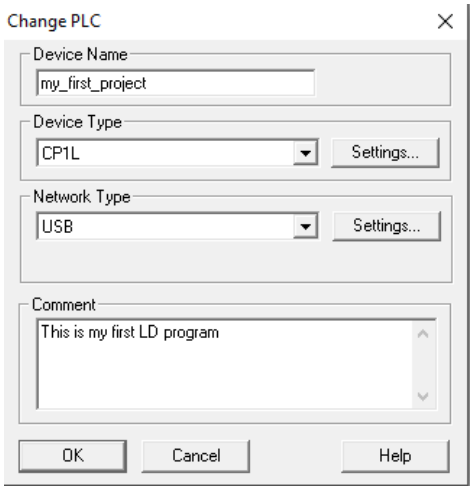
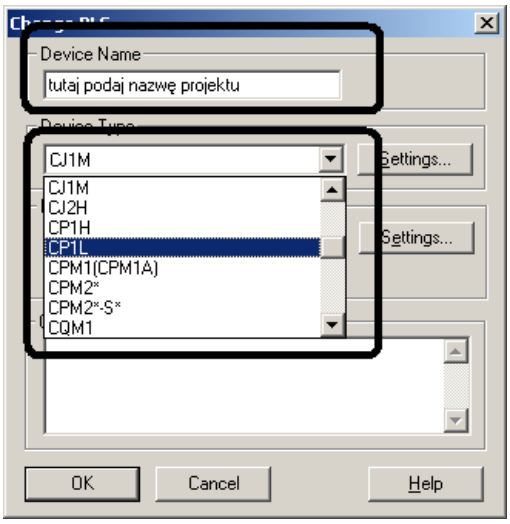
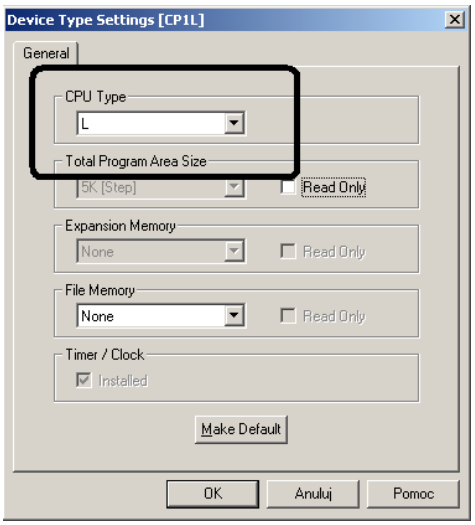
Introduction. Omron *CX-Programmer* is part of *CX-One* which is an integrated package for all of Omron's PLC series. The application includes a wide variety of features to speed up the development of a PLC program.

Task 1. Run *CX-Programmer*. From the *File* menu choose *New…* (*File➔New…*).

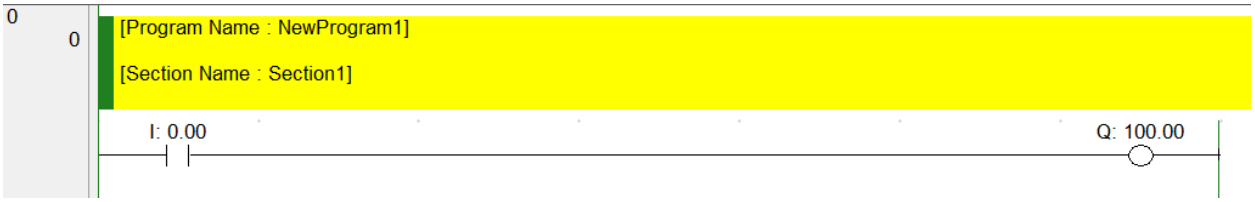


- *Device Name* - the name of the project.
- *Device Type* - PLC type that is used in the project.
- *Network Type* - the interface between PC and PLC.
- *Comment* - designer notes.



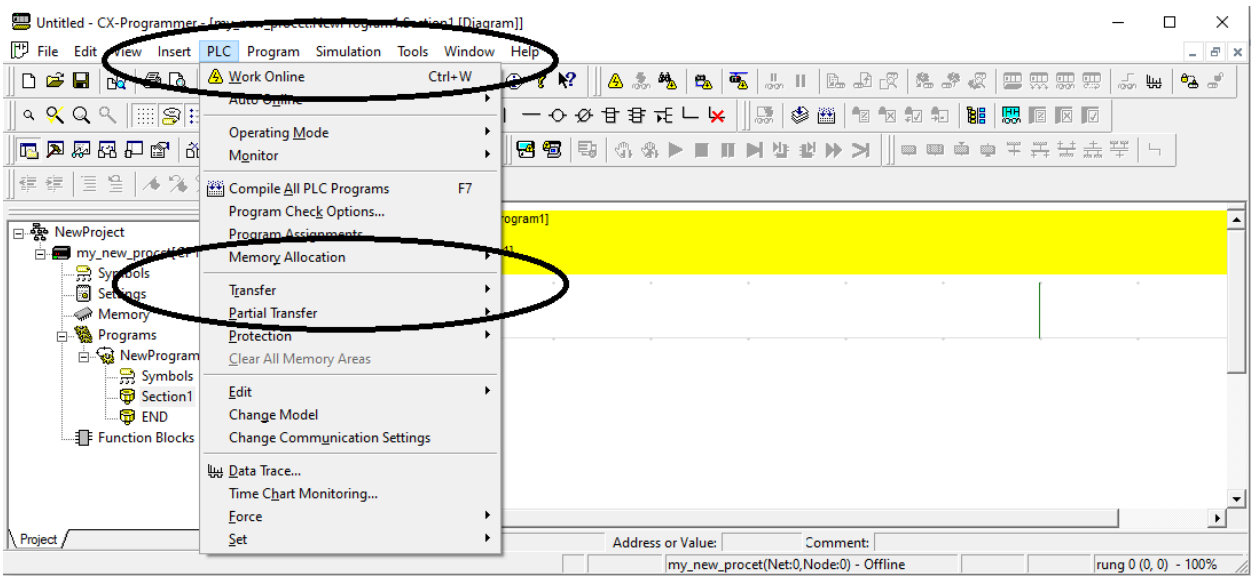


Create the following application:

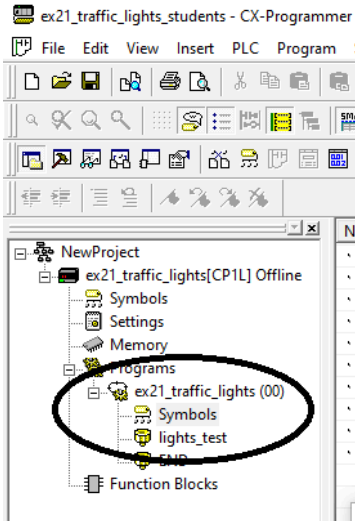


From the *Simulation* menu choose *Work Online Simulator* (*Simulation➔Work Online Simulator*). Wait for the gray background. Use the simulator to see how the program works.

Close the simulator (*Simulation➔Work Online Simulator*). Send this program to the PLC using the combination: *PLC → Work Online*; *PLC → Transfer → To PLC…*

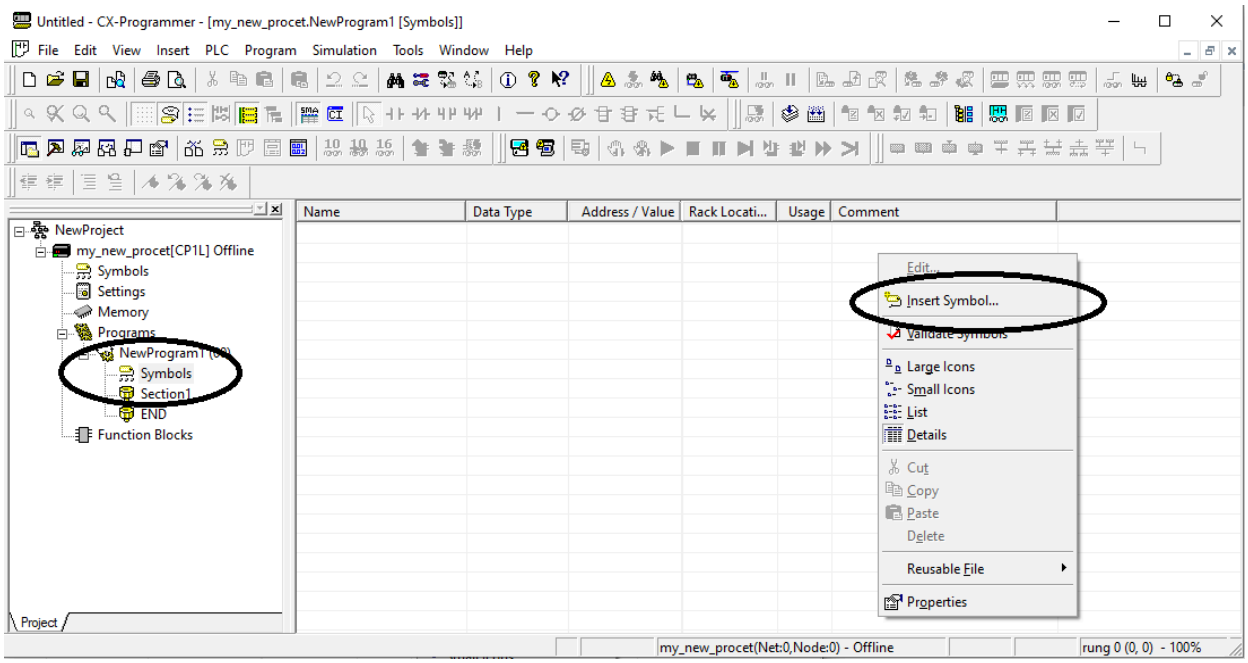


Task 2. Run *CX-Programmer*. From the *File* menu choose *New…* (*File➔New…*).

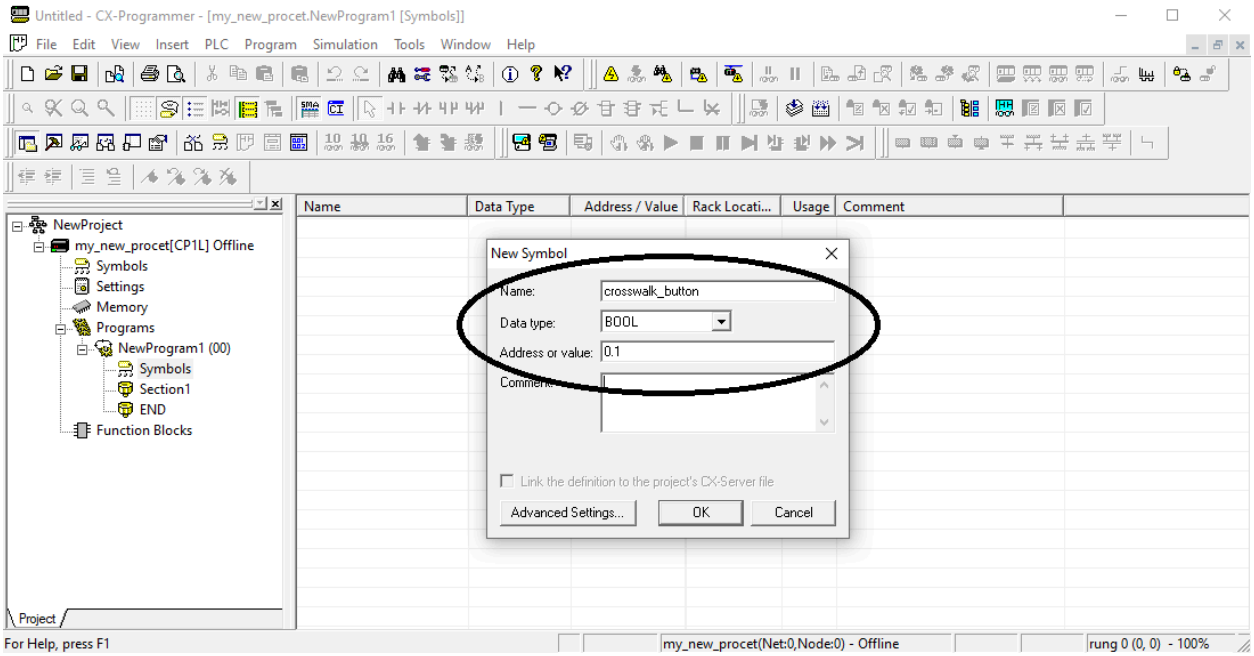


In the project tree, open the *Programs* tab. Select *Symbols*.

Press the right mouse button while keeping the mouse pointer inside the *Symbols* window. Select *Insert Symbol*.



Enter the *Name* and address in the PLC memory (*Address or value*).



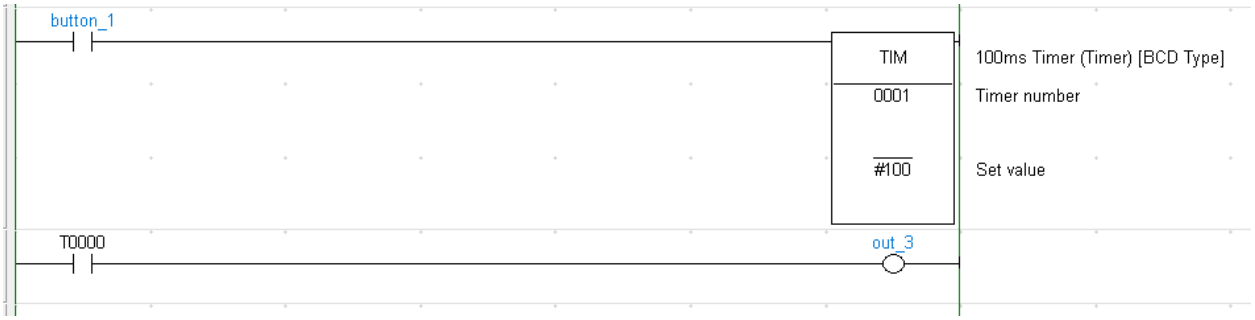
Create symbols according to the following table:

Hardware	Input symbol	Input	Output symbol	Output
Omron #1	button_1		out_1	
	button_2		out_2	
	button_3		out_3	
Omron #2	button_1	0.0	out_1	100.0
	button_2	0.2	out_2	100.1
	button_3	0.3	out_3	100.2
Omron #3	button_1	0.0	out_1	100.0
	button_2	0.2	out_2	100.1

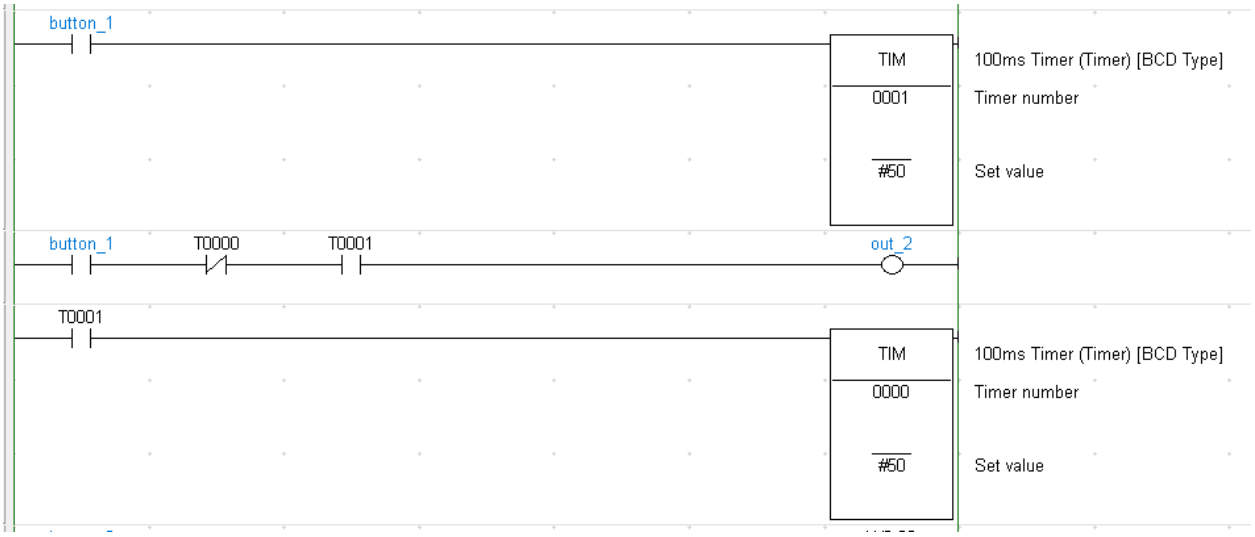
	button_3	0.4	out_3	100.2
Omron #4	button_1	0.0	out_1	100.0
	button_2	0.1	out_2	100.2
	button_3	0.3	out_3	100.3
Omron #5	button_1	0.0	out_1	100.0
	button_2	0.1	out_2	100.2
	button_3	0.3	out_3	100.3
Omron #6	button_1		out_1	
	button_2		out_2	
	button_3		out_3	

Task 3. Timer. Build the following LD diagrams. Check the results.

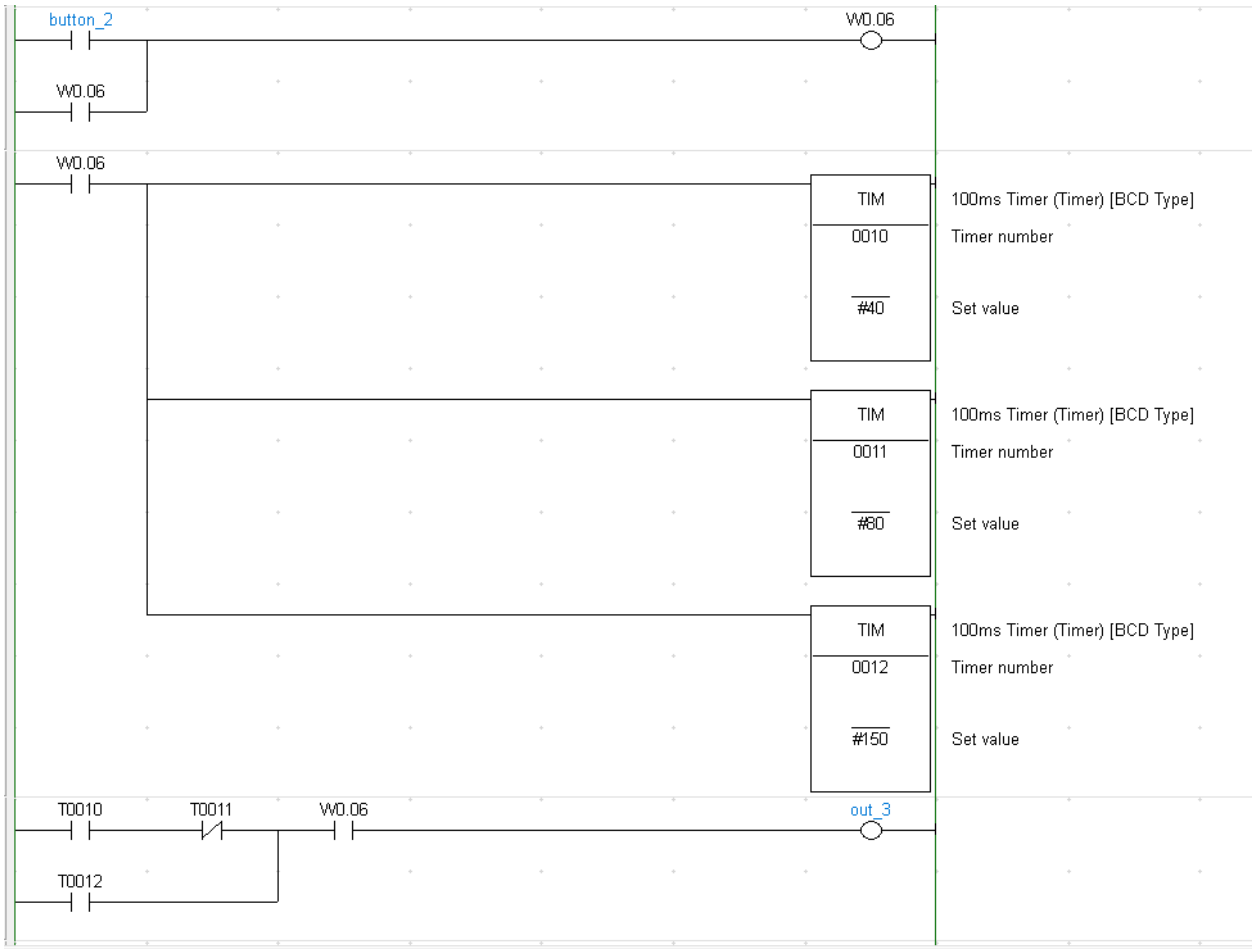
Timer function syntax: ***TIM 1 #100***



Task 4. Build the following LD diagram. Check the results.



Task 5. Build the following LD diagram. Check the results.



Task 6. Generate a 4s pulse on *out_2,* triggered by pressing the *button_3*.

Task 7. Generate 2 5s pulses on *out_1* triggered by pressing the *button_1*. The second pulse should be generated 10s after the first pulse is completed.

Task 8. Prepare a solution that meets the following parameters:

1. *out_1* is energized (on) 5s after either *button_1* or *button_2* is pressed.
2. *out_2* is energized (on) 3s after *button_1* and *button_2* were pressed.

3. *button_3* resets the system.

Task 9. Create an LD program that produces a 2Hz 50% PWM signal on *out_2*.

For those interested:

1. CX-Programmer Introduction Guide:
   www.fa.omron.com.cn/data_pdf/mnu/r132-e1-05_cx-programmer.pdf?id=1605

2. CP1L Programming Manual:
   assets.omron.eu/downloads/manual/en/v1/w451_cp1_cpu_unit_programming_manual_en.pdf