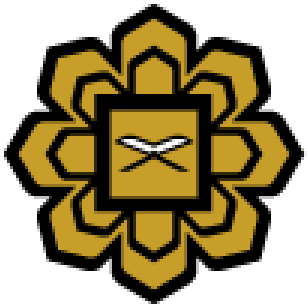


الجامعة الإسلامية العالمية ماليزيا
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
يونيورسيتي إسلام انتارابغسا ملايسيا

Digital Systems and Microprocessor (MCTE 2332)

Semester I, 2020/2021

DIGITAL LOGIC DESIGN PROJECT:

TWO WAYS TRAFFIC LIGHT WITH PEDESTRIAN CROSSING SIGNAL

NAME: MUHAMMAD LUQMAN NUR HAKIM BIN ADENAN

MATRIC NUMBER: 1913445

Section 1

INSTRUCTOR'S NAME: MADAM HAZLINA BINTI MD. YUSOF

SIR YASIR BIN MOHD. MUSTAFAH

GOAL OF THE PROJECT

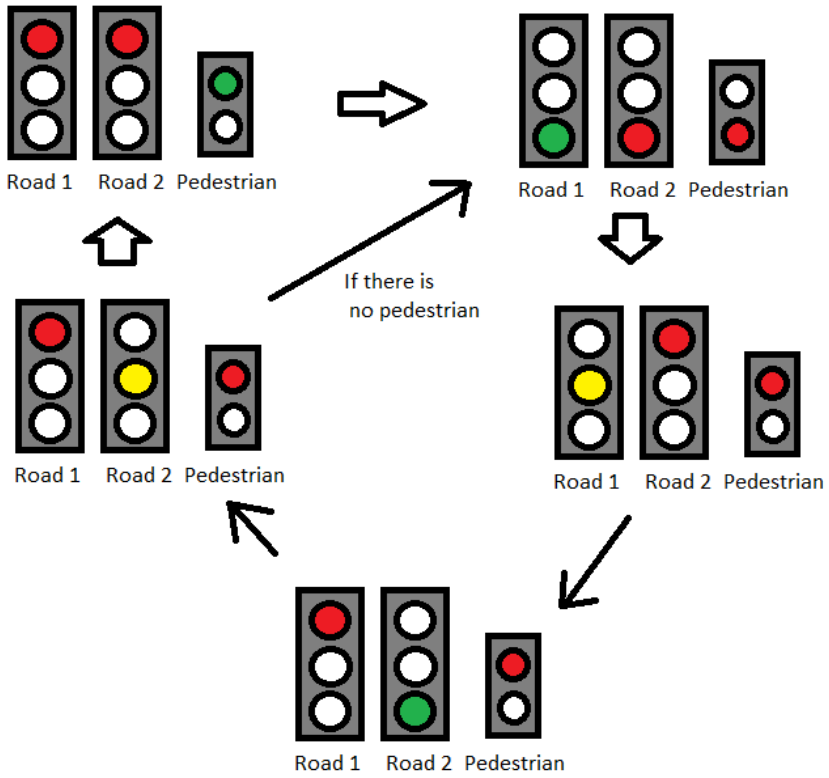
According to the statistical data from Road Transport Department Malaysia, pedestrian accidents in Malaysia the third ranked highest road accident deaths with average number of pedestrians killed per year are 562 persons. Some of the death courses by Hit and run accident, crossing busy road and jaywalking. From this data, I come up with some ideas to help the pedestrian and to minimize the road accidents. The idea is I want to develop a trafiic light with pedestrian light for both ways of the road at the area where mostly the pedestrians want to cross the road. This Idea also can maintain the safety of the vehicle's drivers and pedestrian.

Generally, we know that there are three universal standard colour of traffic lights which are red, yellow and green while there are two colours for pedestrian signal which are red and green. Red light indicates the vehicles to stop before the stopping line while the green light indicates the vehicles to move. Next, yellow light indicates to give alert to the driver to slow down the vehicle and ready to stop the vehicle. Furthermore, for the pedestrian light, green light indicates the pedestrians to cross the road while red light to stop the pedestrian from crossing the road.

DESIGN PROCESS

The idea of the design is there are two driffent ways of the car movement and crossing way for the pedestrian to cross the road.

The Traffic Light Function design:

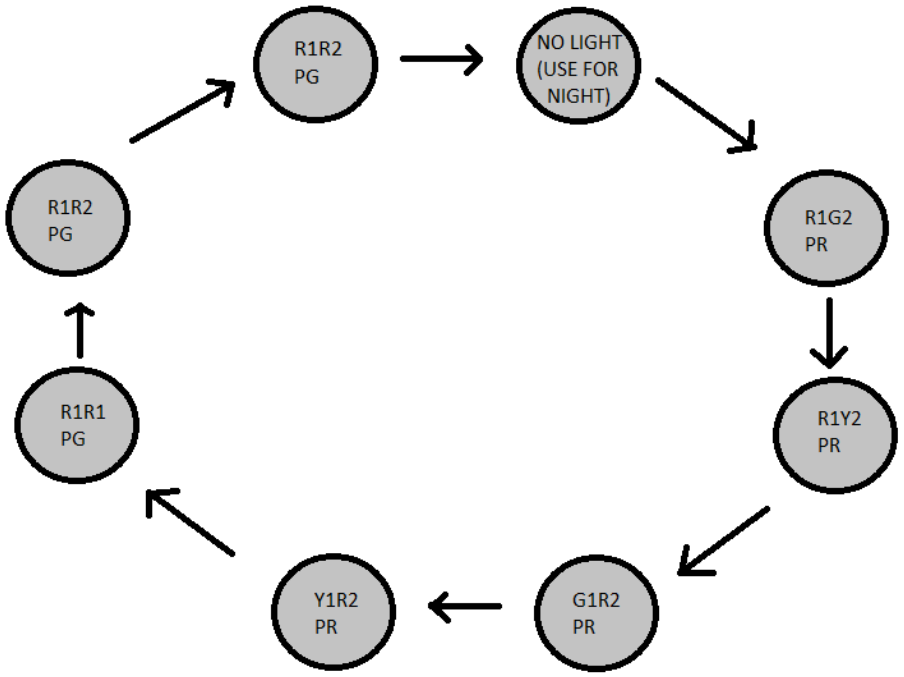


The term I will used for both of the road light and pedestrian light is:

Light Status	Short Form
Red light for the road 1	R1
Yellow light for the road 1	Y1
Green light for the road 1	G1
Red light for the road	R2
Yellow light for the road	Y2
Green light for the road	G2
Red light for the pedestrian to cross	PR
Green light for the pedestrian to cross	PG

DETAILED DESIGN

State Diagram :



Assign the 3-bit binary number:

State	Q2	Q1	Q0	Light State
1	0	0	0	R1 R2 PG
2	0	0	1	No Light (Use during the late night (3am-5am))
3	0	1	0	R1 G2 PR
4	0	1	1	R1 Y2 PR
5	1	0	0	G1 R2 PR
6	1	0	1	Y1 R2 PR
7	1	1	0	R1 R2 PG
8	1	1	1	R1 R2 PG

The Table State:

STATES	INPUT	Q2	Q1	Q0	R1	Y1	G1	R2	Y2	G2	PR	PG
1	0	0	0	0	1	0	0	1	0	0	0	1
2	0	0	0	1	0	0	0	0	0	0	1	0
3	1	0	1	0	1	0	0	0	0	1	1	0
4	1	0	1	1	1	0	0	0	1	0	1	0
5	1	1	0	0	0	0	1	1	0	0	1	0
6	1	1	0	1	0	1	0	1	0	0	1	0
7*	X	1	1	0	1	0	0	1	0	0	0	1
8*	X	1	1	1	1	0	0	1	0	0	0	1

The other two states, binary 110 and 111 will be ignore as it will return to 000 states, red light for both traffic lights .The equation from the output:

R1 =((Q2 Q1’ Q0’)+(Q2 Q1’ Q0))’

Y1 =Q2 Q1’ Q0

G1= Q2 Q1’ Q0’

R2= ((Q2’ Q1’ Q0) + (Q2’ Q1 Q0’))’

Y2= Q2’ Q1 Q0’

G2= Q2’ Q1’ Q0

PR=R1 • R2

PG= R1 • R2

The filp flop in this system is used is: **JK flip flop**

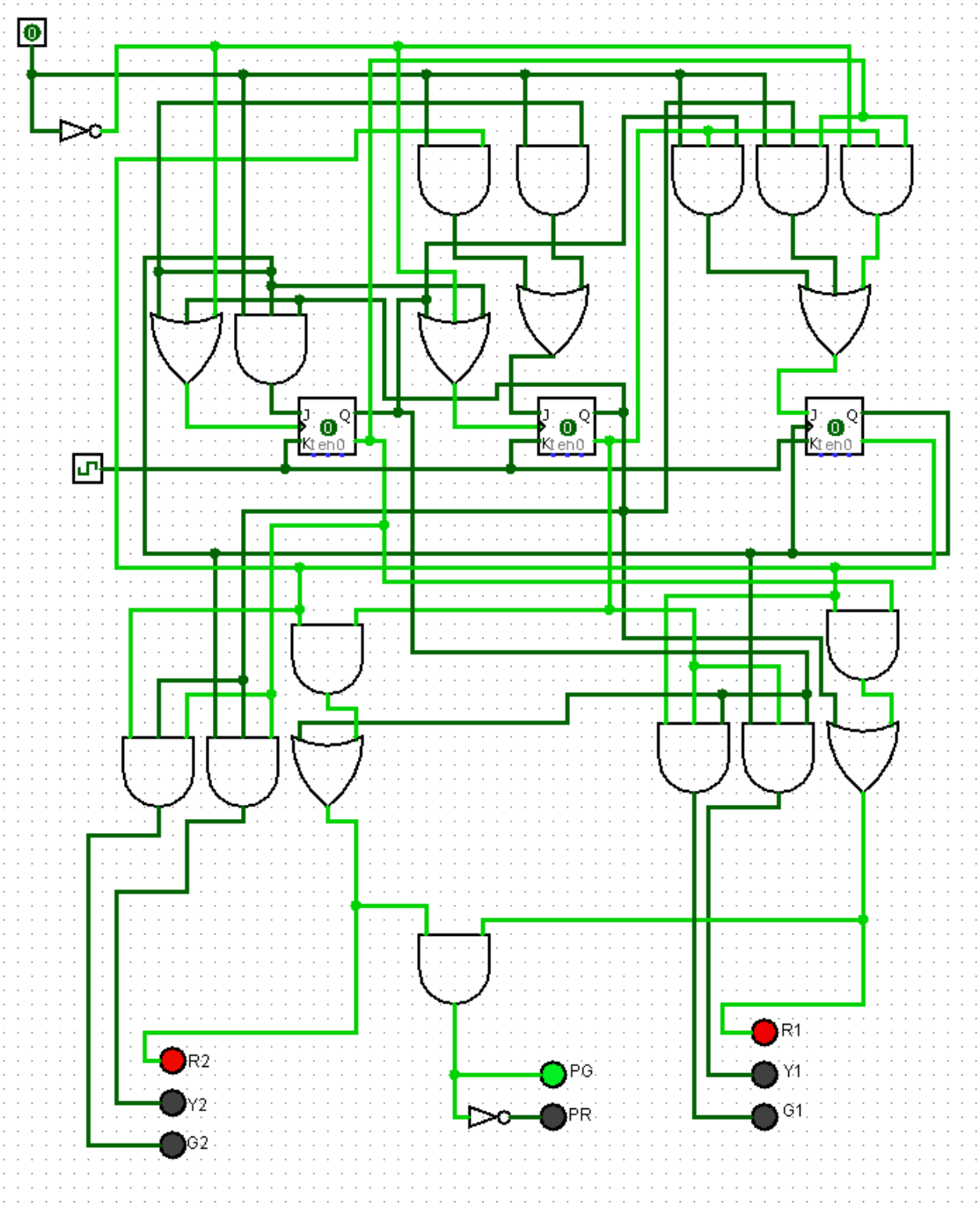
The Truth Table for the JK Function

	Clock	Input		Output		Description
	Clk	J	K	Q	$\overline{Q}$	
same as for the SR Latch	X	0	0	1	0	Memory no change
	X	0	0	0	1	
	¯↓_	0	1	1	0	Reset Q » 0
	X	0	1	0	1	
	¯↓_	1	0	0	1	Set Q » 1
	X	1	0	1	0	
toggle action	¯↓_	1	1	0	1	Toggle
	¯↓_	1	1	1	0	

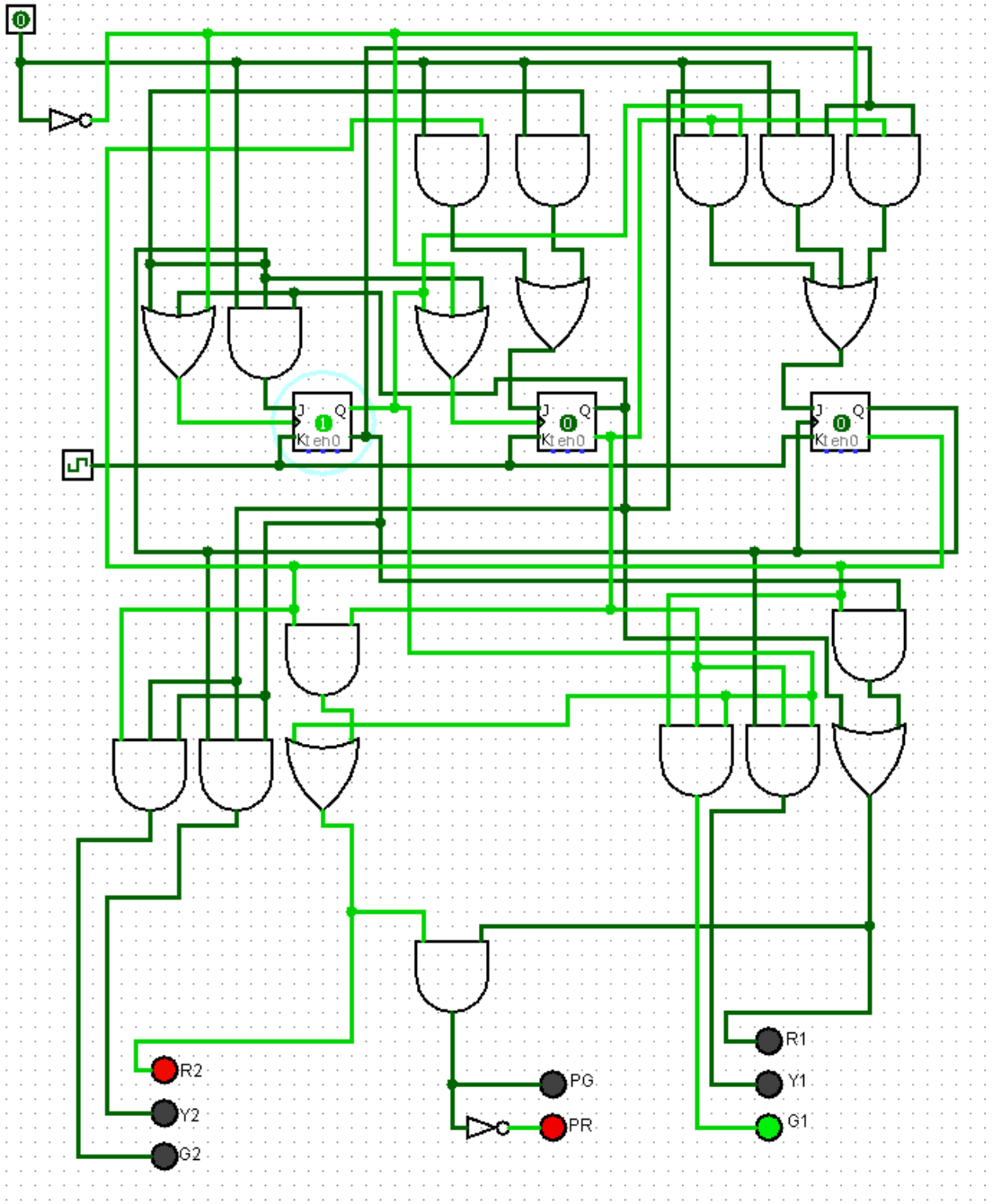
Figure 1 from electronics-tuturiols.ws

DESIGN VERIFICATION

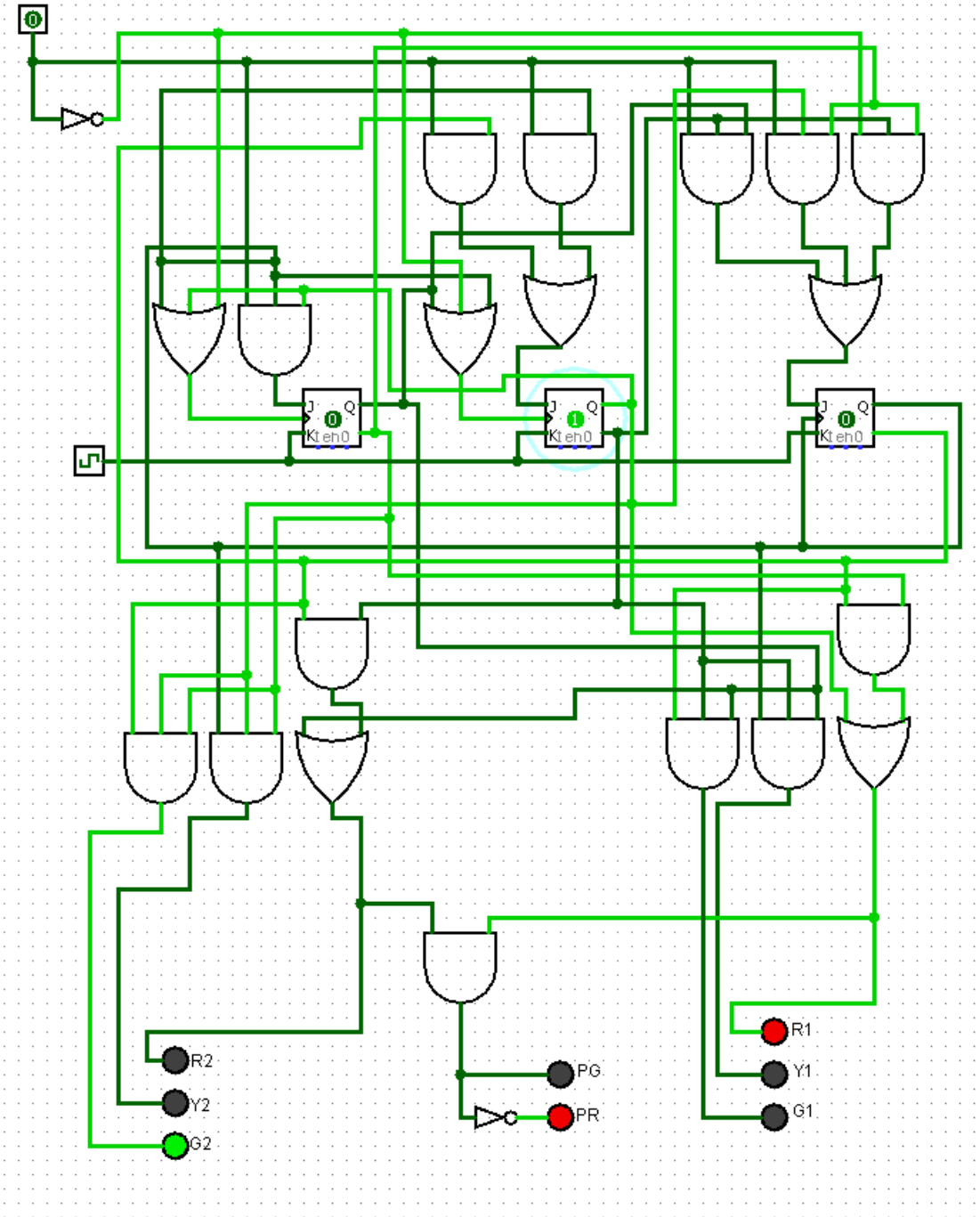
When both traffic signal light (R1 and R2) is red, the pedestrian (PG) will turn to green. Thus, the pedestrian can cross the road safely.



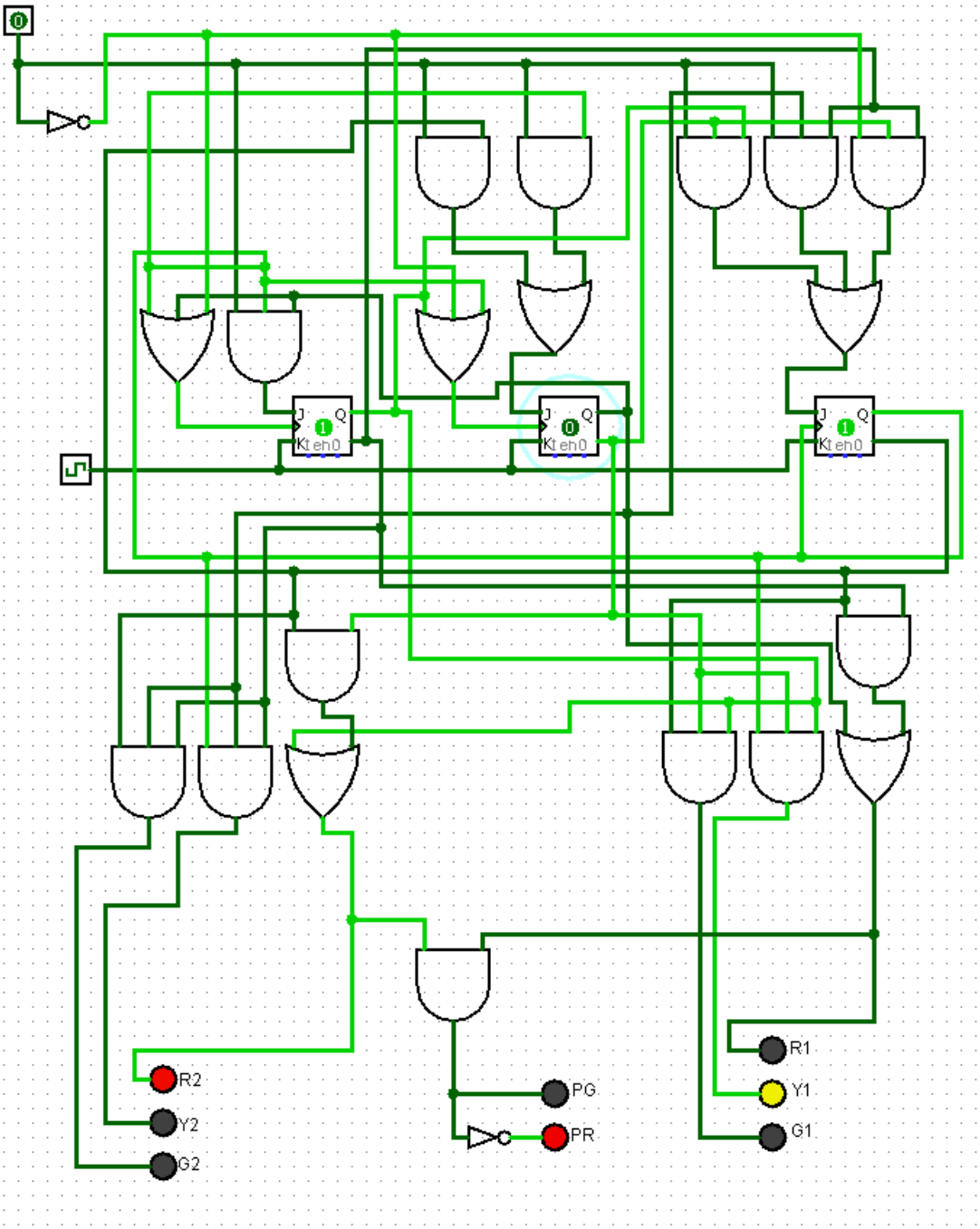
If green light for road 1 (G1), both light of road 2 (R2) and pedestrian light (PR) will turn to red.



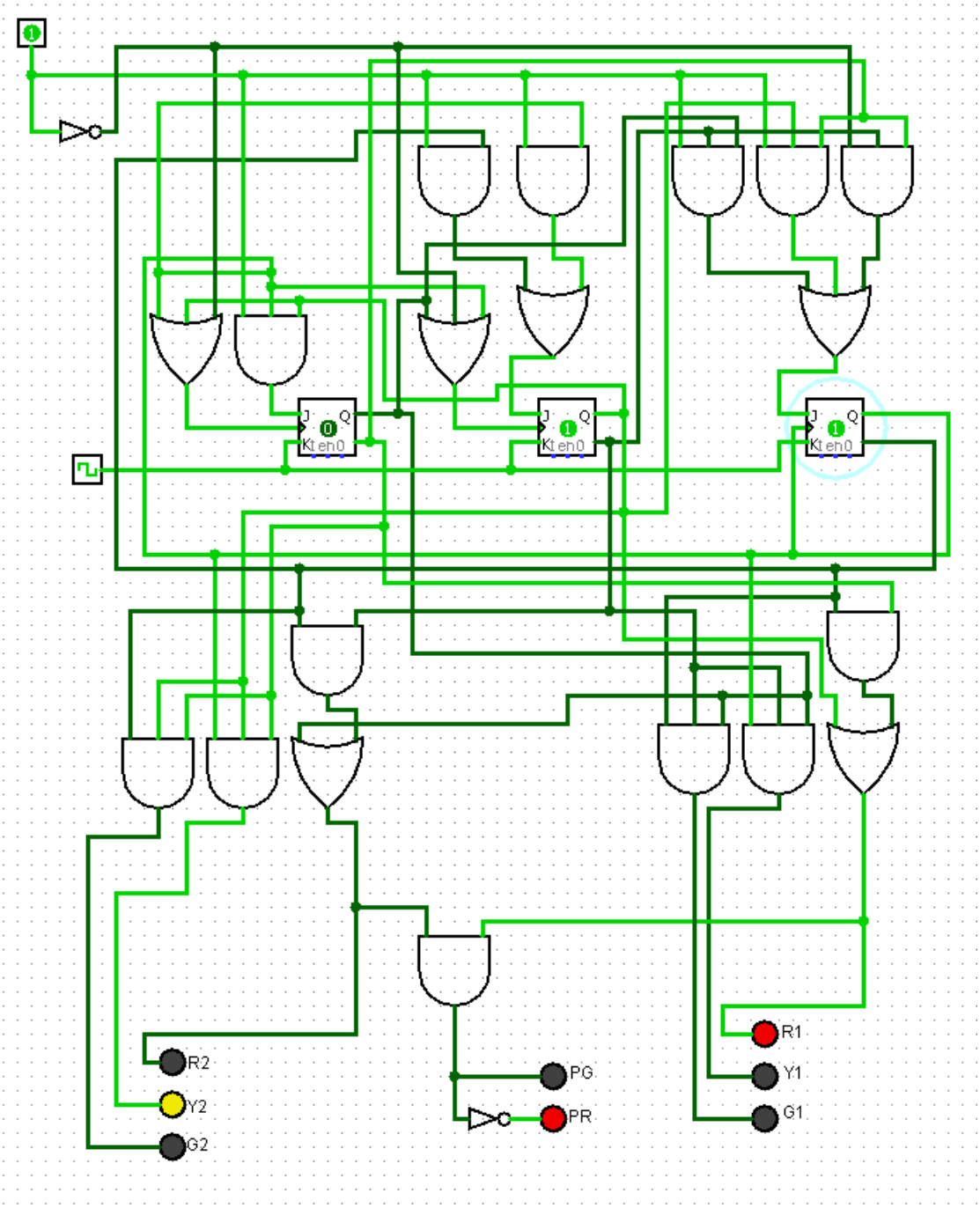
If green light for road 2 (G2), both light of road 1 (R1) and pedestrian light (PR) will turn to red.



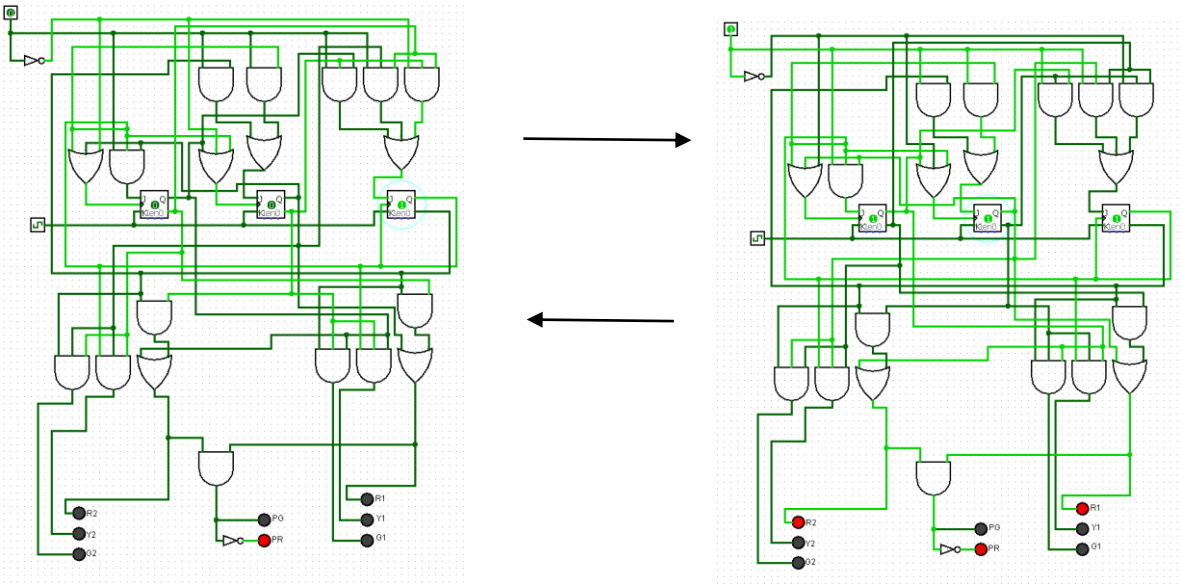
If the light turns from green to yellow for road 1 (Y1), both light of road 2 (R2) and pedestrian light (PR) still in red. This makes sure for the safety of pedestrian and vehicles on the other road before moving or crossing the road.



If the light turns from green to yellow for road 1 (Y1), both light of road 2 (R2) and pedestrian light (PR) still in red. This makes sure for the safety of pedestrian and vehicles on the other road before moving or crossing the road.



During the late night (3am-5am), The light will change from red to no light. It will keep blink. This is useful for the night driver, they no need to wait for the light to turn green if there is no other driver of pedestrian.



CONCLUSIONS

Thus, the aim this project is to develop a traffic light and pesdestrian signal that will manage the traffic flow and make sure the safety for the pedestrian to cross the road. This system also help to prevent any road accident between the vechicles and accident between the pedestrian and the vechicles. This will help to minimize the road accident from happen. Thus, all the knowledge throughout the semester has been implemented to make this system working well according with the objective of this project. Hence, I can say that the ocjectives of this experiment are achieved.