_PLC**
- From time to time, make sure to Save your program (with Ctrl + S)



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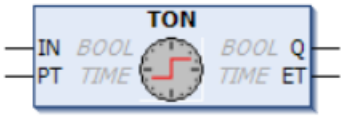
Steps

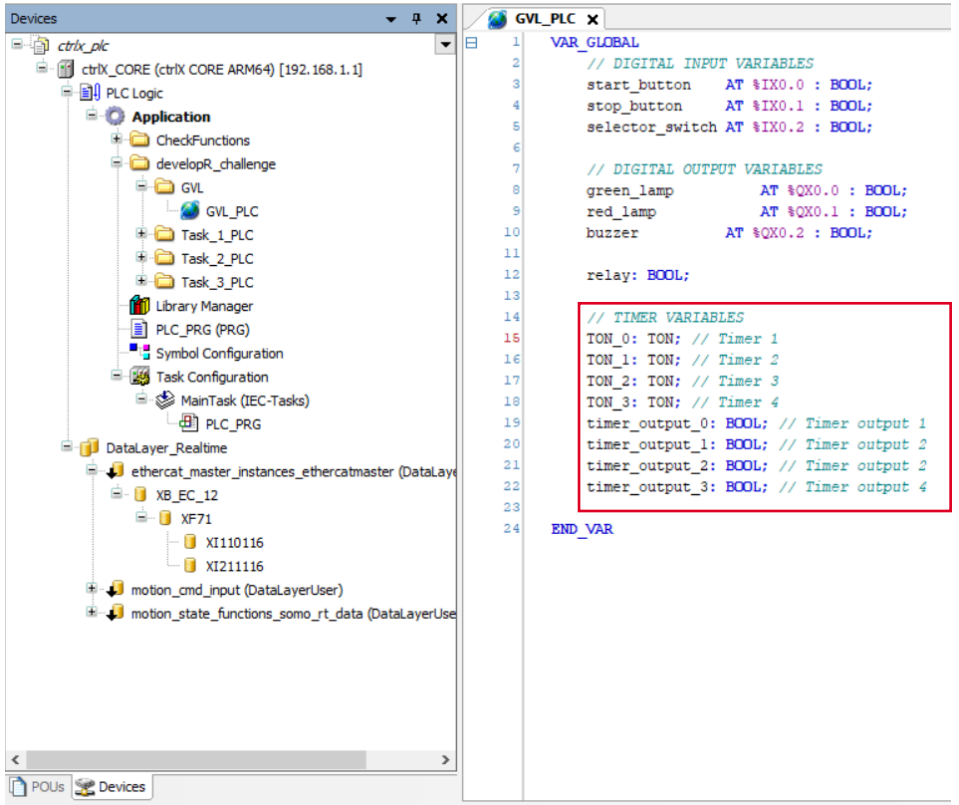
2. For Task 2, there are some additional Variables and they are located in the GVL_PLC.

Add-on Variables for Task 2 PLC Program (POU)

- Other than the Input and Output variables in the **GVL_PLC,** there are also other variables to be used for Task 2
- These include variables for timer functions.
- Timers:
  - Are essential components used to manage time-based events and operations such as turning on or off outputs.
  - **TON (Timer On Delay)** : The TON Function Block introduces a delay before activating an output. It begins timing when the input condition is TRUE and triggers the output once the preset time (PT) has passed. Key settings involve PT, the input condition, and the output.



- Use the appropriate variables to solve the challenge!
- **Good Luck!**



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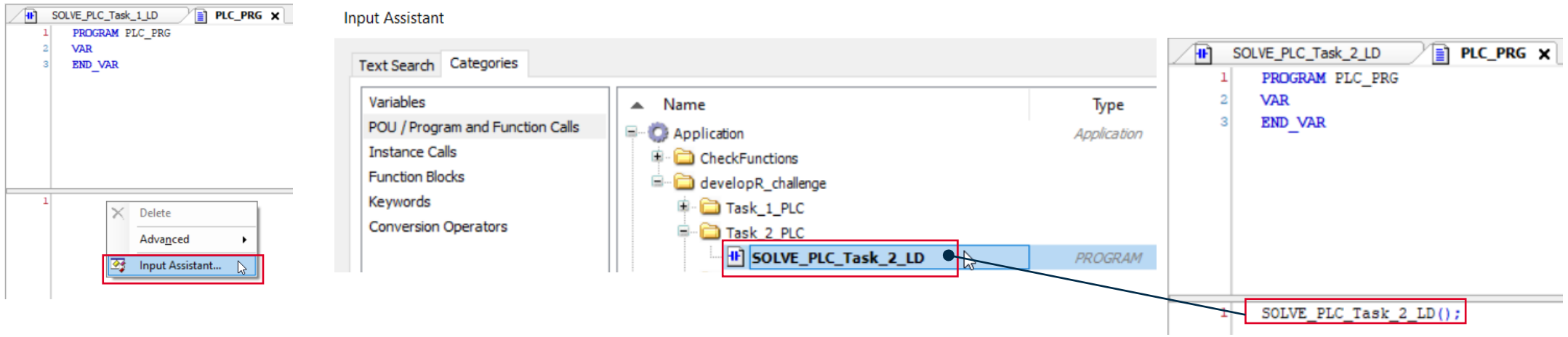
Steps

3. Once you have completed Task 2 and ready to download the PLC Program to the ctrlX CORE, follow the steps below.

How to insert Task 2 PLC Program (POU) into PLC_PRG

- Open “**PLC_PRG**” PLC_PRG (PRG) in the Device tree
- Right click on the empty page of the POU editor
- Select “**Input Assistant...**”
- Under the POU / Program and Function Calls Categories, select the PLC Program **“SOLVE_PLC_Task_2_LD”** and click **OK**
- In the POU editor, there should be the program that you selected. This means that the program will be uploaded to the control.



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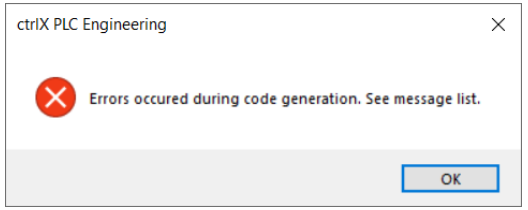
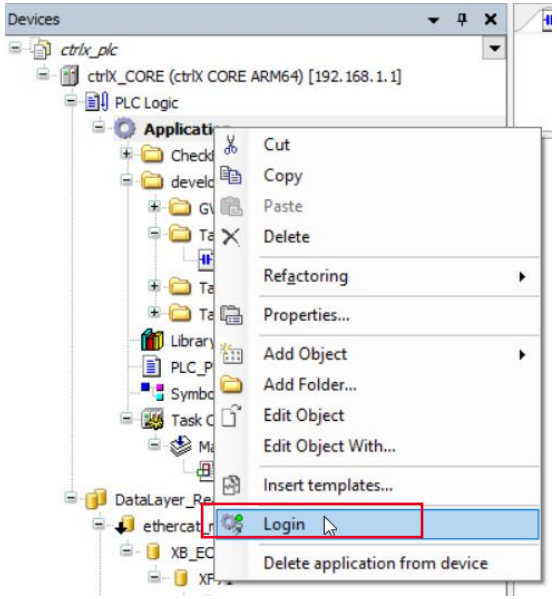
3. Once you have completed Task 2 and ready to download the PLC Program to the ctrlX CORE, follow the steps below.

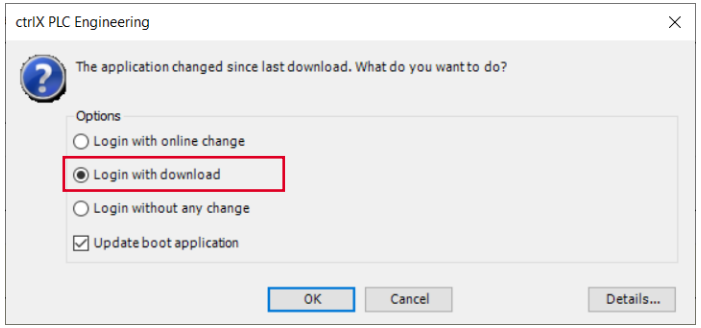
How to download Task 2 PLC Program (POU) to the ctrlX CORE

- In the Device tree, right click on the "**Application**" object
- Click on **"Login"**
- This will open a popup message. Select option: **Login with download** and click **OK**
- The PLC program will be compiled and build. Only when there are no errors that the download will start.
- If there are any errors, you will see a popup message below



- Look in the console at the bottom section for the error messages





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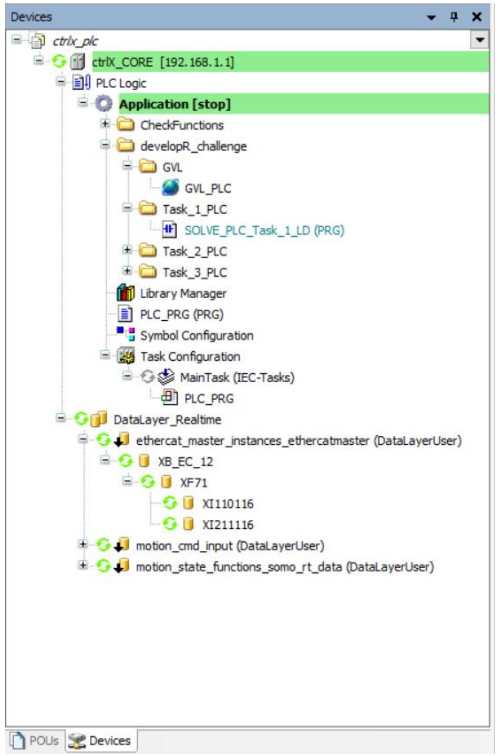
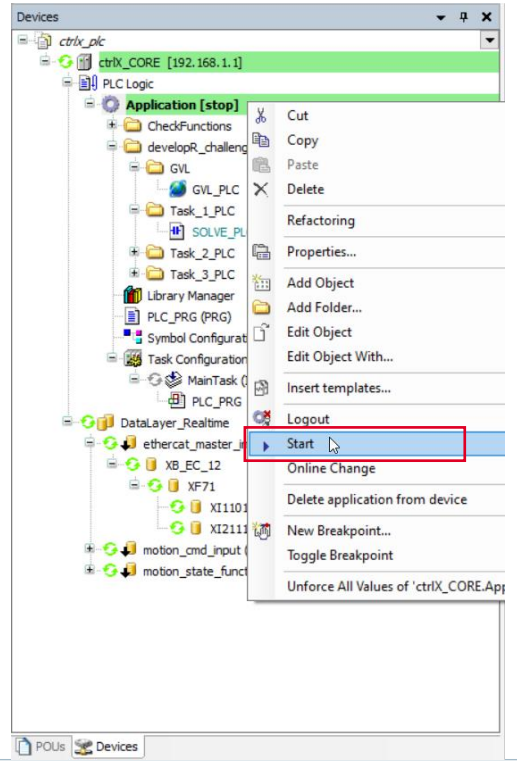
3. Once you have completed Task 2 and ready to download the PLC Program to the ctrlX CORE, follow the steps below.

How to download Task 2 PLC Program (POU) to the ctrlX CORE

- If the download is successful, your Application object will be highlighted in Green and a **[stop]** status will be displayed.
- This means that the PLC is in Stop mode and no PLC program is running in this mode.
- To change the mode, you can right click on the "**Application**" object again and Click on "**Start**"





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Steps

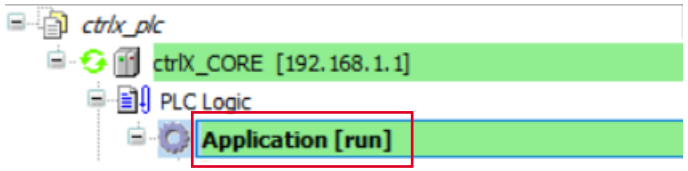
3. Once you have completed Task 2 and ready to download the PLC Program to the ctrlX CORE, follow the steps below.

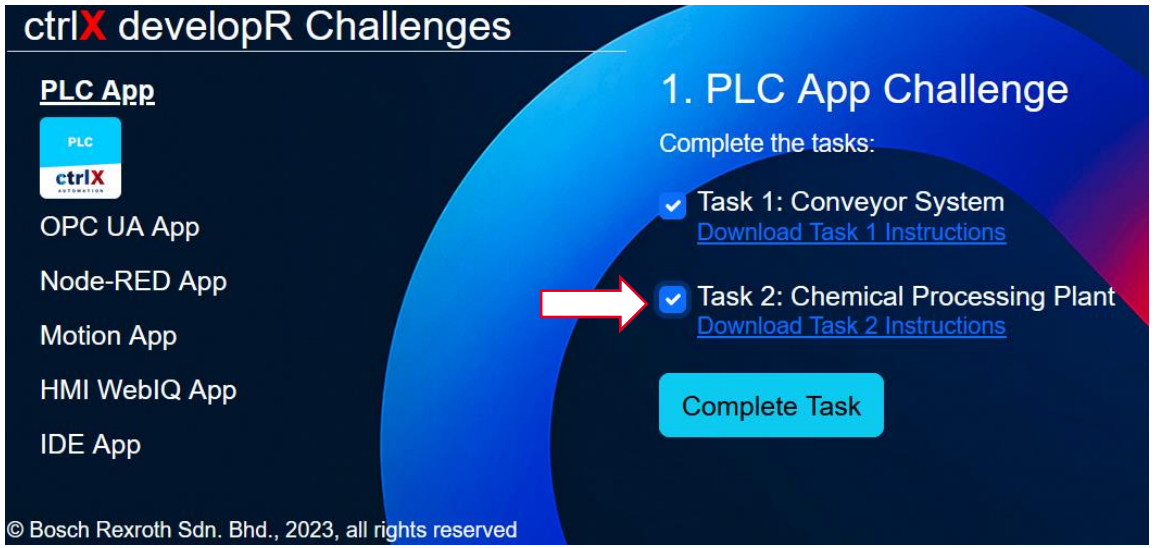
How to download Task 2 PLC Program (POU) to the ctrlX CORE

- This will change the mode from **[stop]** to **[run]**
- You can test your program 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 PLC App challenge section, tick [✓] the Task 2 checkbox
- If you are done with testing, you can logout by right clicking the Application object and select Logout

Congratulations, you've completed the tasks!

Follow the next step to complete the challenge!





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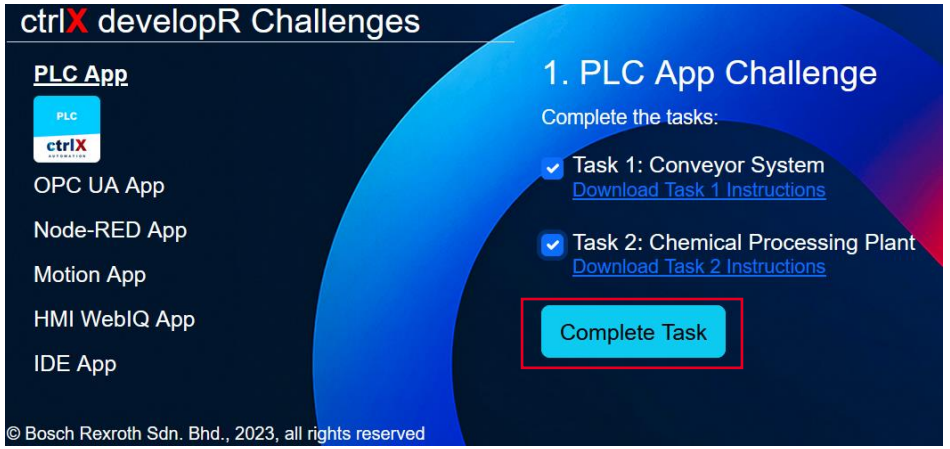
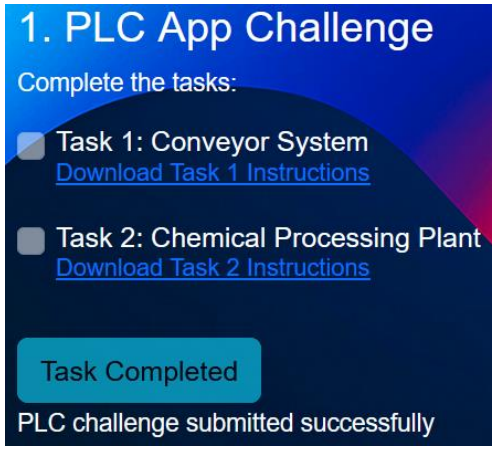
Steps

4. Once you have completed Task 1 and Task 2, follow the steps below.

How to complete the PLC App Challenge

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





- Once pressed, the button 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 PLC App challenge! Awesome job!

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Congratulations!

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