

# Traffic Light Circuit

Group project 3#

CPIT210 | Prof. Md Abdulhamid

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# Content:

- Introduction
- The integrated circuit used
- How the integrated circuits work



# Introduction:

This circuit is used to control traffic a four way traffic light control system, so it makes each traffic light work when it's needed to be green or yellow and when it's not.



# Integrated circuits:

- 74193 IC - Presentable 4-bit binary up/down counter.
- 74175 IC - Quad D flip-flop
- 74151 IC – 8-Input Multiplexer
- 74138 IC – 3-to-8 Decoder
- 74139 IC – 2-to-4 Decoder



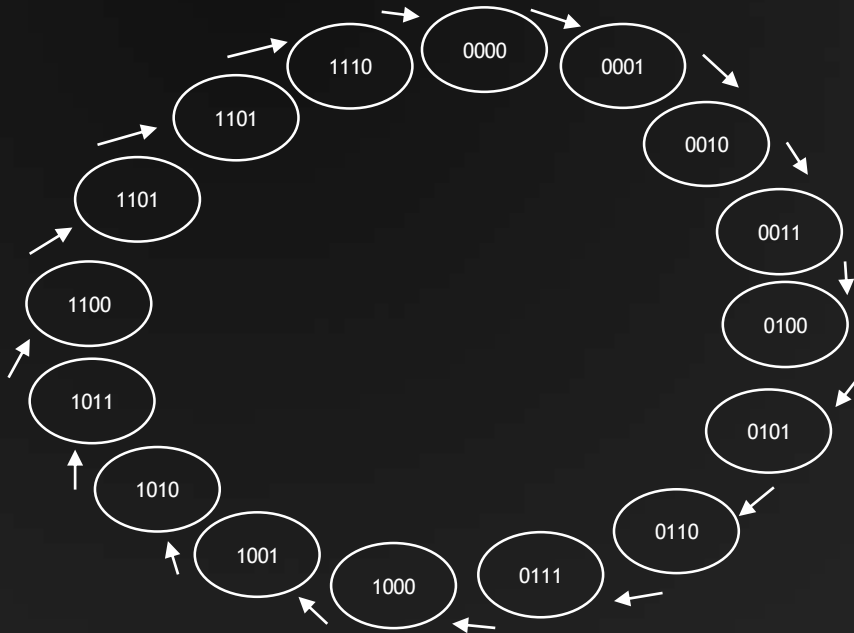
# How the integrated circuits work:

- 74193 IC - Presentable 4-bit binary up/down counter.
- The 74193 is an UP/DOWN MODULO-16 Binary Counter. Separate Count Up and Count Down Clocks are used and in either counting mode the circuits operate synchronously. The outputs change state synchronous with the LOW-to-HIGH transitions on the clock inputs.  
Separate Terminal Count Up and Terminal Count Down outputs are provided which are used as the clocks for a subsequent stages without extra logic, thus simplifying multistage counter designs. Individual present inputs allow the circuits to be used as programmable counters. Both the Load and the Reset (R) inputs asynchronously override the clocks.



# How the integrated circuits work:

- 74193 IC - Presentable 4-bit binary up/down counter.
- State Diagram:



# How the integrated circuits work:

- 74193 IC - Presentable 4-bit binary up/down counter.

- Transition Table:

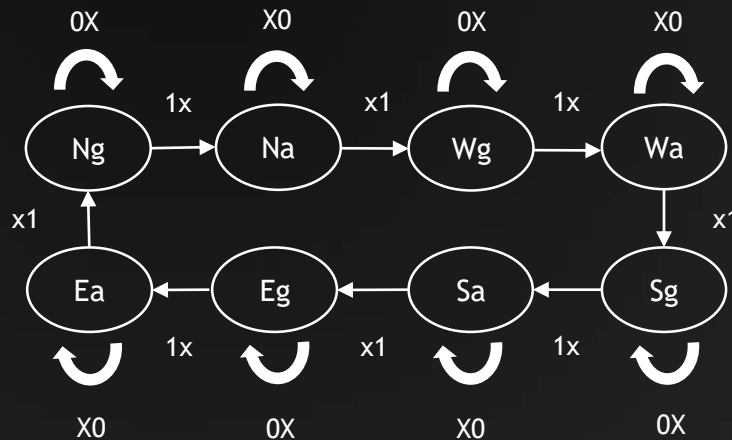
Input		Current State			Next State		
T <sub>0</sub>	T <sub>A</sub>	Q <sub>2</sub>	Q <sub>1</sub>	Q <sub>0</sub>	Q <sub>2</sub> <sup>+</sup>	Q <sub>1</sub> <sup>+</sup>	Q <sub>0</sub> <sup>+</sup>
0	x	0	0	0	0	0	0
1	x	0	0	0	0	0	1
x	0	0	0	1	0	0	1
x	1	0	0	1	0	1	0
0	x	0	1	0	0	1	0
1	x	0	1	0	0	1	1
x	0	0	1	1	0	1	1
x	1	0	1	1	1	0	0
0	x	1	0	0	1	0	0
1	x	1	0	0	1	0	1
x	0	1	0	1	1	0	1
x	1	1	0	1	1	1	0
0	x	1	1	0	1	1	0
1	x	1	1	0	1	1	1
x	0	1	1	1	1	1	1
x	1	1	1	0	0	0	0





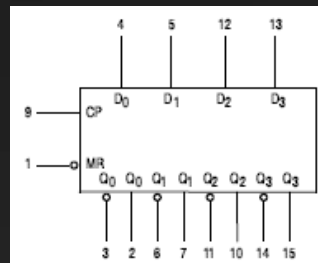
# How the integrated circuits work:

- 74193 IC - Presentable 4-bit binary up/down counter.
- State diagram for finite state machine :



# How the integrated circuits work:

- 74175 IC - Quad D flip-flop.
- The 74175 is a high speed Quad D Flip-Flop. The device is useful for general flip-flop requirements where clock and clear inputs are common. The information on the D inputs is stored during the LOW to HIGH clock transition. Both true and complemented outputs of each flip-flop are provided. A Reset input resets all flip-flops, independent of the Clock or D inputs, when LOW.

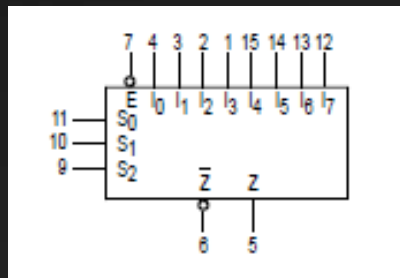


Logic symbol



# How the integrated circuits work:

- 74151 IC – 8-Input Multiplexer.
- The 74151 is a high speed 8-input Digital Multiplexer. It provides, in one package, the ability to select one bit of data from up to eight sources. The 74151 can be used as a universal function generator to generate any logic function of four variables. Both assertion and negation outputs are provided.



Logic symbol



# How the integrated circuits work:

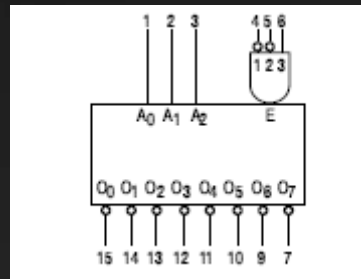
- 74151 IC – 8-Input Multiplexer.
- Traffic light control Table :

Current State			output							
			North		West		South		East	
Q <sub>2</sub>	Q <sub>1</sub>	Q <sub>0</sub>	B	A	B	A	B	A	B	A
0	0	0	1	0	0	0	0	0	0	0
0	0	1	0	1	0	0	0	0	0	0
0	1	0	0	0	1	0	0	0	0	0
0	1	1	0	0	0	1	0	0	0	0
1	0	0	0	0	0	0	1	0	0	0
1	0	1	0	0	0	0	0	1	0	0
1	1	0	0	0	0	0	0	0	1	0
1	1	1	0	0	0	0	0	0	0	1



# How the integrated circuits work:

- 74138 IC – 3-to-8 Decoder.
- The 74138 is a high speed 3-of-8 Decoder/Demultiplexer. This device is ideally suited for high speed bipolar memory chip select address decoding. The multiple input enables allow parallel expansion to a 1-of-24 decoder using just three 74138 devices or to a 1-of-32 decoder using four 74138 and one inverter.

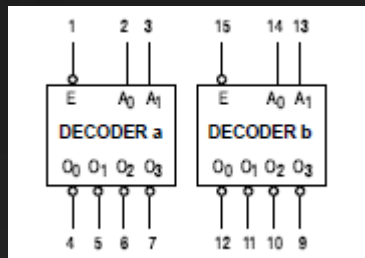


Logic symbol



# How the integrated circuits work:

- 74139 IC – 2-to-4 Decoder.
- The 74139 is a high speed 2-of-4 Decoder/Demultiplexer. The device has two independent decoders, each accepting two inputs and providing four mutually exclusive active LOW Outputs. Each decoder has an active LOW Enable input which can be used as a data input for a 4-output demultiplexer. Each half of the 74139 can be used as a function generator providing all four minterms of two variables.



Logic symbol



# Thank you

