

# TRILOGI

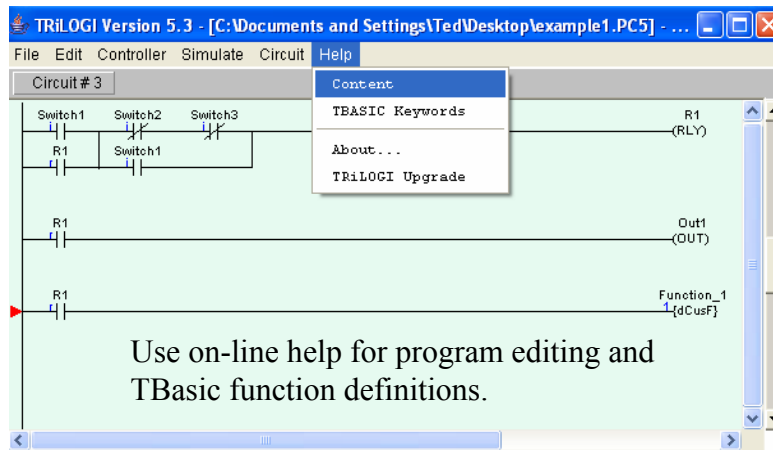
## 5.3

### PLC Ladder Diagram Programmer and Simulator

A tutorial prepared for IE 575 by  
Dr. T.C. Chang

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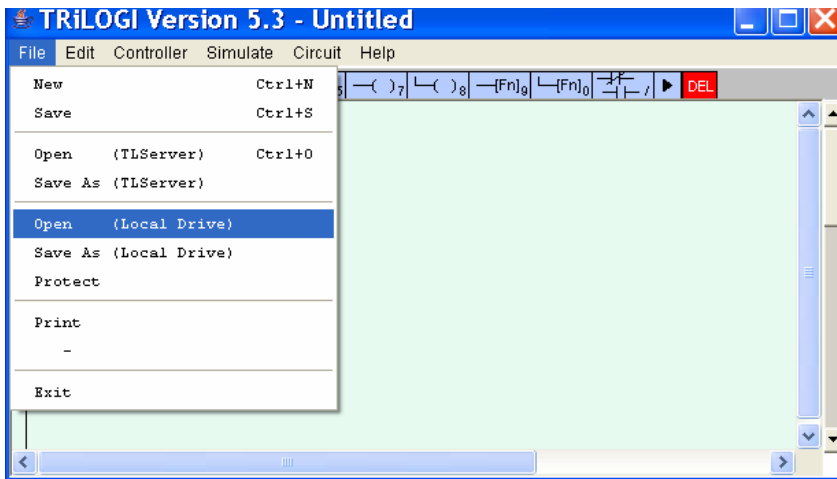
## Use On-Line Help



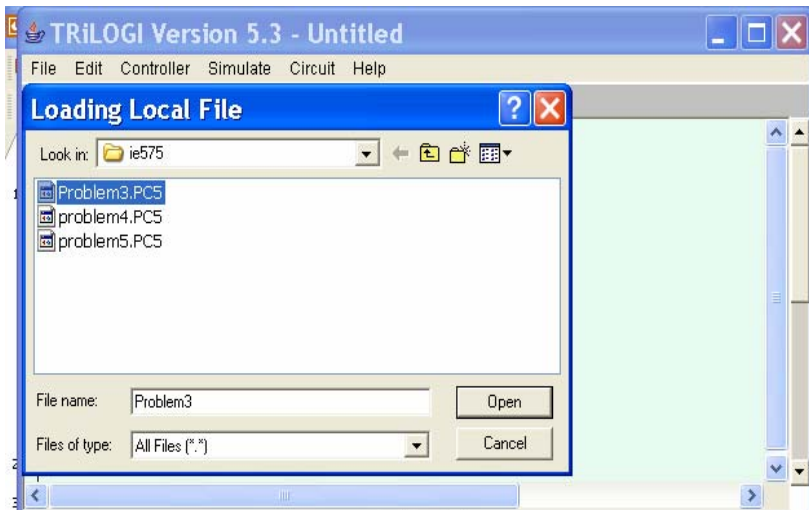
2

# Open File

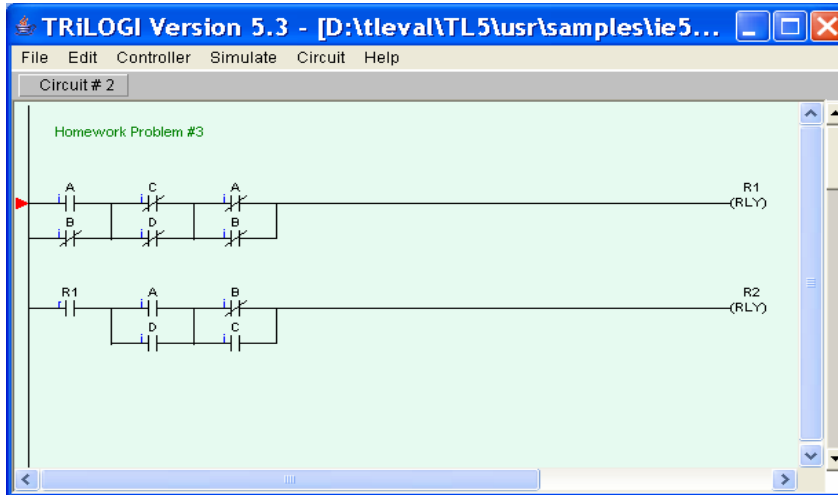
Open from local drive (file on your disk).



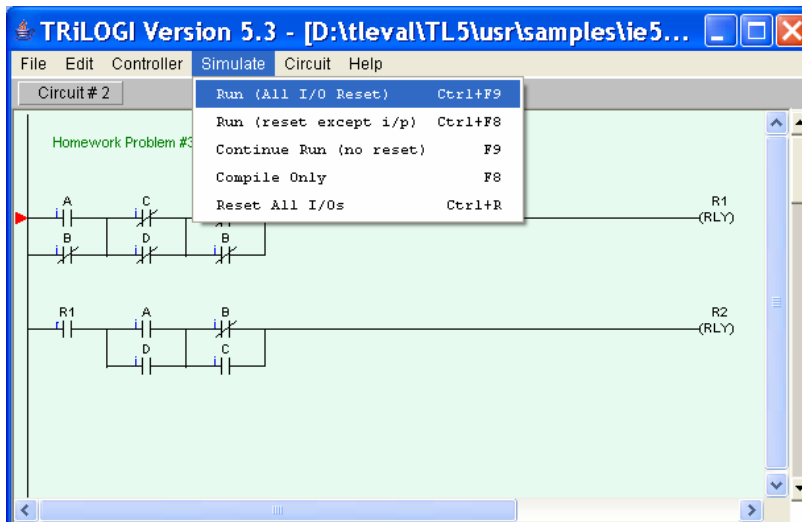
# Select the desired file



# File Open



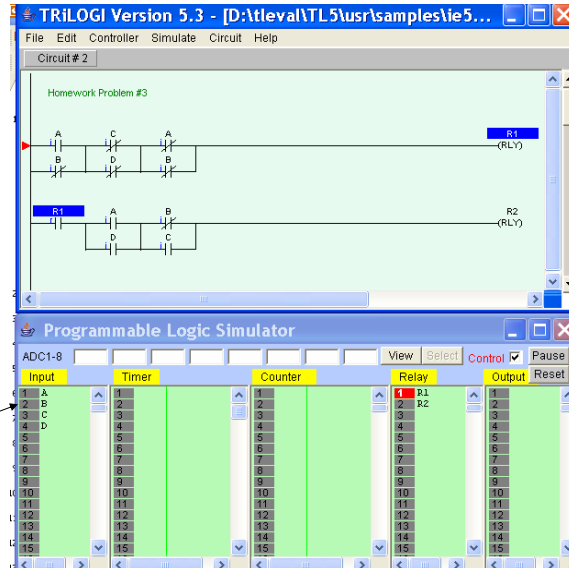
# Simulate the Program



# Simulation

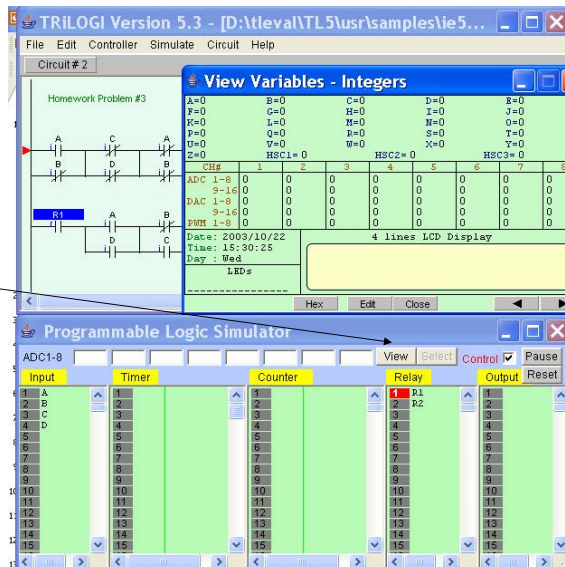
Use left button to select an input (push button).

Right button to toggle an input.

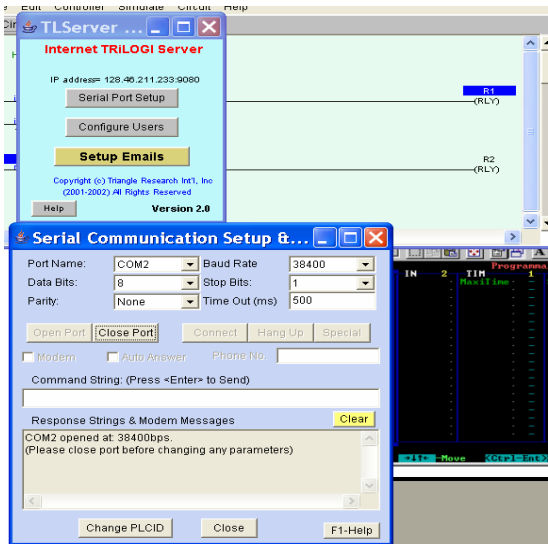


# Simulation

Click "View" to show variables.



## Start Server



The screenshot shows the TLServer application window with the 'Serial Communication Setup' dialog box open. The dialog box has the following fields and options:

- Port Name: COM2
- Baud Rate: 38400
- Data Bits: 8
- Stop Bits: 1
- Parity: None
- Time Out (ms): 500
- Buttons: Open Port, Close Port, Connect, Hang Up, Special
- Modem:  Modem,  Auto Answer, Phone No.:
- Command String: (Press <Enter> to Send)
- Response Strings & Modem Messages: Clear
- Status: COM2 opened at 38400bps (Please close port before changing any parameters)
- Buttons: Change PLCID, Close, F1-Help

Need server to connect to a PLC.

Set the correct COM port. In networked PLCs use “Change PLCID” to set PLC ID number. The PLC ID will be saved in the EEPROM of the PLC.

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## Configure Users



The screenshot shows the TLServer application window with the 'Administrator Login' dialog box open. The dialog box has the following fields and options:

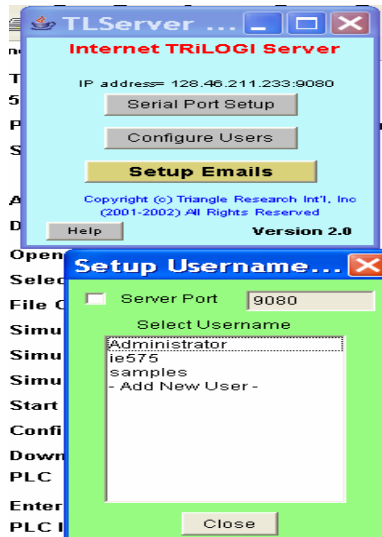
- Username: Administrator
- Password: [Empty field]
- Buttons: Cancel

Click Configure Users. You must be an administrator to enter a new user.

This is not for IE 575 students.

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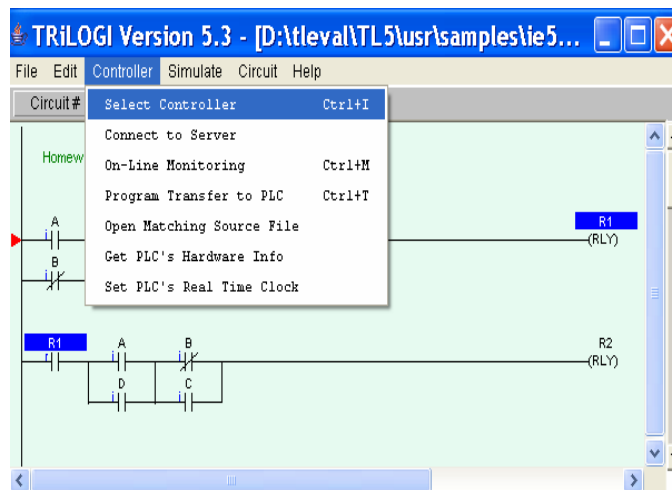
# Enter New User



Click –Add New User-  
to add new user.

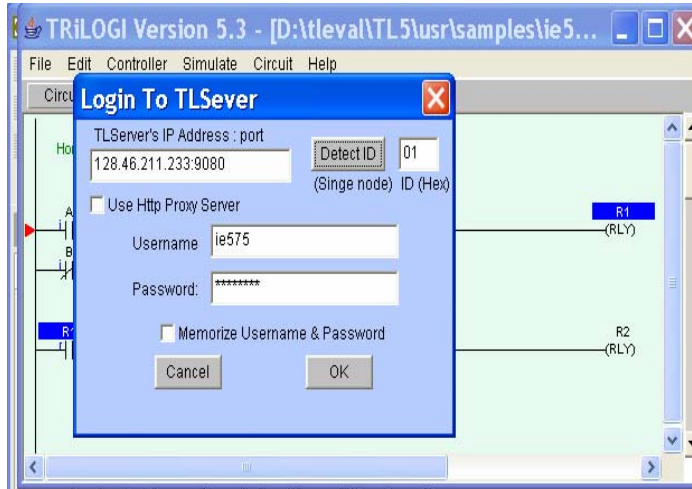
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# Download program to PLC – select PLC



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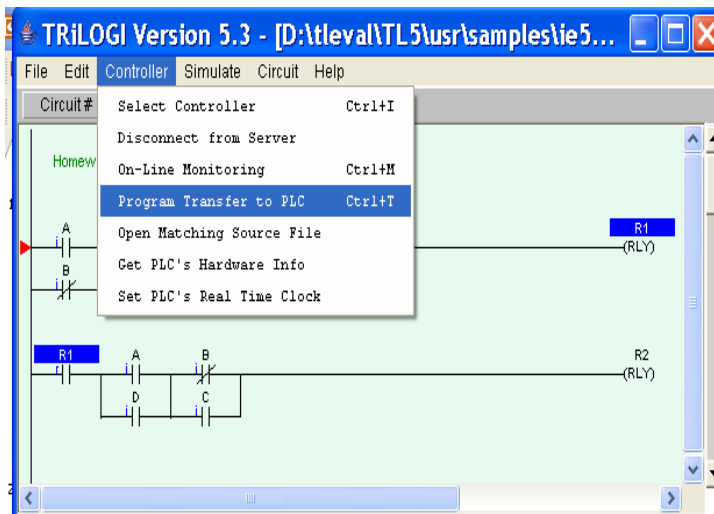
## Enter Username, Password and Select PLC ID



IE 575 students use ie575 and camclass as username and password.

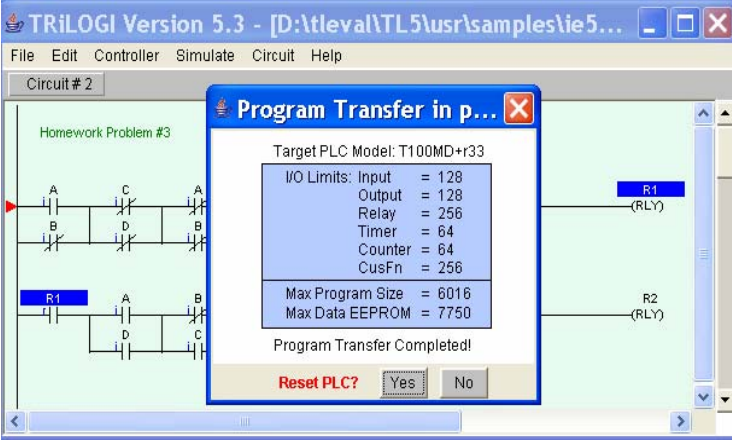
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## Program Transfer to PLC



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# Program Transfer



TRiLOGI Version 5.3 - [D:\tlevel\TL5\usr\samples\ie5...

File Edit Controller Simulate Circuit Help

Circuit # 2

Homework Problem #3

Program Transfer in p...

Target PLC Model: T100MD+r33

I/O Limits:	Input	= 128
	Output	= 128
	Relay	= 256
	Timer	= 64
	Counter	= 64
	CusFn	= 256

Max Program Size = 6016  
Max Data EEPROM = 7750

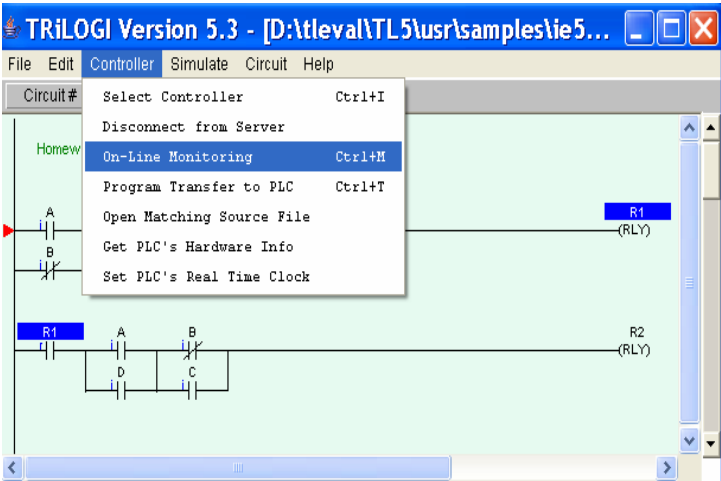
Program Transfer Completed!

Reset PLC? Yes No

R1 (RLY)  
R2 (RLY)

Click "Yes" on several questions and the program will be transferred. "Yes" on Reset PLC. 15

# On-Line Monitoring



TRiLOGI Version 5.3 - [D:\tlevel\TL5\usr\samples\ie5...

File Edit Controller Simulate Circuit Help

Circuit #

Select Controller Ctrl+I  
Disconnect from Server  
On-Line Monitoring Ctrl+M  
Program Transfer to PLC Ctrl+T  
Open Matching Source File  
Get PLC's Hardware Info  
Set PLC's Real Time Clock

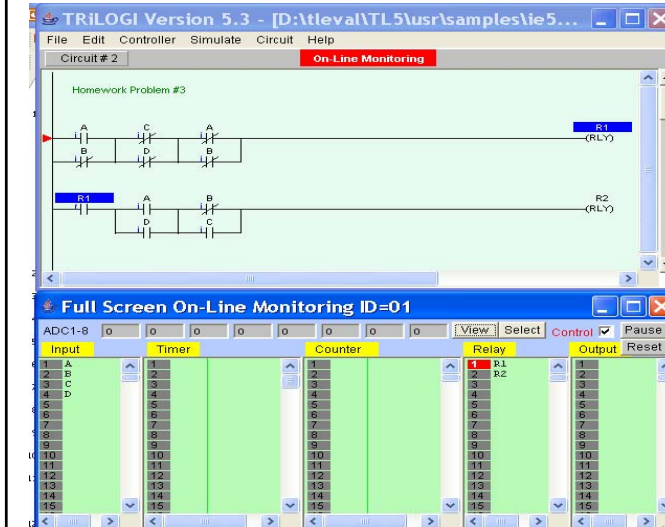
Homew

R1 (RLY)  
R2 (RLY)

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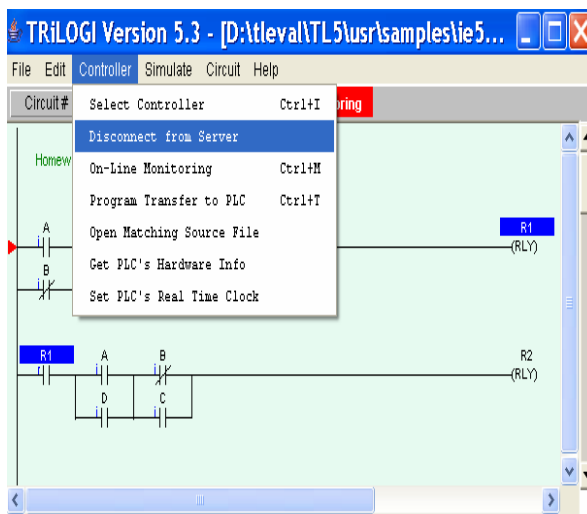
# On-Line Monitoring Window



You may not click on the input to change it. Only input at the PLC will be shown.

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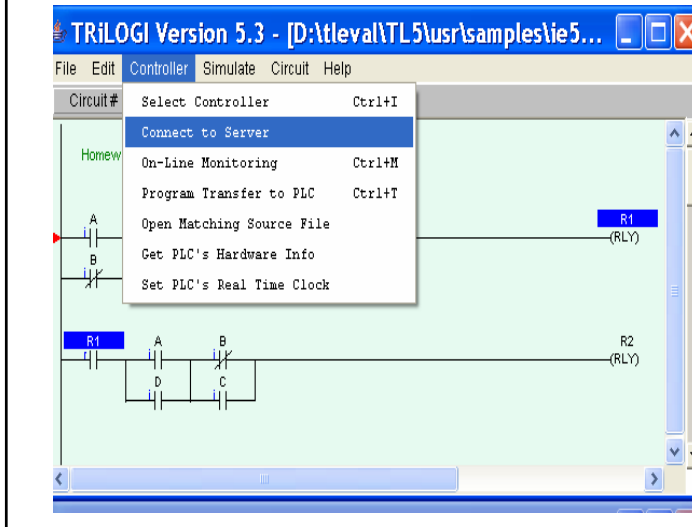
# Disconnect from Server



In order to link your TRILOGI window to a different PLC, you must disconnect it from the current PLC.

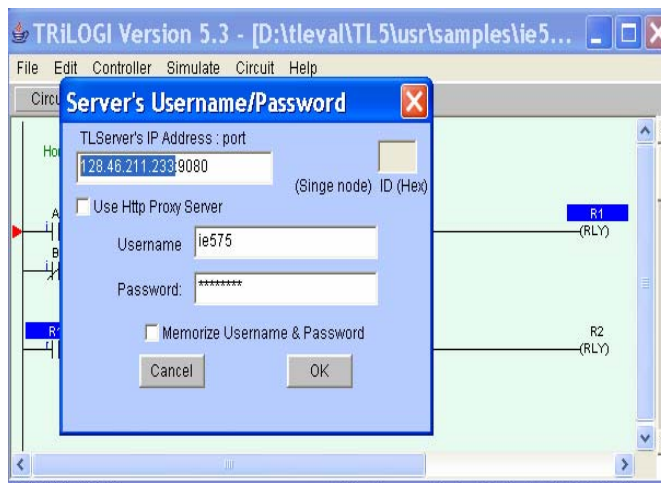
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## Connect to Server



In the previous example, the server was running on the local PC. You may connect to a server running on a remote PC (anywhere), as long as you have the username and password for the PLC and the IP address of the PC.

## New Server



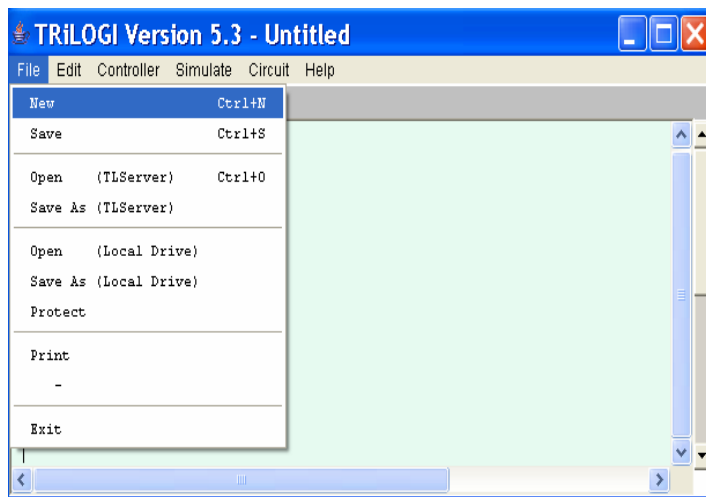
Change the server IP address.

## User New Server

- After the new server has been connected, treat it the same as the local server. No extra example will be given here.

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## Input New Program



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TRILOGI Version 5.3 - Untitled

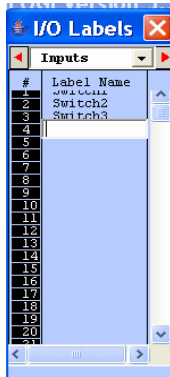
File Edit Controller Simulate Circuit Help

Abort Edit Circuit  
 Undo Ctrl+Z  
 Cut Circuit  
 Copy Circuit Ctrl+C  
 Paste Circuit Ctrl+V  
 Find Ctrl+F  
 Goto Ctrl+G  
**I/O Table F2**  
 View I/O Type on Ladder F3  
 Edit Custom Function F7  
 Clear Custom Function

You must define I/O table before you may insert new circuit (rung).

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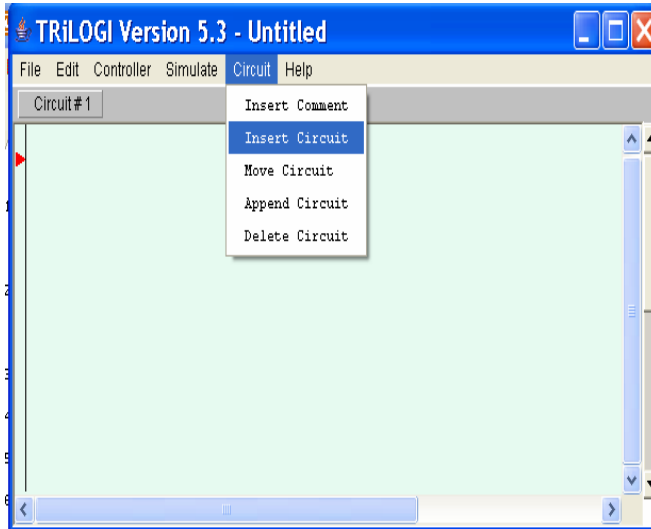
## I/O Table



Click the label name for Input # 1 to enter “Switch1”. Press “enter” to enter the name.

Click the > button to advance to “Output”, “Relay”, “Timer”, etc.

# Insert Circuit



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# Insert a Contact

The screenshot shows the TRILOGI Version 5.3 - Untitled application window. The 'I/O Labels' dialog box is open, displaying a list of inputs. The 'Inputs' tab is selected, and the list contains the following data:

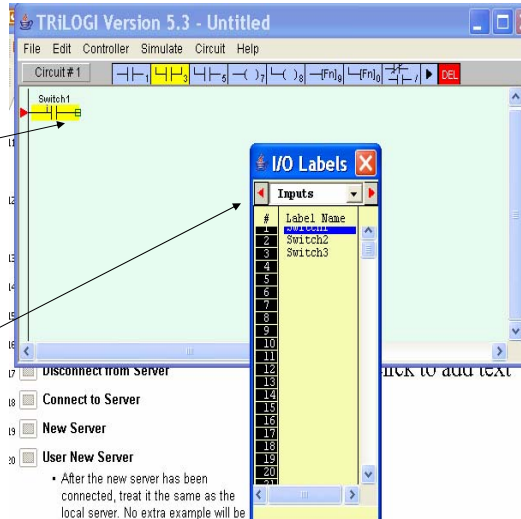
#	Label Name
1	Switch1
2	Switch2
3	Switch3
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	

Arrows point from the text 'Click contact, right click to select Normally Closed contact. Now choose the Input.' to a contact symbol on the workspace and the 'I/O Labels' dialog box. Below the workspace, there are several checkboxes: 'Disconnect from Server', 'Connect to Server', 'New Server', and 'User New Server'. A note below these checkboxes reads: 'After the new server has been connected, treat it the same as the'. The text 'CLICK TO ADD TEXT' is visible at the bottom right of the workspace.

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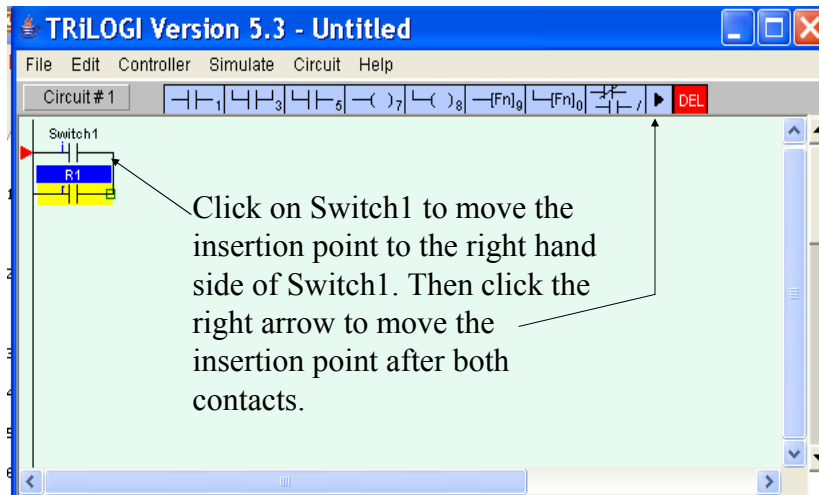
# “OR” and Contact

Insertion point is shown in a green box. After the “OR” contact is selected, choose a relay from the I/O table. Use the “>” or the pull down menu to select Relay.



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# Choose a Relay Contact



# New Insertion Point

TRILOGI Version 5.3 - [C:\Documents and Settings\Ted\Desktop\example1.PC5] - ...

File Edit Controller Simulate Circuit Help

Circuit # 1

Switch1  
R1

If the insertion point is not moved here the logic will be  $(\text{Switch1} * \text{Switch2}) + R1$ . When the insertion point is moved outside (solid yellow box) the logic becomes  $(\text{Switch1} + R1) * \text{Switch2}$

# Insert a Normally Closed Contact

TRILOGI Version 5.3 - [C:\Documents and Settings\Ted\Desktop\example1.PC5] - ...

File Edit Controller Simulate Circuit Help

Circuit # 1

Switch1  
R1  
Switch2

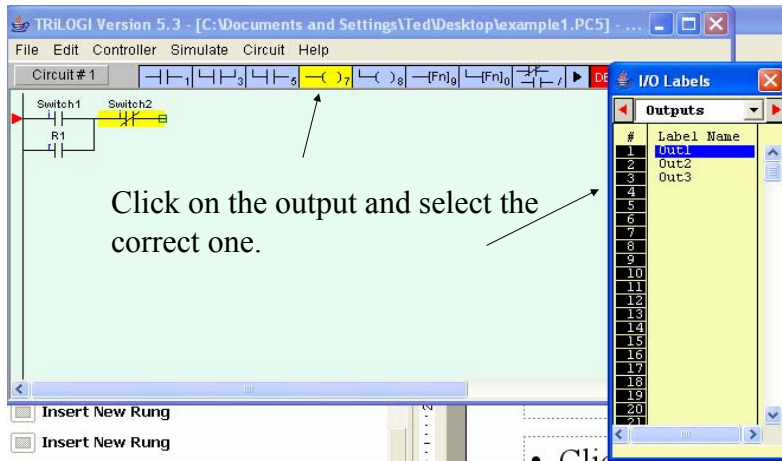
Right click contact and select the input.

I/O Labels

#	Label Name
1	Switch1
2	Switch2
3	Switch3
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	

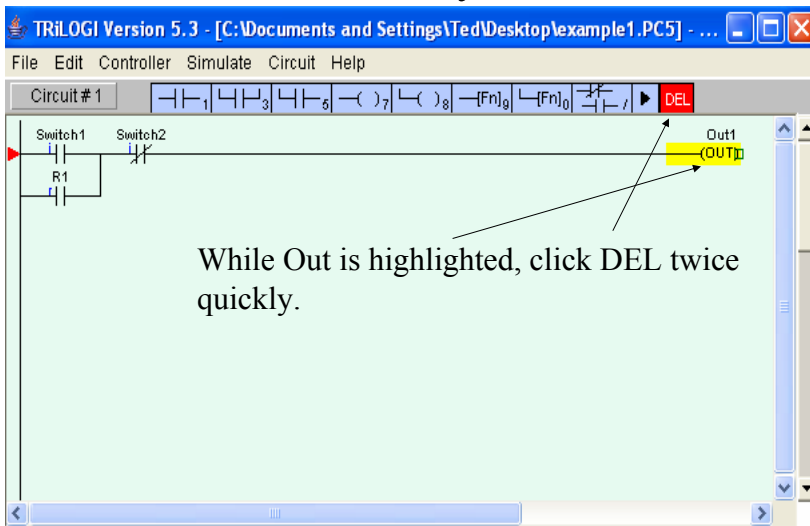
Insert New Rung  
Insert New Rung

## Add an Output



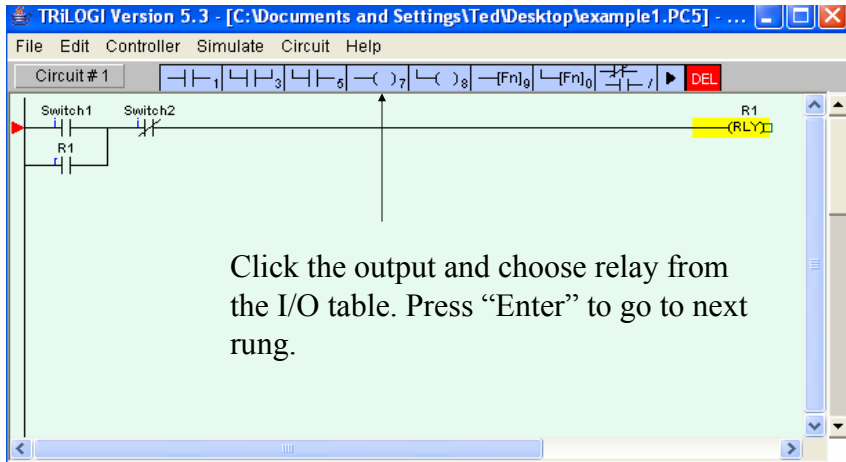
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## Delete the Output and Change to Relay



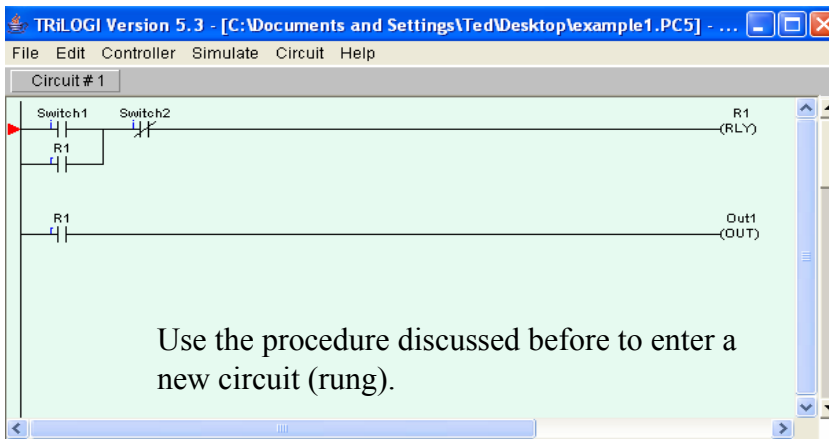


# Replace with Relay



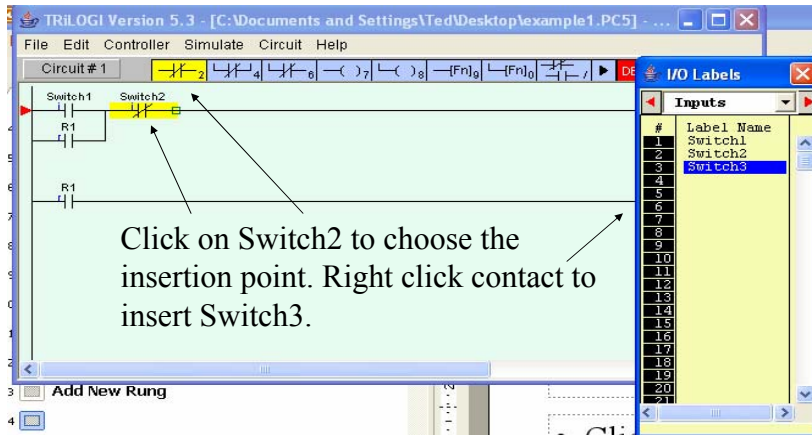
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# Add New Rung



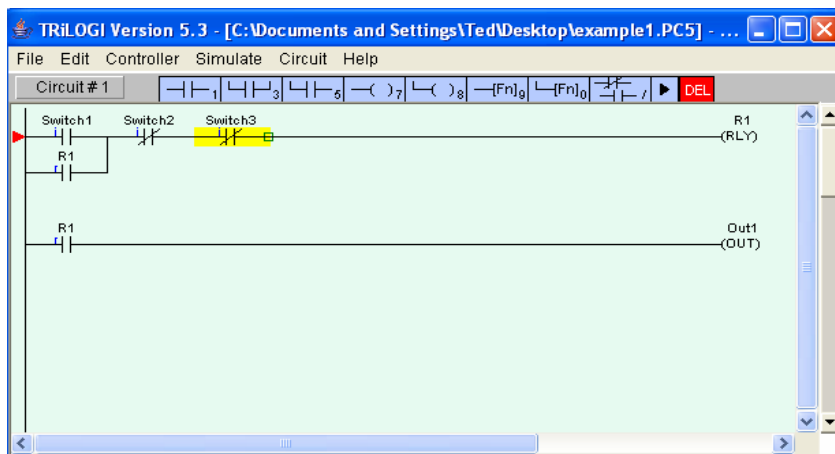
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# Insert a Contact



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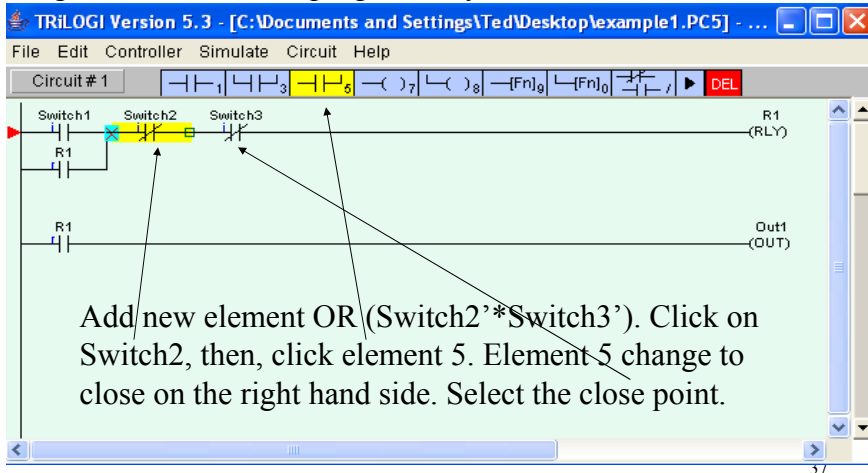
# Completed Ladder Diagram



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# Add OR Condition

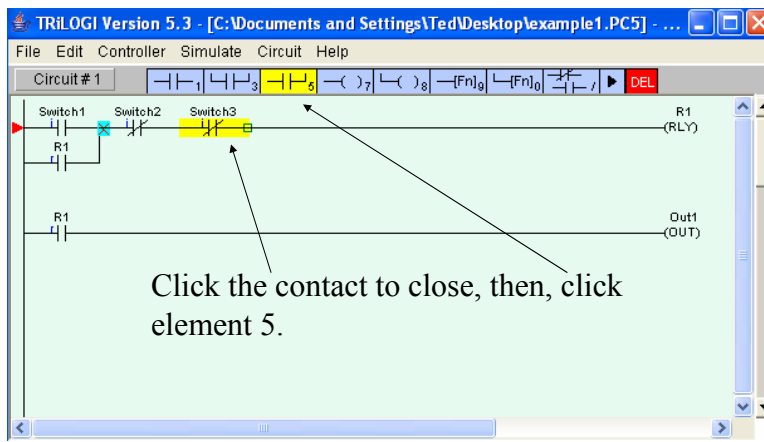
Following example is used to show how to edit the ladder diagram. The resultant program may not be correct.



The screenshot shows the TRILOGI software interface. The main workspace displays a ladder diagram with three rungs. The top rung contains three switches in series: Switch1, Switch2, and Switch3. Switch2 and Switch3 are highlighted in yellow. A red 'X' is visible on Switch2. The bottom rung contains a single switch labeled R1. The right side of the diagram shows a coil labeled R1 (RLY) and an output labeled Out1 (OUT). The software's menu bar includes File, Edit, Controller, Simulate, Circuit, and Help. The status bar at the bottom right shows the page number 37.

Add new element OR (Switch2'\*Switch3'). Click on Switch2, then, click element 5. Element 5 change to close on the right hand side. Select the close point.

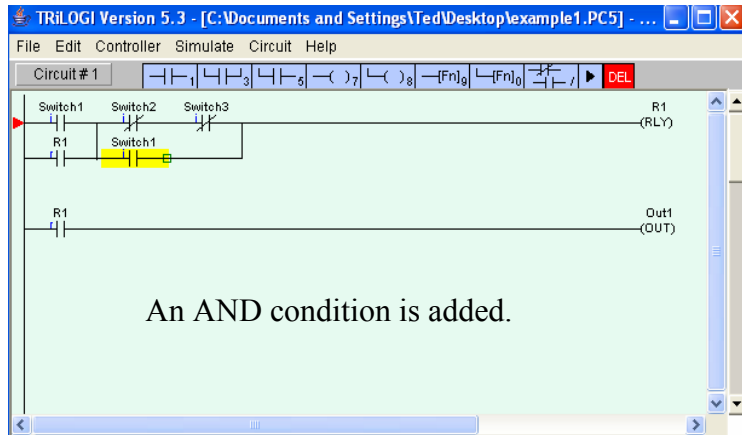
# Close the OR Logic



The screenshot shows the same TRILOGI software interface as the previous slide. The ladder diagram is identical, but the OR logic between Switch2 and Switch3 has been closed. The software's menu bar and status bar are the same as in the previous slide. The status bar at the bottom right shows the page number 38.

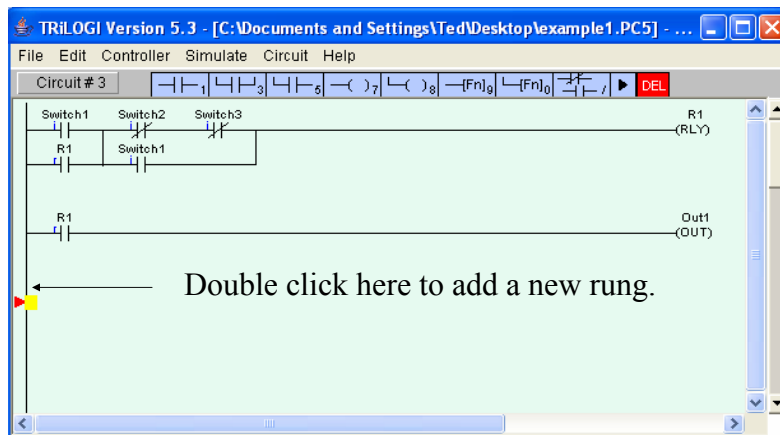
Click the contact to close, then, click element 5.

# New Element Complete



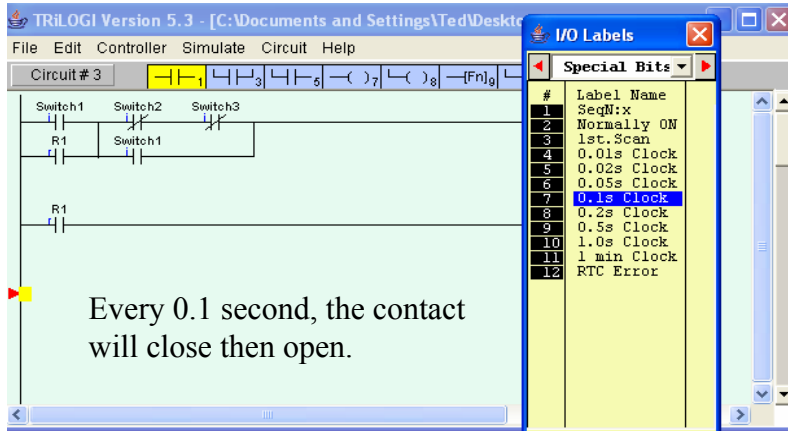
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# Insert Custom Function



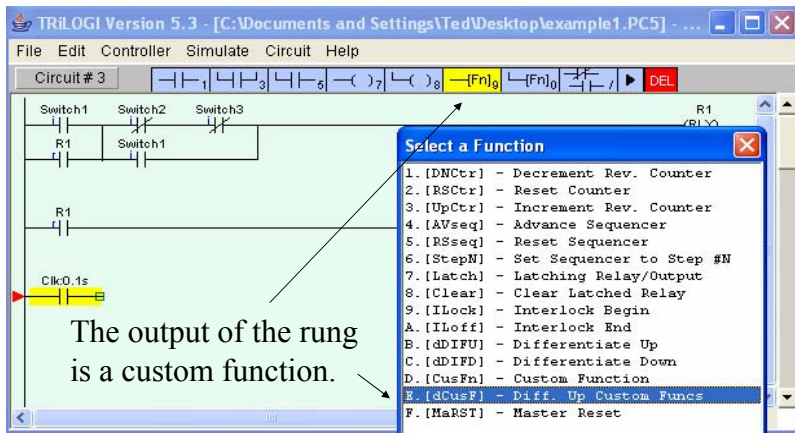
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# Add a Special Bit 0.1s Pulse



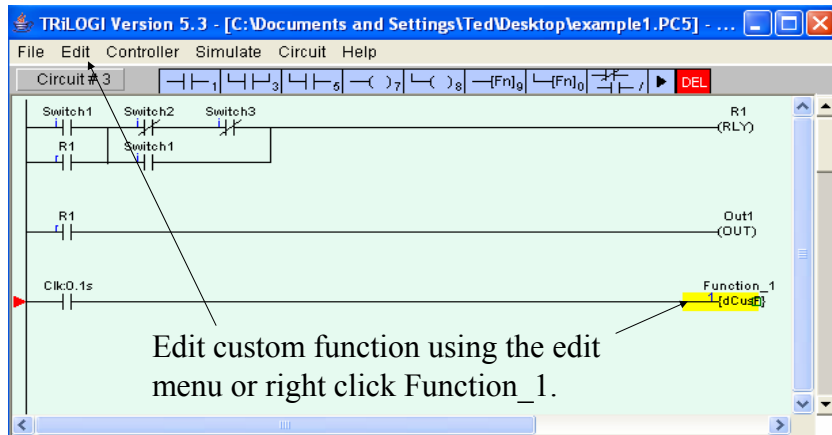
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# Select Custom Function



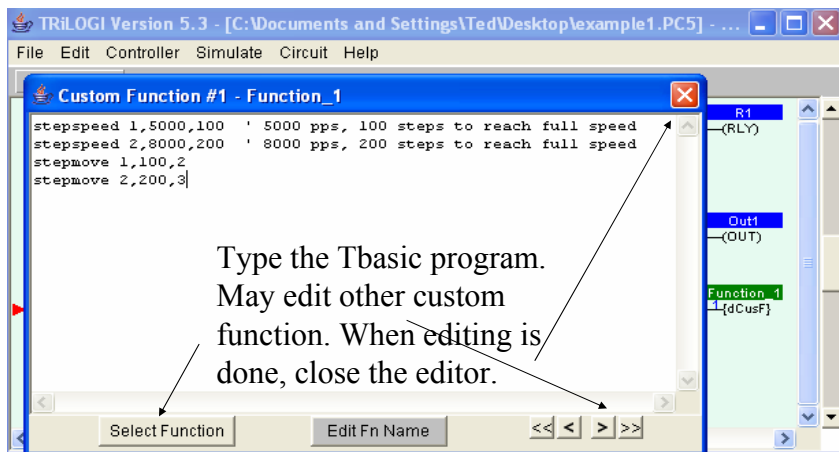
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# Select Delta Custom Function 1



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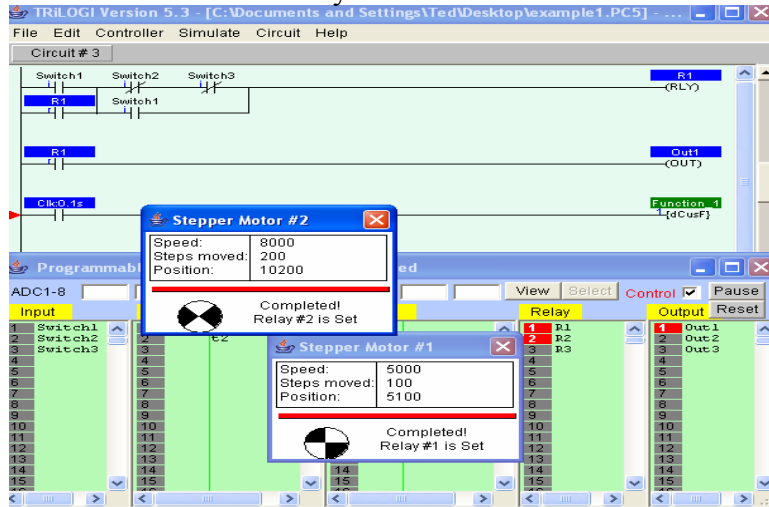
# Edit Custom Function



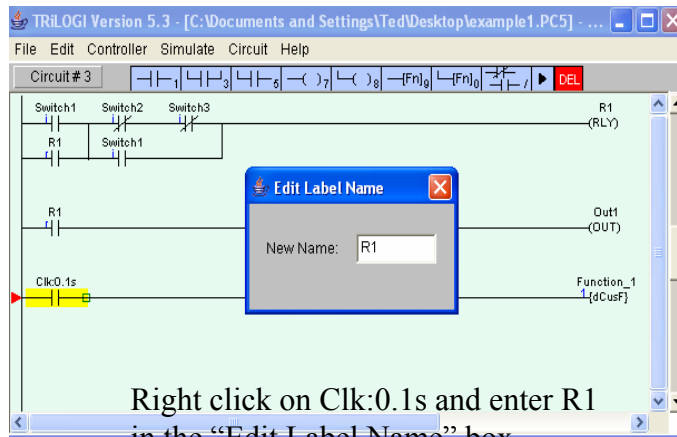
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# Simulate the Program

This program will run two stepper motors continuously. Since the function is called every 0.1 second.



# Replace the Clock with R1



# Simulate the Modified Program

