SEMESTER : FALL 2019
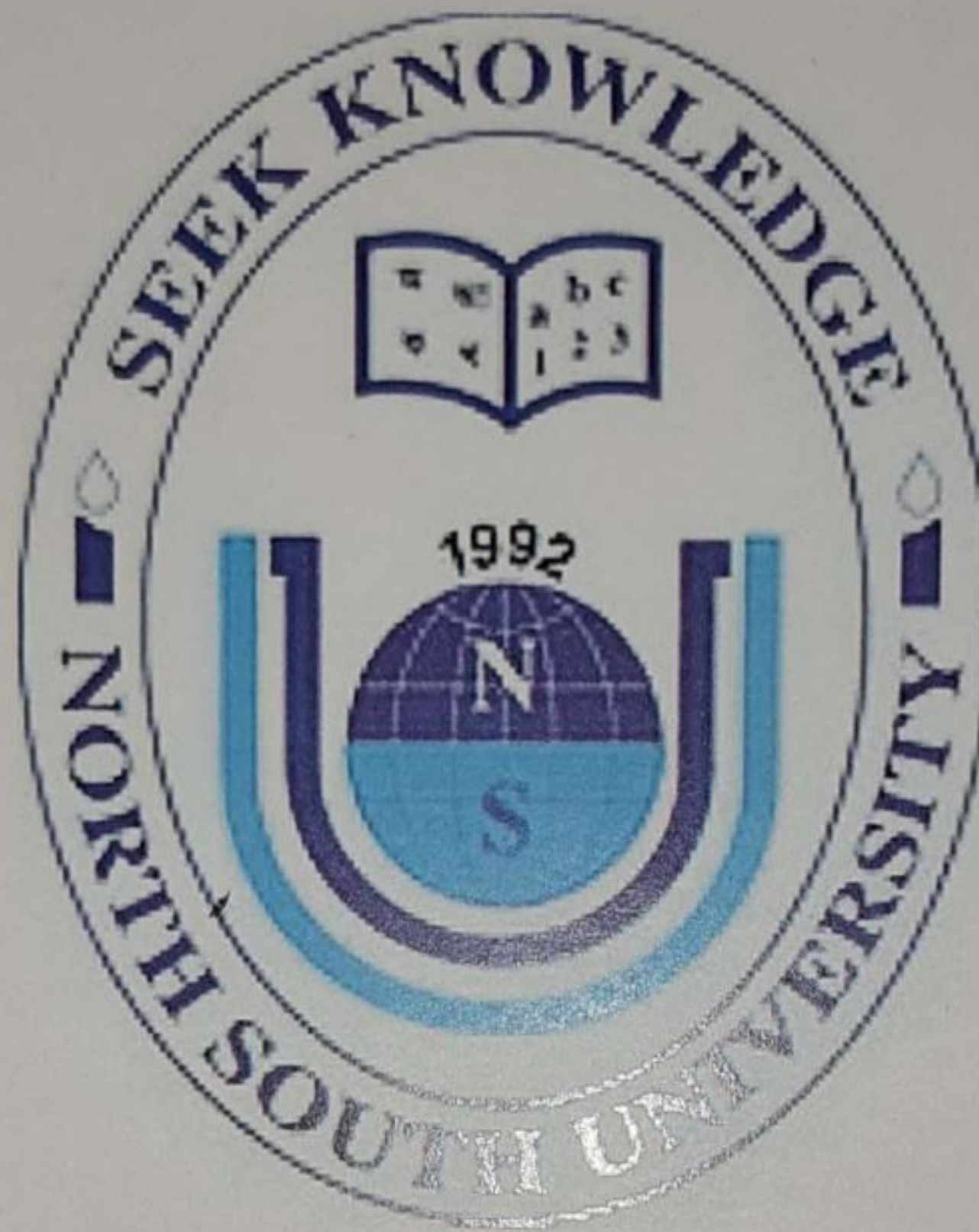
<u>DATE:</u>   26th November,2019
<u>COURSE:</u> CSE231
<u>SECTION:</u> 11

PROJECT REPORT

<u>Group-02</u>

<u>Name of the members:</u>

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<u>Project Name:</u>   7-segment LED Light

# Digital logic Design project

INDEX:

Specifications:

We chose Simplified POS(Product of sum) for making our seven segment LED project. Simplified POS helped us to build it by minimizing our cost. The IC-gates used in making this project is very user friendly and was implemented easily.

Costing:

1. Bread Board : 3 pieces   3*90tk=210tk
2. 2 Input OR : 2 pieces   2*30tk=60tk
3. 2 Input AND: 1 piece   1*30tk=30tk
4. 3 Input OR :   1 piece   1*30tk=30tk
5. 3 Input AND: 1piece   1*30tk=30tk
6. NOT gate: 1piece   1*30tk=30tk
7. Wires :   =140tk
8. Resistors (1k ohm &220 ohm)   = 10tk
9. Led lights: =10tk
10. 7-segment LED light: 1*30tk=30tk
11. 9-volt Battery: 1*40tk=40tk
12. Battery terminal: 1*10tk=10tk
13. Capacitor   =10tk
14. resistors(100k ohm)   =10tk
15. Clock 555   =10tk

    TOTAL COST: =660TK

* State Diagram :-
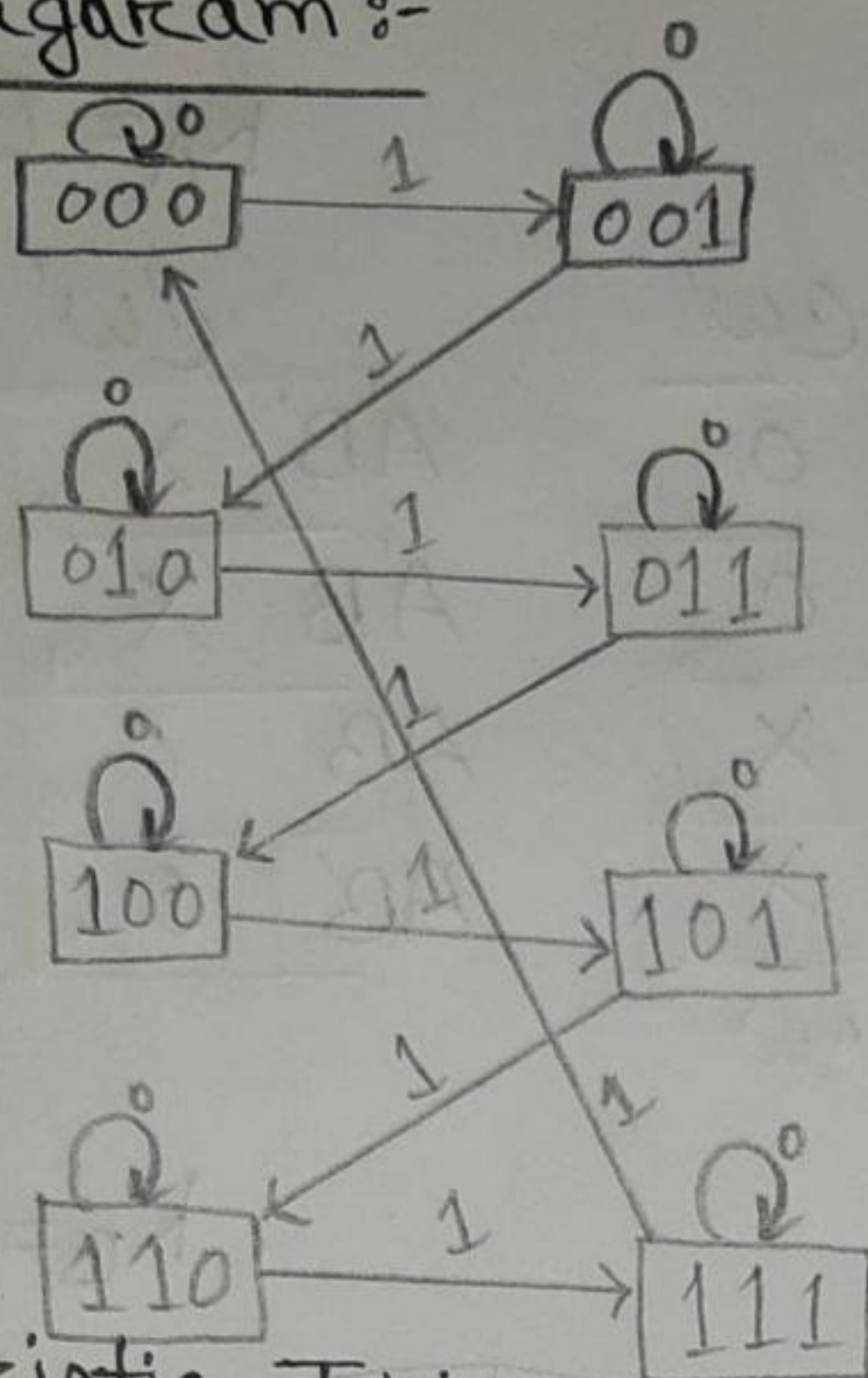
* Charecteristic Table :-

Present State			input	Next state			Flip Flop input					
A(t)	B(t)	C(t)	W	A(t+1)	B(t+1)	C(t+1)	J_A	K_A	J_B	K_B	J_C	K_C
0	0	0	0	0	0	0	0	X	0	X	0	X
0	0	0	1	0	0	1	0	X	0	X	1	X
0	0	1	0	0	0	1	0	X	0	X	X	0
0	0	1	1	0	1	0	0	X	1	X	X	1
0	1	0	0	0	1	0	0	X	X	0	0	X
0	1	0	1	0	1	1	0	X	X	0	1	X
0	1	1	0	0	1	1	0	X	X	0	X	0
0	1	1	1	1	0	0	1	X	X	1	X	1
1	0	0	0	1	0	0	X	0	0	X	0	X
1	0	0	1	1	0	1	X	0	0	X	1	X
1	0	1	0	1	0	1	X	0	0	X	X	0
1	0	1	1	1	1	0	X	0	1	X	X	1
1	1	0	0	1	1	0	X	0	X	0	0	X
1	1	0	1	1	1	1	X	0	X	0	1	X
1	1	1	0	1	1	1	X	0	X	0	X	0
1	1	1	1	0	0	0	X	1	X	1	X	1

✶ K-map :

$J_A = BCW$

	$C'W'$	$C'W$	CW	CW'
$A'B'$	0 (0)	0 (1)	0 (3)	0 (2)
$A'B$	0 (4)	0 (5)	1 (7)	0 (6)
AB	X (12)	X (13)	X (15)	X (14)
AB'	X (8)	X (9)	X (11)	X (10)

↓ BCW

$K_A = BCW$

	$C'W'$	$C'W$	CW	CW'
$A'B'$	X (0)	X (1)	X (3)	X (2)
$A'B$	X (4)	X (5)	X (7)	X (6)
AB	0 (12)	0 (13)	1 (15)	0 (14)
AB'	0 (8)	0 (9)	0 (11)	0 (10)

↓ BCW

$J_B = CW$

	$C'W'$	$C'W$	CW	CW'
$A'B'$	0 (0)	0 (1)	1 (3)	0 (2)
$A'B$	X (4)	X (5)	X (7)	X (6)
AB	X (12)	X (13)	X (15)	X (14)
AB'	0 (8)	0 (9)	1 (11)	0 (10)

↓ CW

$K_B = CW$

	$C'W'$	$C'W$	CW	CW'
$A'B'$	X (0)	X (1)	X (3)	X (2)
$A'B$	0 (4)	0 (5)	1 (7)	0 (6)
AB	0 (12)	0 (13)	1 (15)	0 (14)
AB'	X (8)	X (9)	X (11)	X (10)

↓ CW

$J_C = W$

	$C'W'$	$C'W$	CW	CW'
$A'B'$	0 (0)	1 (1)	X (3)	X (2)
$A'B$	0 (4)	1 (5)	X (7)	X (6)
AB	0 (12)	1 (13)	X (15)	X (14)
AB'	0 (8)	1 (9)	X (11)	X (10)

↓ W

$K_C = W$

	$C'W'$	$C'W$	CW	CW'
$A'B'$	X (0)	X (1)	1 (3)	0 (2)
$A'B$	X (4)	X (5)	1 (7)	0 (6)
AB	X (12)	X (13)	1 (15)	0 (14)
AB'	X (8)	X (9)	1 (11)	0 (10)

↓ W

Sequental Circuit Using
JK Flip Flop

File   Edit   Project   Simulate   Window   Help
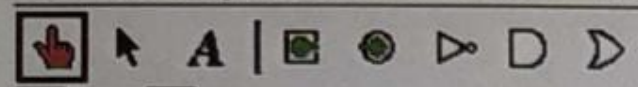
Sequential circuit*
  simplified pos sort
  Wiring
  Gates
  Plexers
  Arithmetic
  Memory
  Input/Output
  Base

Clock	
Facing	East
High Duration	1 Tick
Low Duration	1 Tick
Label	
Label Location	West
Label Font	SansSerif Plain 12

100%

W

B   BCw   A(t+1)

Cw

W   B(t+1)

Cw

C

W   C(t+1)

x   y   z

x

$(x+y'+z')$

z'

x'   a

y'

$(x'+y'+z)$

z

x'

$(x'+y+z')$ $(x+y'+z')$

z   b   d

$(x'+y'+z)$

x

y' $(x+y')$

x'   c

y $(x'+y)$

y' $(y'+z')$ e

z'

x $(x+z')$

z'

y $(y+z)$ f

z

$(y'+z')$

g
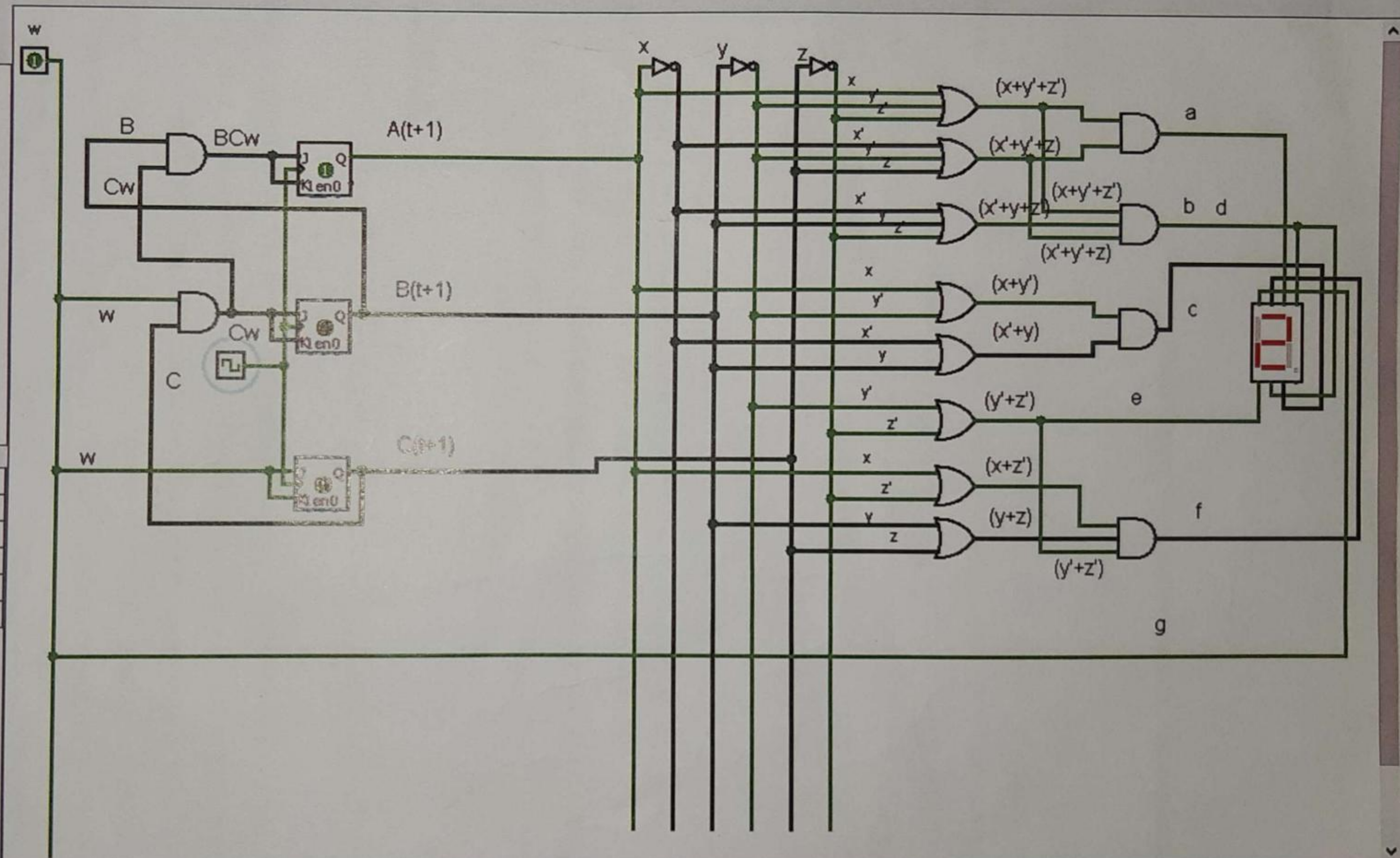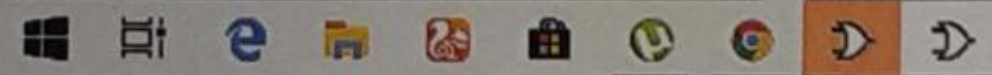
Procedure:

At first , we have checked all the IC-gates and segment LED is properly working or not. If any gate is not in good condition we have to face difficulties, that's why we have checked before implementation. Then , we checked all negative & positive connection in the board before giving connection to 9-volt battery.Next, we have started working by using the IC- gates by putting on the board. We carefully gave input connections by keeping the pin configuration of IC-gates in our mind. We also carefully gave connection to Vcc and Gnd in the gates.In these way, by using simplified POS we found our desire output in 7-segment LED light.Then, we made a clock with timer-555 ,resistors,capacitors and wires. Next, we used JK-flip flop to implement our sequential circuit part.After making sequential part in our breadboard, we connected sequential part with combinational circuit. Thus, we made our digital circuit with 7-segment LED light.

Difficulties:

The difficulties we faced during implementation of our circuit is stated below:

1. While implementing the circuit design, we faced our difficulty in our 2-input OR IC-gate. 2-input OR IC-gate was not working properly as its 1st gate in the OR IC-gate was disturbed. We found out the problem and fixed it.

2. Our last digit of the project was not showing in the LED display at the first try. We checked the wires and found there was a connection problem in the wires and we fixed it.

3. We faced a problem with reset and clear at the time of making clock.

4. We also faced a problem with capacitor, but later on we fixed the issue.