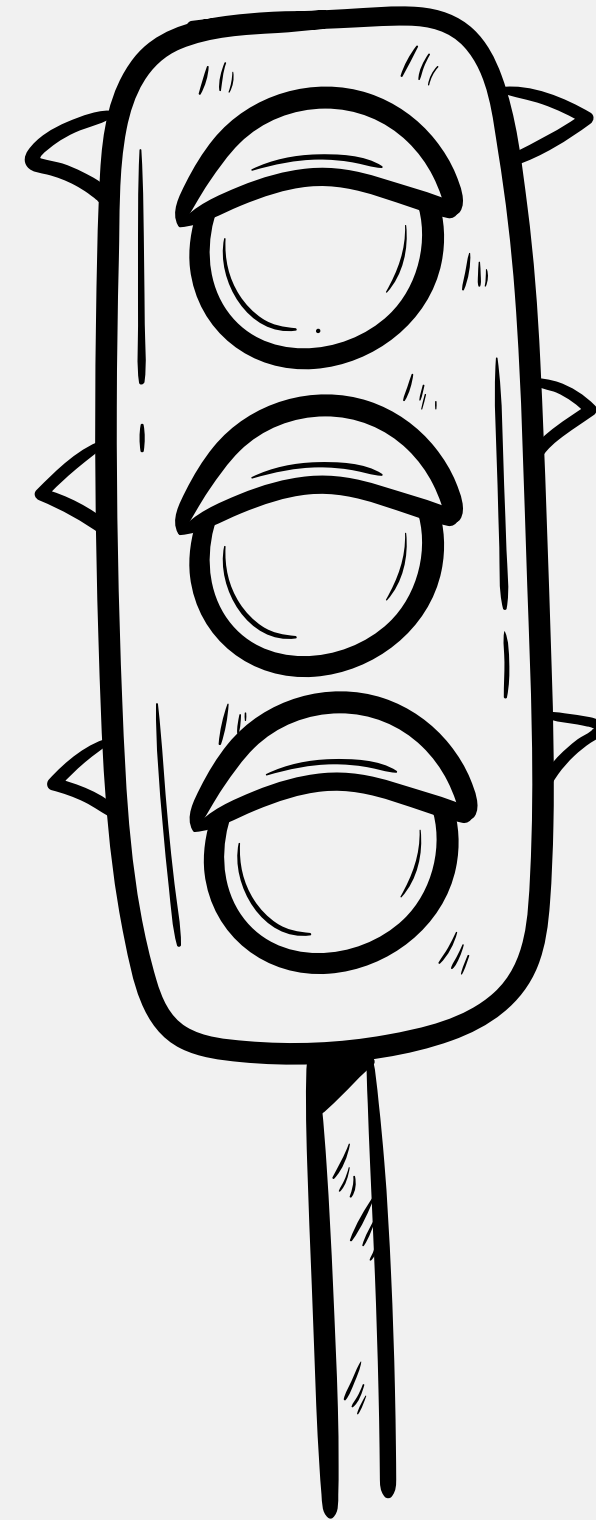


Traffic Light

Logic Design for a T-Junction Traffic light system.



The Problem

- Traffic jams



- Accidents



- Long commute time



Goals

01

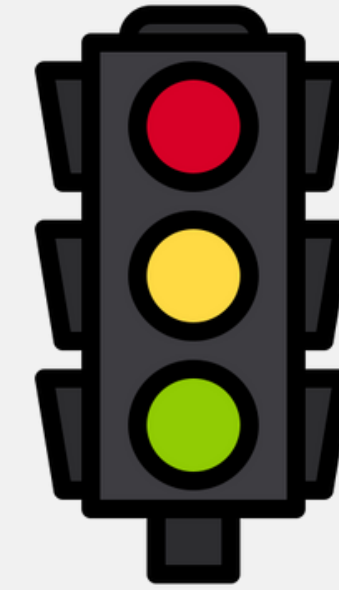
interrupts the heavy traffic at intersections to allow other vehicles or pedestrians to cross it.

02

help in reducing the severity and frequency of various types of accidents or crashes.

03

help in providing a continuous movement of traffic at a certain speed in a given route or way.



Before Traffic light

Common traffic jams

Very high risk of accidents

Longer commute times

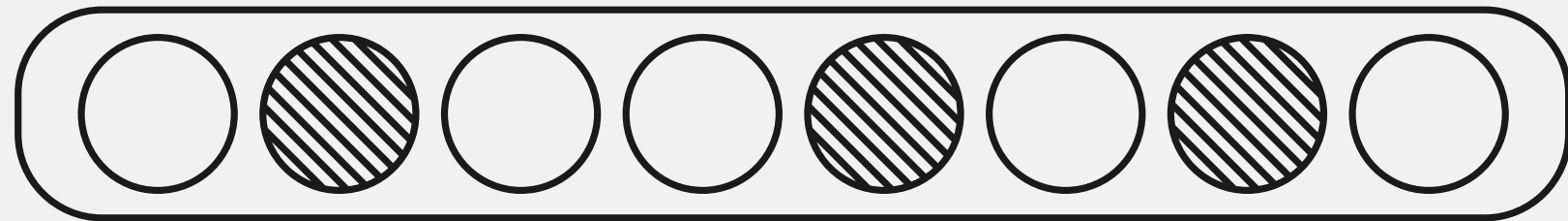
With Traffic light

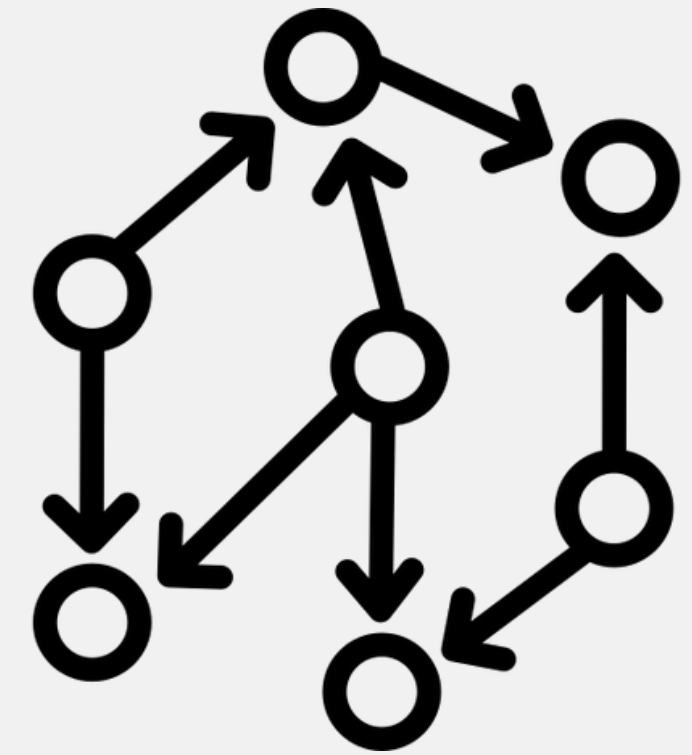
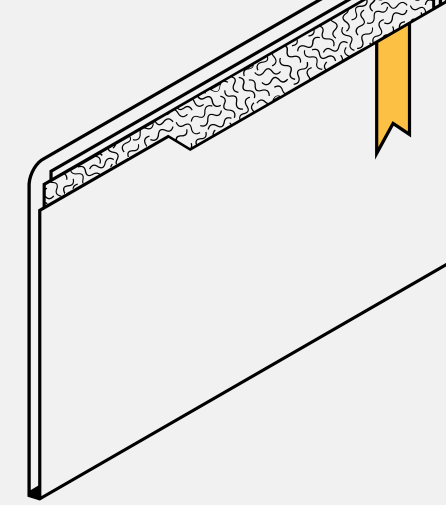
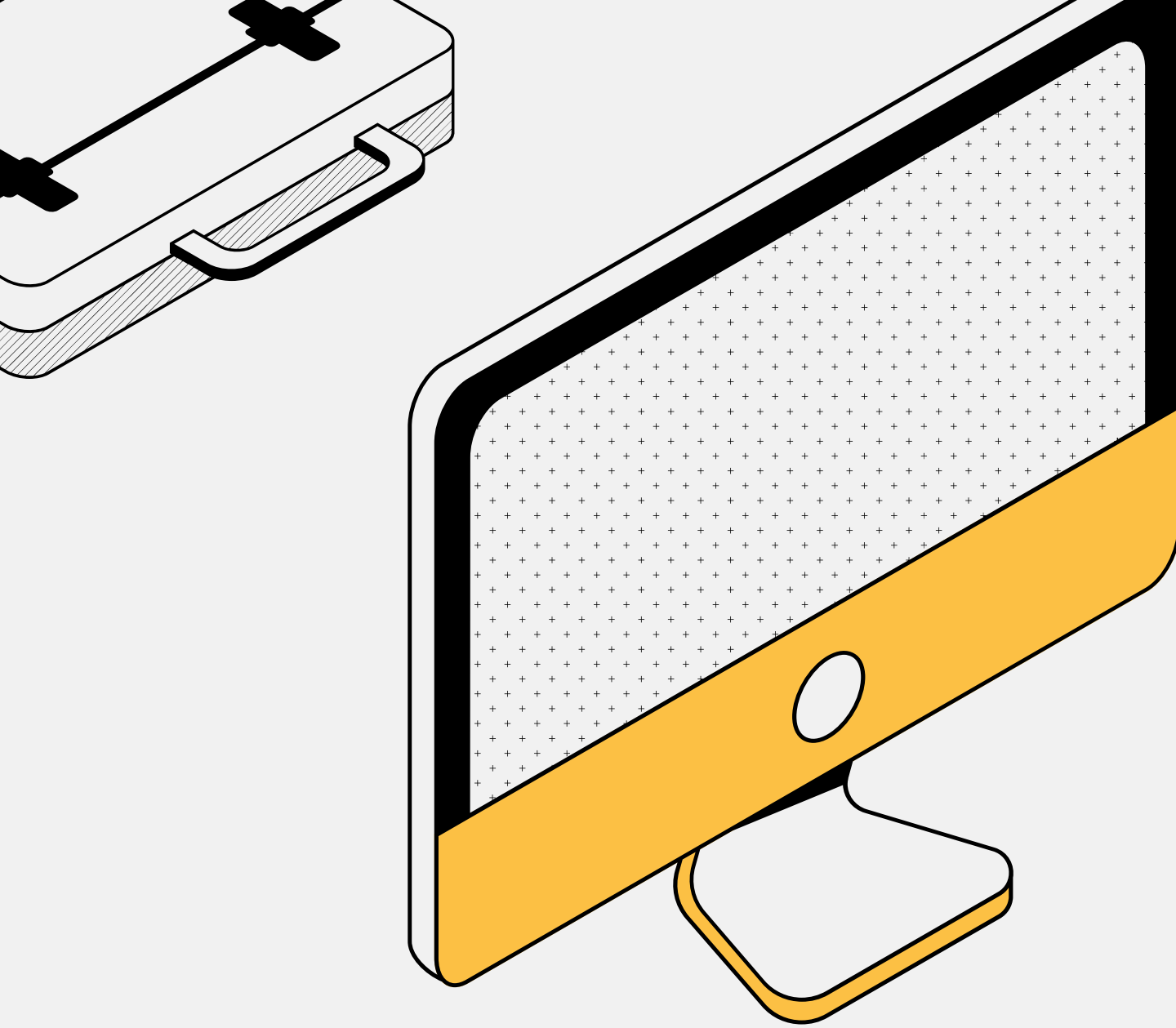
Continuous flow of traffic

Very little accidents

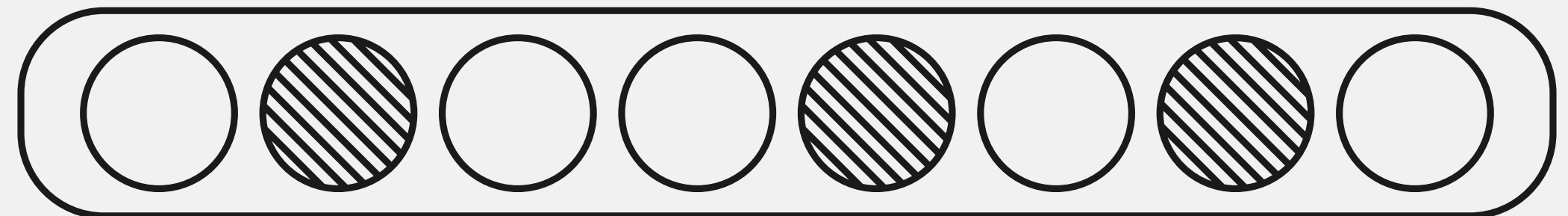
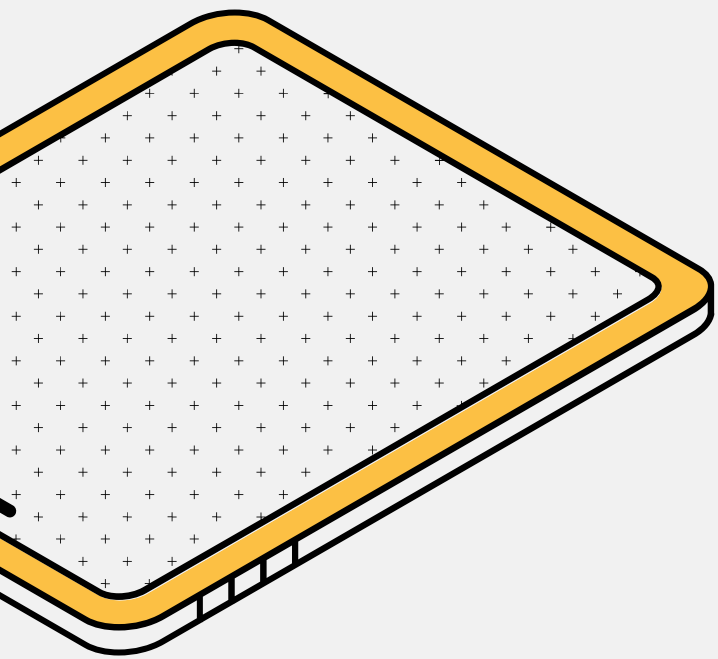
Shorter commute times

Design model

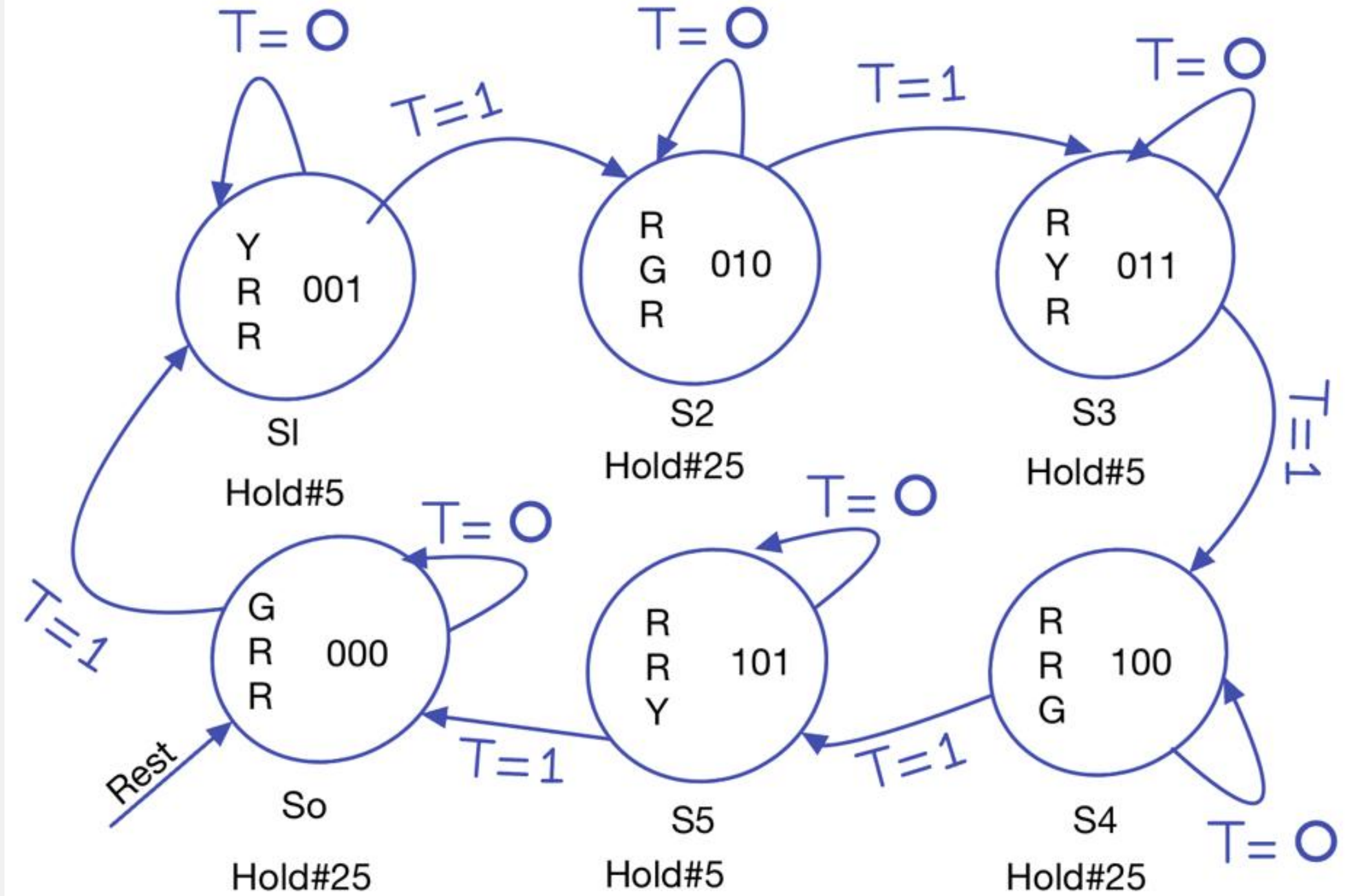
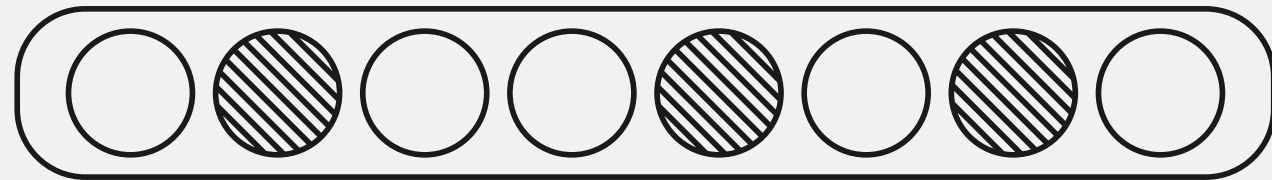




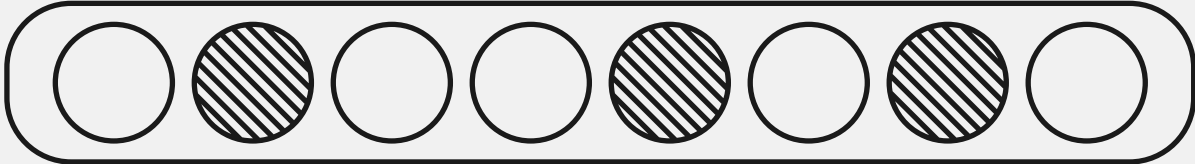
The Finite State Machine Controller



State Table Diagram



StateTable

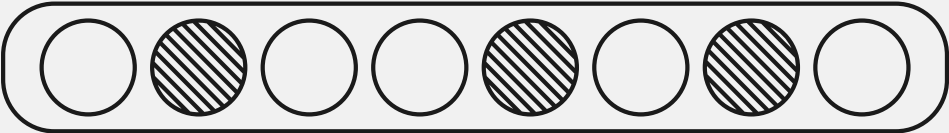


State	encoding	P1	P2	P3	Delay
S0	000	Green	Red	Red	25 sec
S1	001	Yellow	Red	Red	5 sec
S2	010	Red	Green	Red	25 sec
S3	011	Red	Yellow	Red	5 sec
S4	100	Red	Red	Green	25 sec
S5	101	Red	Red	Yellow	5 sec

present state			Input	Next State		
a	b	c		a^	b^	c^
0	0	0	0	0	0	0
0	0	0	1	0	0	1
0	0	1	0	0	0	1
0	0	1	1	0	1	0
0	1	0	0	0	1	0
0	1	0	1	0	1	1
0	1	1	0	0	1	1
0	1	1	1	1	0	0
1	0	0	0	1	0	0
1	0	0	1	1	0	1
1	0	1	0	1	0	1
1	0	1	1	0	0	0



Next State



		C, T			
		00	01	11	10
A, B	00	0	0	0	0
	01	0	0	1	0
	11	x	x	x	x
	10	1	1	0	1

		C, T			
		00	01	11	10
A, B	00	0	0	1	0
	01	1	1	0	1
	11	x	x	x	x
	10	0	0	0	0

$a^ = BCT + A\bar{C} + A\bar{T}$

$b^ = \bar{A}\bar{B}CT + B\bar{C} + B\bar{T}$

C, T

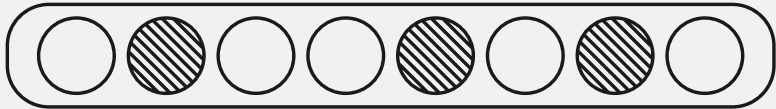
		00	01	11	10
A, B	00	0	1	0	1
	01	0	1	0	1
	11	x	x	x	x
	10	0	1	0	1

$C^ = \bar{C}T + C\bar{T}$

Input				Output		
a	b	c	T	p1r	p1y	p1g
0	0	0	0	0	0	1
0	0	0	1	0	0	1
0	0	1	0	0	1	0
0	0	1	1	0	1	0
0	1	0	0	1	0	0
0	1	0	1	1	0	0
0	1	1	0	1	0	0
0	1	1	1	1	0	0
1	0	0	0	1	0	0
1	0	0	1	1	0	0
1	0	1	0	1	0	0
1	0	1	1	1	0	0



signal 1



		C, T			
		00	01	11	10
A, B	00	0	0	0	0
	01	1	1	1	1
	11	x	x	x	x
	10	1	1	1	1

p1y = B + A

		C, T			
		00	01	11	10
A, B	00	0	0	1	1
	01	0	0	0	0
	11	x	x	x	x
	10	0	0	0	0

p1y = $\overline{A}\overline{B}C$

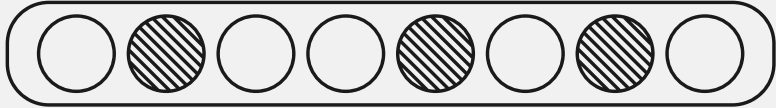
		C, T			
		00	01	11	10
A, B	00	1	1	0	0
	01	0	0	0	0
	11	x	x	x	x
	10	0	0	0	0

p1g = $\overline{A}\overline{B}\overline{C}$

Input				Output		
a	b	c	T	p1r	p1y	p1g
0	0	0	0	1	0	0
0	0	0	1	1	0	0
0	0	1	0	1	0	0
0	0	1	1	1	0	0
0	1	0	0	0	0	1
0	1	0	1	0	0	1
0	1	1	0	0	1	0
0	1	1	1	0	1	0
1	0	0	0	1	0	0
1	0	0	1	1	0	0
1	0	1	0	1	0	0
1	0	1	1	1	0	0



signal 2



C, T

		00	01	11	10
A, B	00	1	1	1	1
	01	0	0	0	0
	11	x	x	x	x
	10	1	1	1	1

p2r = \overline{B}

C, T

		00	01	11	10
A, B	00	0	0	0	0
	01	0	0	1	1
	11	x	x	x	x
	10	0	0	0	0

p2y = B C

C, T

		00	01	11	10
A, B	00	0	0	0	0
	01	1	1	0	0
	11	x	x	x	x
	10	0	0	0	0

p2g = $B \overline{C}$

Input				Output		
a	b	c	T	p1r	p1y	p1g
0	0	0	0	1	0	0
0	0	0	1	1	0	0
0	0	1	0	1	0	0
0	0	1	1	1	0	0
0	1	0	0	1	0	0
0	1	0	1	1	0	0
0	1	1	0	1	0	0
0	1	1	1	1	0	0
1	0	0	0	0	0	1
1	0	0	1	0	0	1
1	0	1	0	0	1	0
1	0	1	1	0	1	0



signal 3



		C, T			
		00	01	11	10
A, B	00	1	1	1	1
	01	1	1	1	1
	11	x	x	x	x
	10	0	0	0	0

p3r = \overline{A}

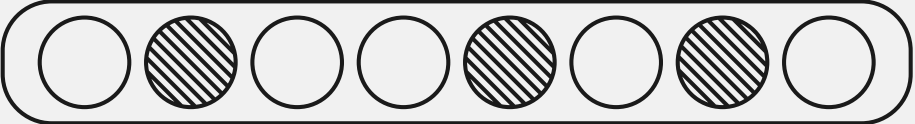
		C, T			
		00	01	11	10
A, B	00	0	0	0	0
	01	0	0	0	0
	11	x	x	x	x
	10	0	0	1	1

p3y = $A C$

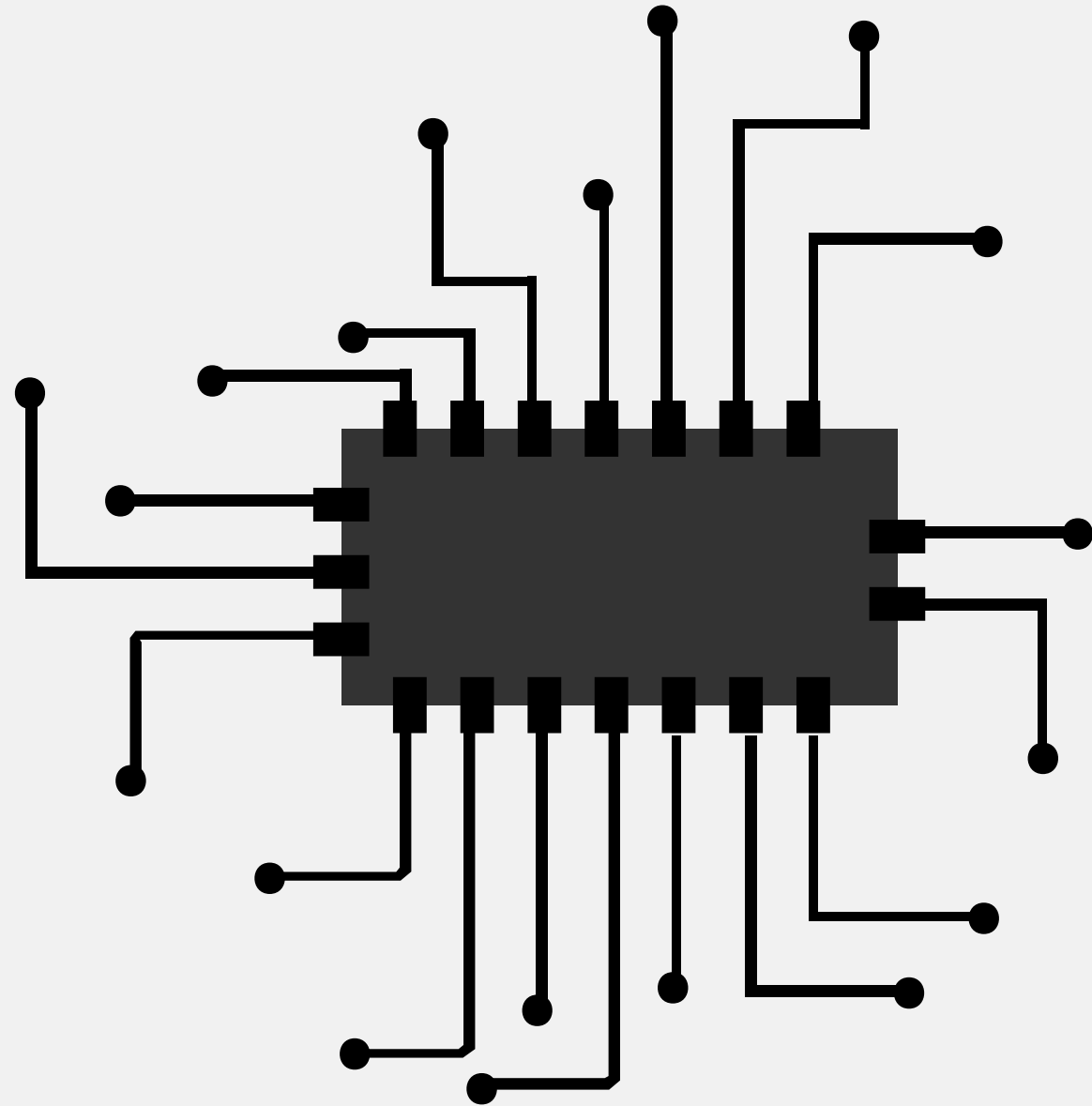
		C, T			
		00	01	11	10
A, B	00	0	0	0	0
	01	0	0	0	0
	11	x	x	x	x
	10	1	1	0	0

p2g = $A \overline{C}$

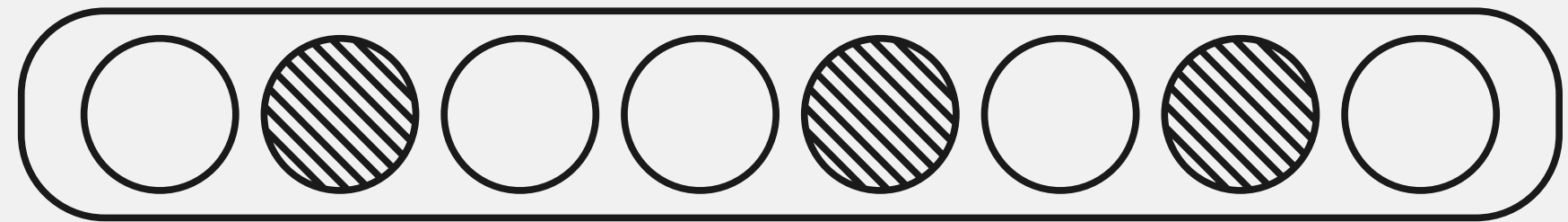
Truth Table



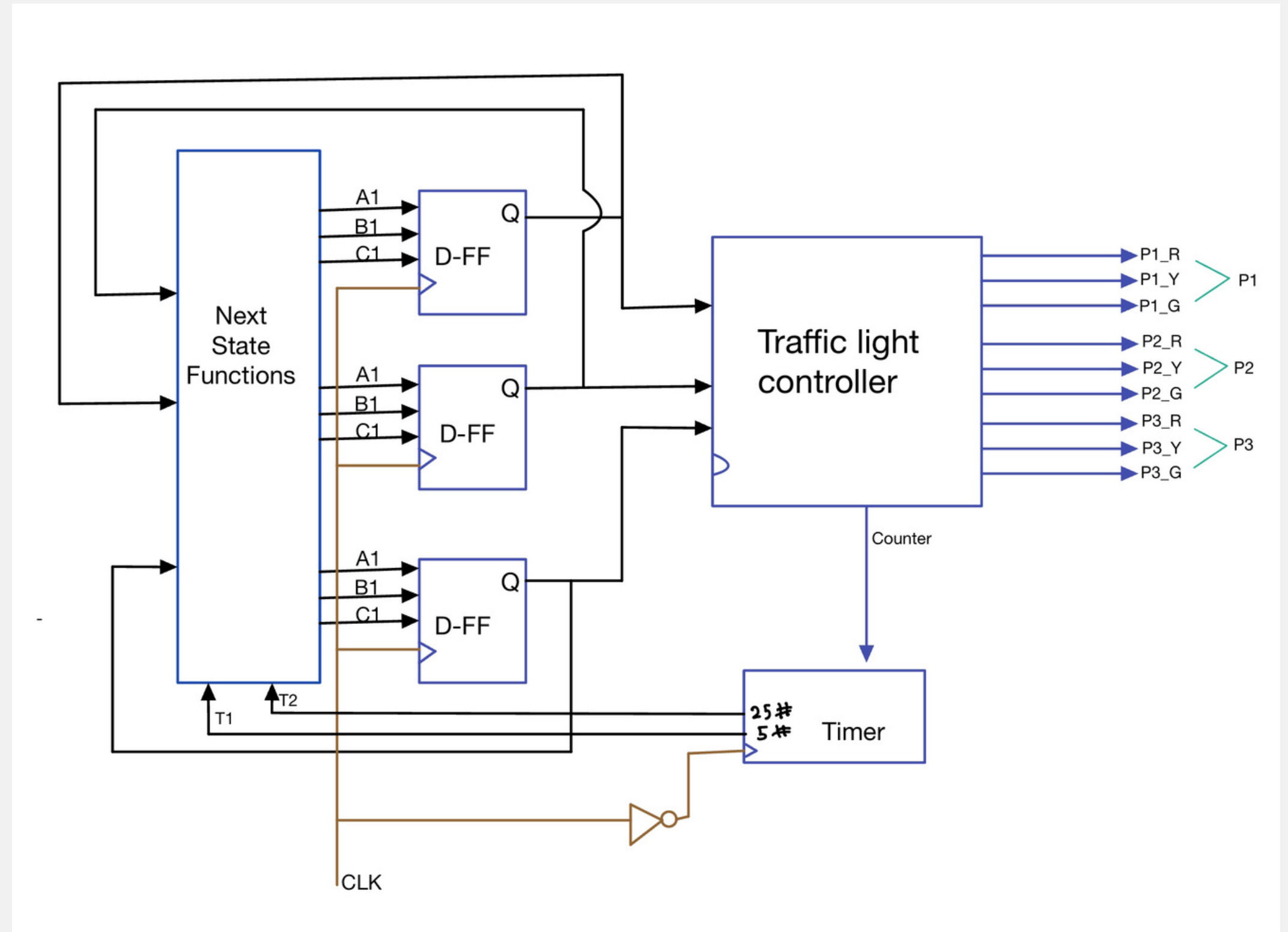
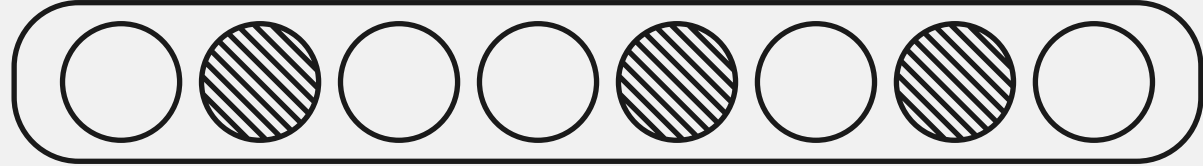
present state			Input	Next State			output									flip flop		
a	b	c	T	a^	b^	c^	p1r	p1y	p1g	p2r	p2y	p2g	p3r	p3y	p3g	d1	d2	d3
0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	1
0	0	0	1	0	0	1	0	0	1	1	0	0	1	0	0	0	0	1
0	0	1	0	0	0	1	0	1	0	1	0	0	1	0	0	0	1	0
0	0	1	1	0	1	0	0	1	0	1	0	0	1	0	0	0	1	0
0	1	0	0	0	1	0	1	0	0	0	0	1	1	0	0	0	1	1
0	1	0	1	0	1	1	1	0	0	0	0	1	1	0	0	0	1	1
0	1	1	0	0	1	1	1	0	0	0	1	0	1	0	0	1	0	0
0	1	1	1	1	0	0	1	0	0	0	1	0	1	0	0	1	0	0
1	0	0	0	1	0	0	1	0	0	1	0	0	0	0	1	1	0	1
1	0	0	1	1	0	1	1	0	0	1	0	0	0	0	1	1	0	1
1	0	1	0	1	0	1	1	0	0	1	0	0	0	1	0	0	0	0
1	0	1	1	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0



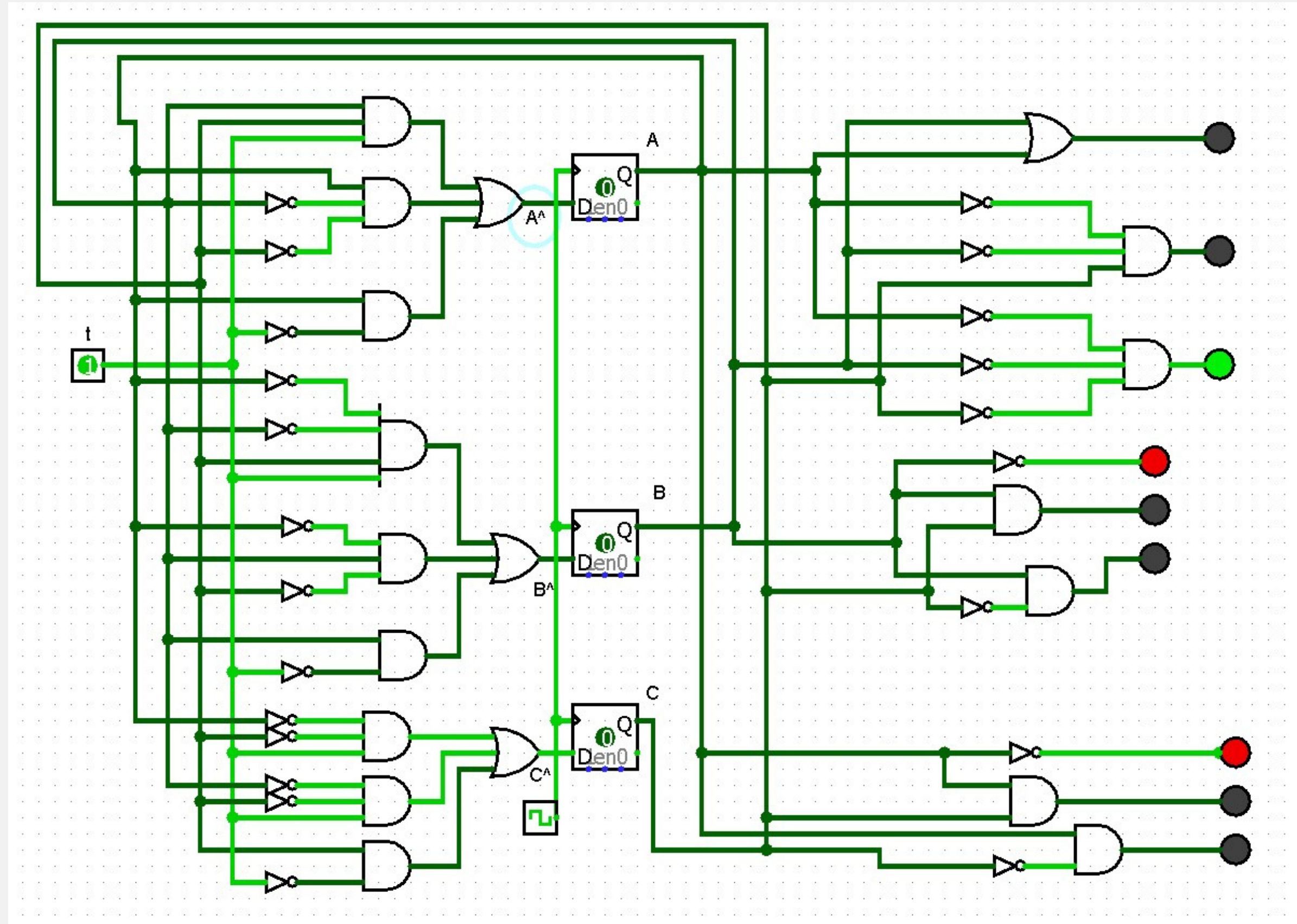
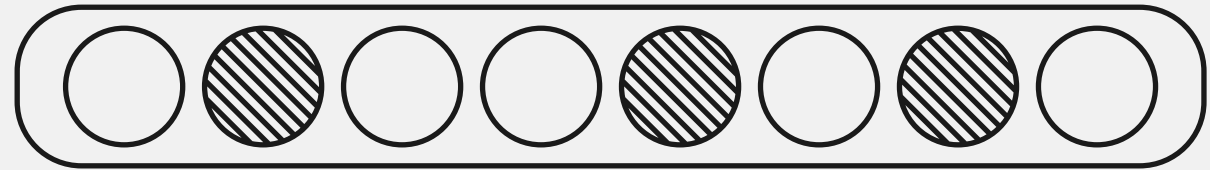
Circuit & data bath



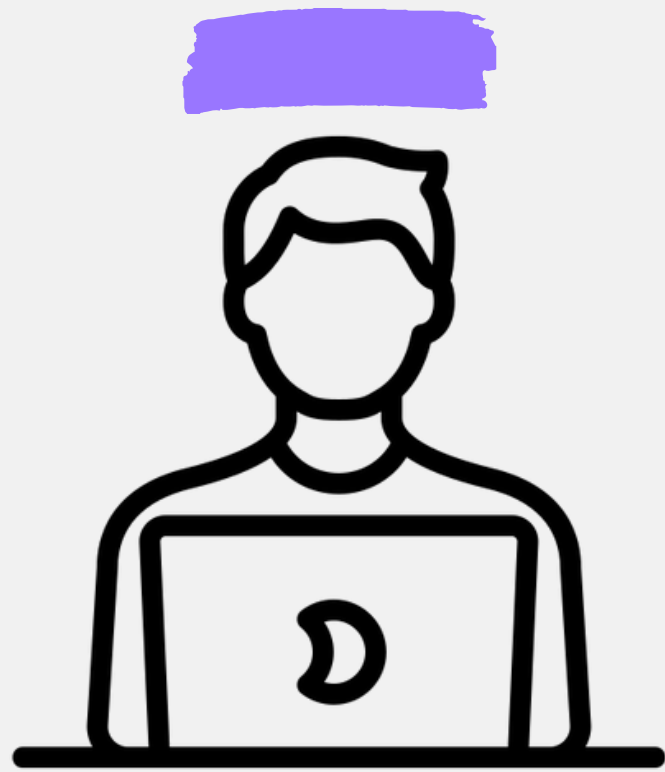
Data Path



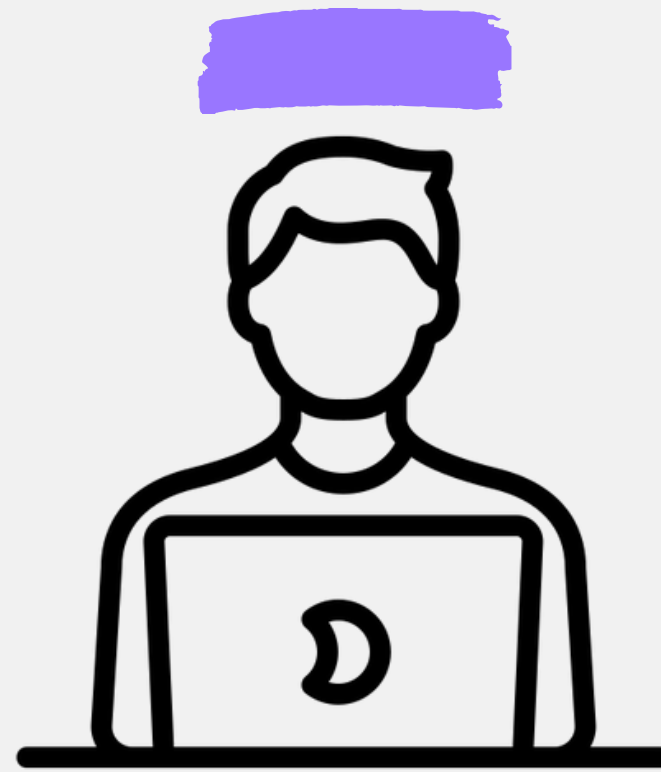
Logic Design



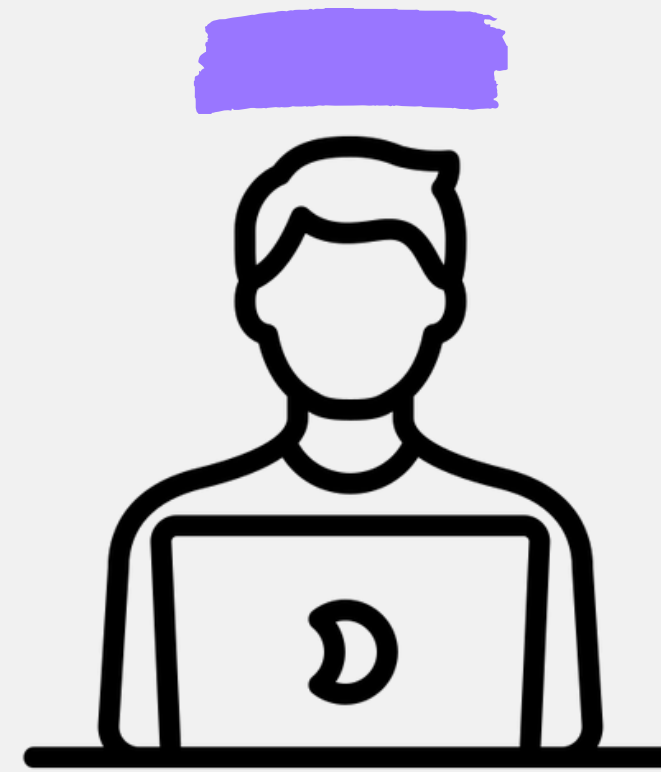
Meet the Group



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THANK YOU!

Do you have any questions for us?