

Homework #2 ECE 461 / 661

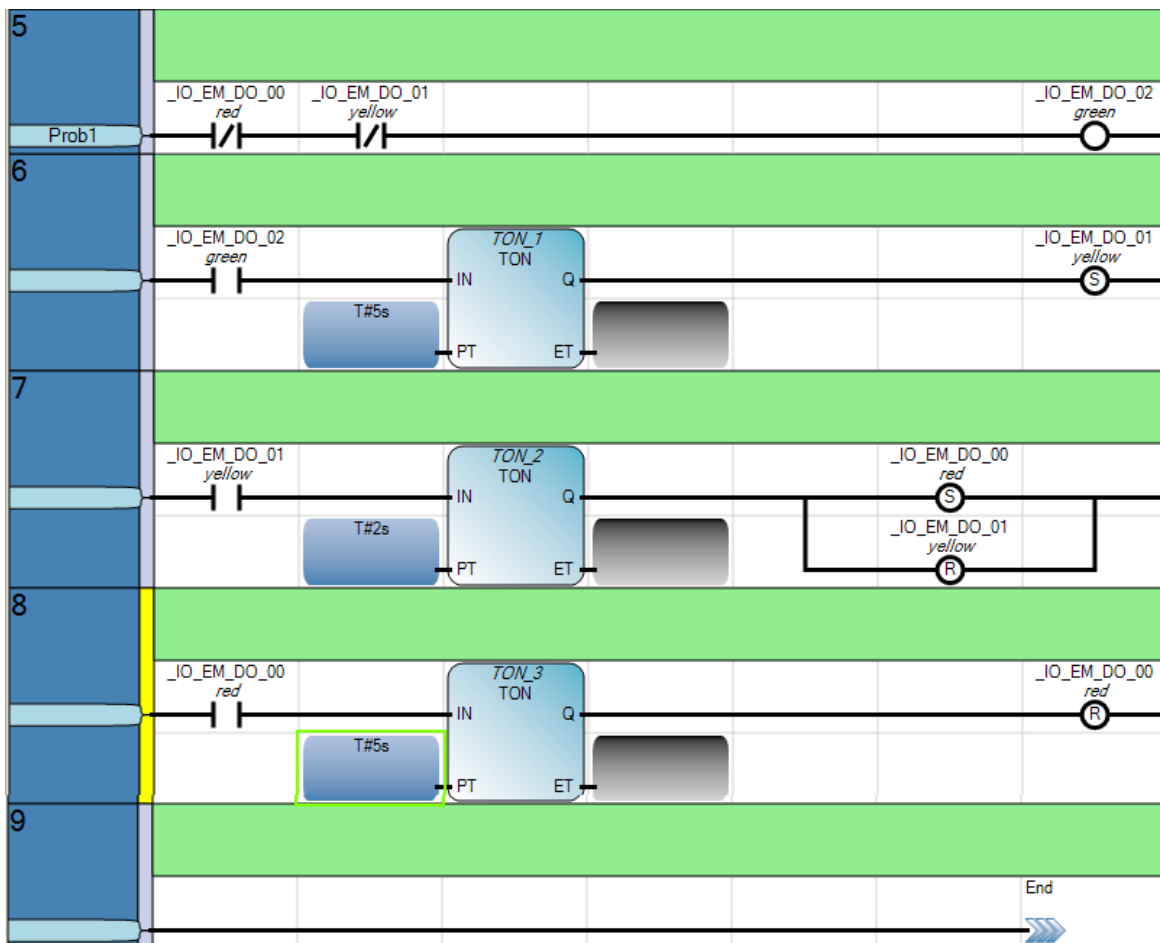
PLC, Timers, Counters - Due Wednesday, September 9th

Write a ladder-logic program for a stoplight with two functions:

- IN0: Normal Operation: Green for 5 seconds, yellow for 2 seconds, red for 5 seconds, and repeats.
- IN1: Flashing Yellow: Toggle the yellow light on and off, every one second, and
- IN2: Flashing Red: Toggle the red light on and off every one second

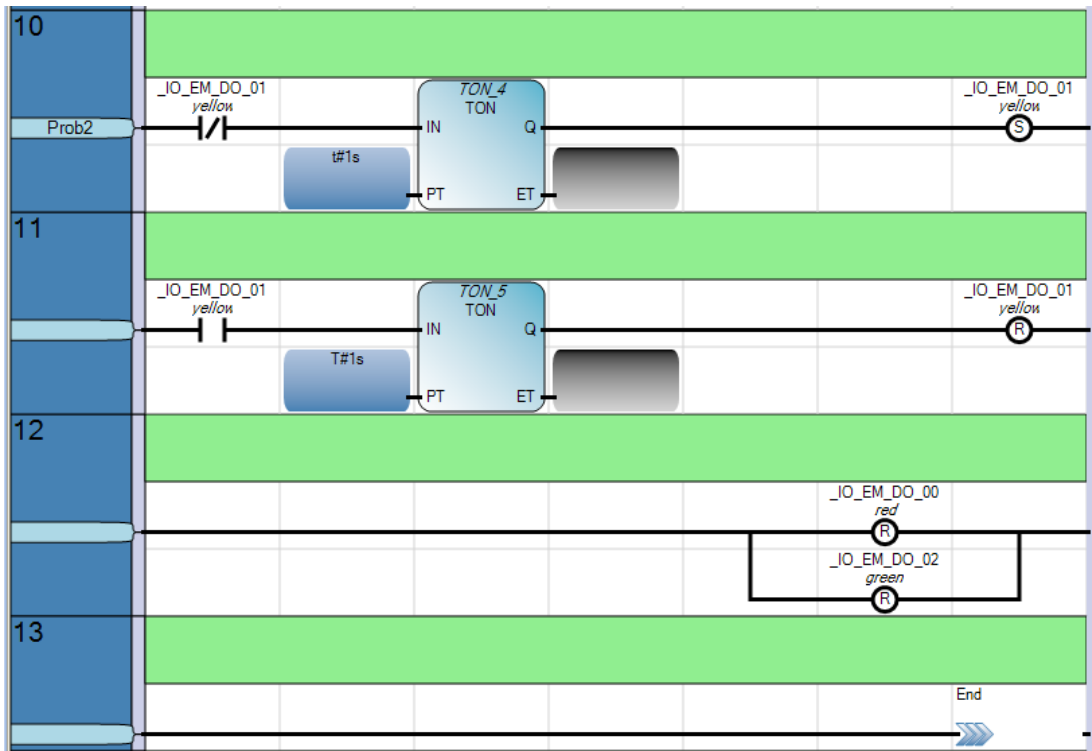
1) Write a ladder logic program for a stop-light, which cycles green / yellow / red as

- Green (5 seconds)
- Yellow (2 seconds)
- Red (5 seconds)

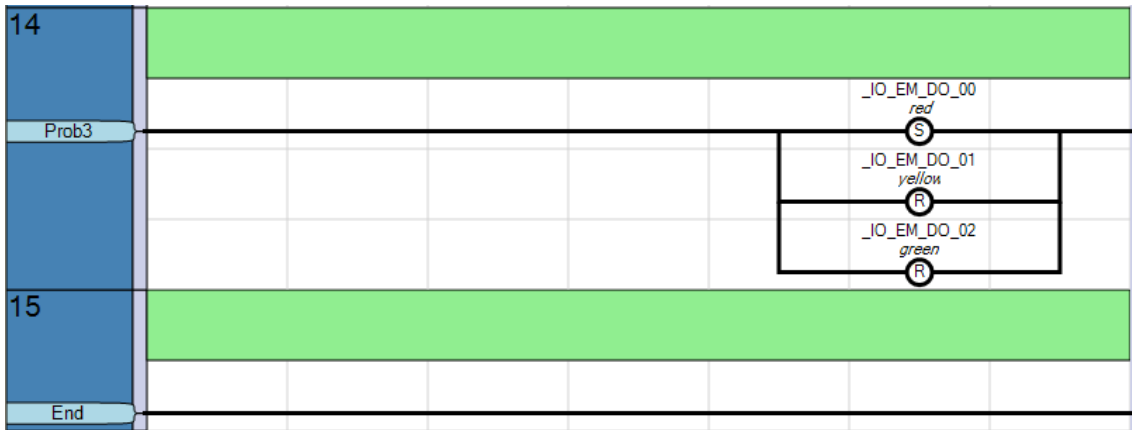


2) Write a ladder logic program which flashes the yellow light on and off every one seconds.

Note: This is a variation of an on/off switch I like better. You can control the on and off times with each timer and it only takes two rungs.



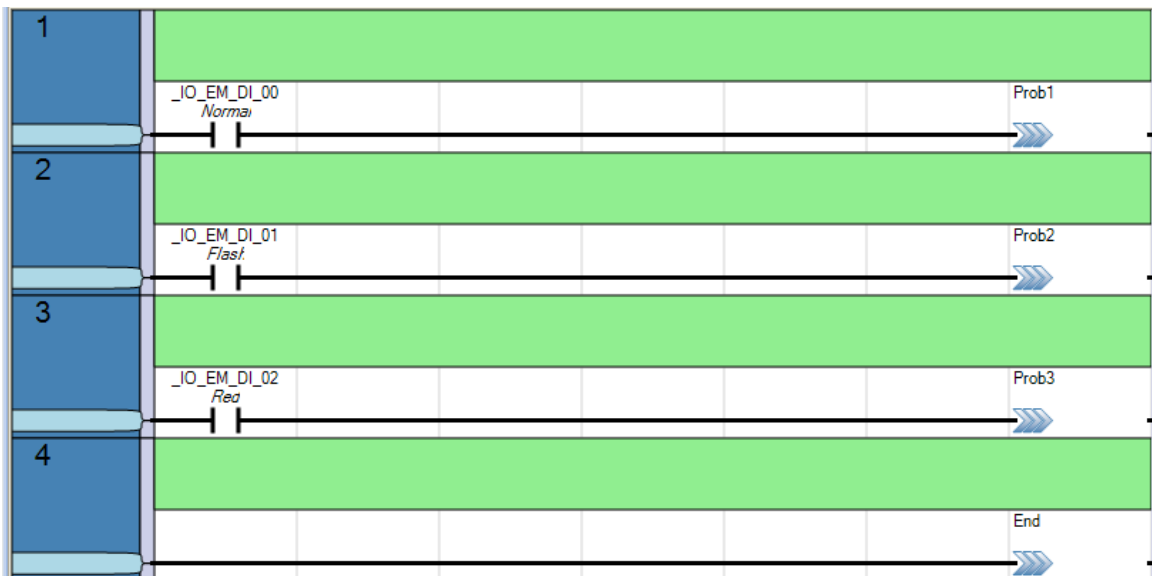
3) Write a ladder logic program which turns on the red light (pretty easy).



4) Combine the above three operations.

- When IN0 is pressed, the PLC goes into normal mode (problem 1)
- When IN1 is pressed, the PLC goes into flashing yellow mode (problem 2)
- When IN2 is pressed, the PLC goes into red mode (problem 3)

Assume the switches are on / off switches (like light switches) and are held on:



Lab (Friday)

5-6) Input your programs into Code Coposer (screen dump for homework)

7-8) Compile and download your program. Demo to the instructor or take a video of your working PLC and show the video to the instructor. (Youtube works)

BONUS! The Citizen's United ruling by the Supreme Court stated that companies are people and are protected by the 1st amendment to the constitution (freedom of speech). Assume that companies are in fact people and protected by all 27 amendments to the constitution.

Explain what the implications are for applying one of the other 26 amendments to companies, treating companies as people.

2	(1791) The right to bear arms	Corporations can raise standing armies (?) or have their own arms stockpiles (?)
3	(1791) No quartering of troops in peacetime	
4	(1791) Guards against unreasonable searches and seizures	
5	(1791) The right to due process and no double jeopardy	Once a company is sued, it cannot be sued again for the same 'crime'?
6	(1791) The right to a fair and speedy trial	
7	(1791) Right to a jury trial for criminal and some civil cases	
8	(1791) Prohibits excessive bail and no unusual punishment	
9	(1791) Addresses our unenumerated rights	
10	(1791) Federal powers are not stated in the Constitution are reserved for the states	
11	(1795) Any state can be sued by a U.S. citizen	Any company can sue a state?
12	(1804) Changes in electoral college procedures	
13	(1865) Abolishes and prohibits slavery	Buying and selling companies is illegal? The stock market is illegal?
14	(1868) Citizenship due process equal protection	Companies cannot be do to race, color, creed, or national origin
15	(1870) U.S. cannot prevent a person from voting because of race, color, or creed	
16	(1913) Congress is given the power to tax incomes	
17	(1913) The direct election of senators	
18	(1919) Prohibition of liquor	No alcohol on NDSU property.
19	(1920) Women gain the right to vote	Female companies can vote too.
20	(1933) Procedures for outgoing president and the new president coming in	
21	(1933) Repeal of prohibition (18th Amendment)	Never mind....
22	(1951) Limit on presidential terms	
23	(1961) District of Columbia receives electoral votes	
24	(1964) Prohibits federal and state governments from charging poll tax	
25	(1967) Presidential succession and presidential disability	
26	(1971) 18 year olds gain the right to vote	Companies which were founded 18 years ago can vote? How many votes does IBM get?
27	(1992) Any change in congressional salaries takes place after the general election	