



NORTH SOUTH UNIVERSITY

Department of Electrical & Computer Engineering (ECE)

CSE 332 Computer Organization & Architecture

Section: 02

Faculty: Tanjila Farah (TnF)

Lab Report: 2

Design of a 4-bit Binary Up-Down Synchronous counter

Submitted By: (Writer's name & ID)

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Date of Experiment:

Date of Submission:

For Instructor's use only

SCORE:	REMARKS:
PENALTY:	

Objective:

- * Design a 4-bit up-down counter
- * using flip-flops to store the 4-bit value.
- * use 4 D flip-flops to create a 4-bit register
- use XOR gate and D Flip-Flop to create T Flip-Flop.
- * How the counter Register works with clock pulses.
- * How the value changes, by giving up counter and down counter.

List of Equipment:

* Trainer Board.

* IC 7404, 2x 7408, 7432, 7486, 2x 7474

* Wires for connection.

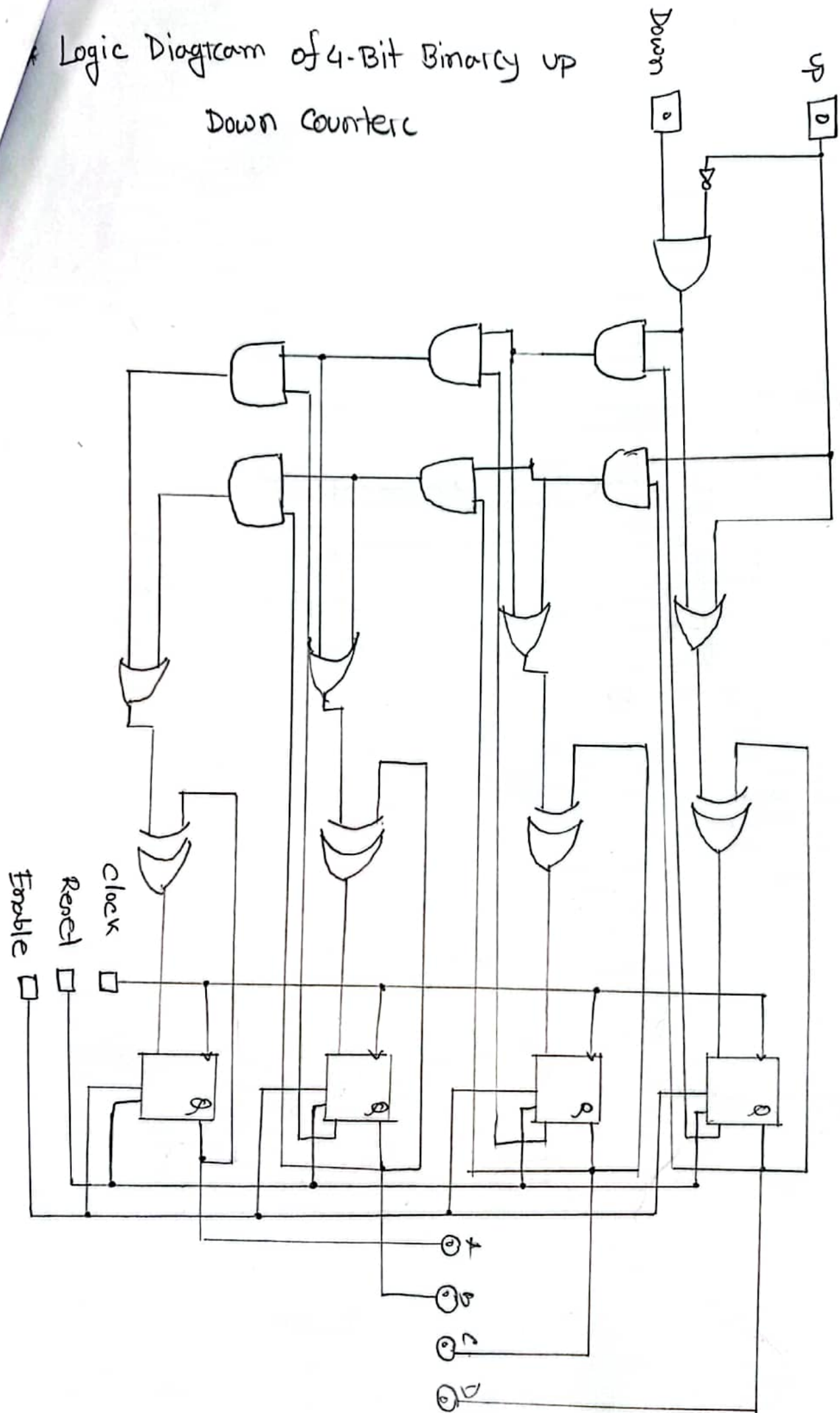
* power supply.

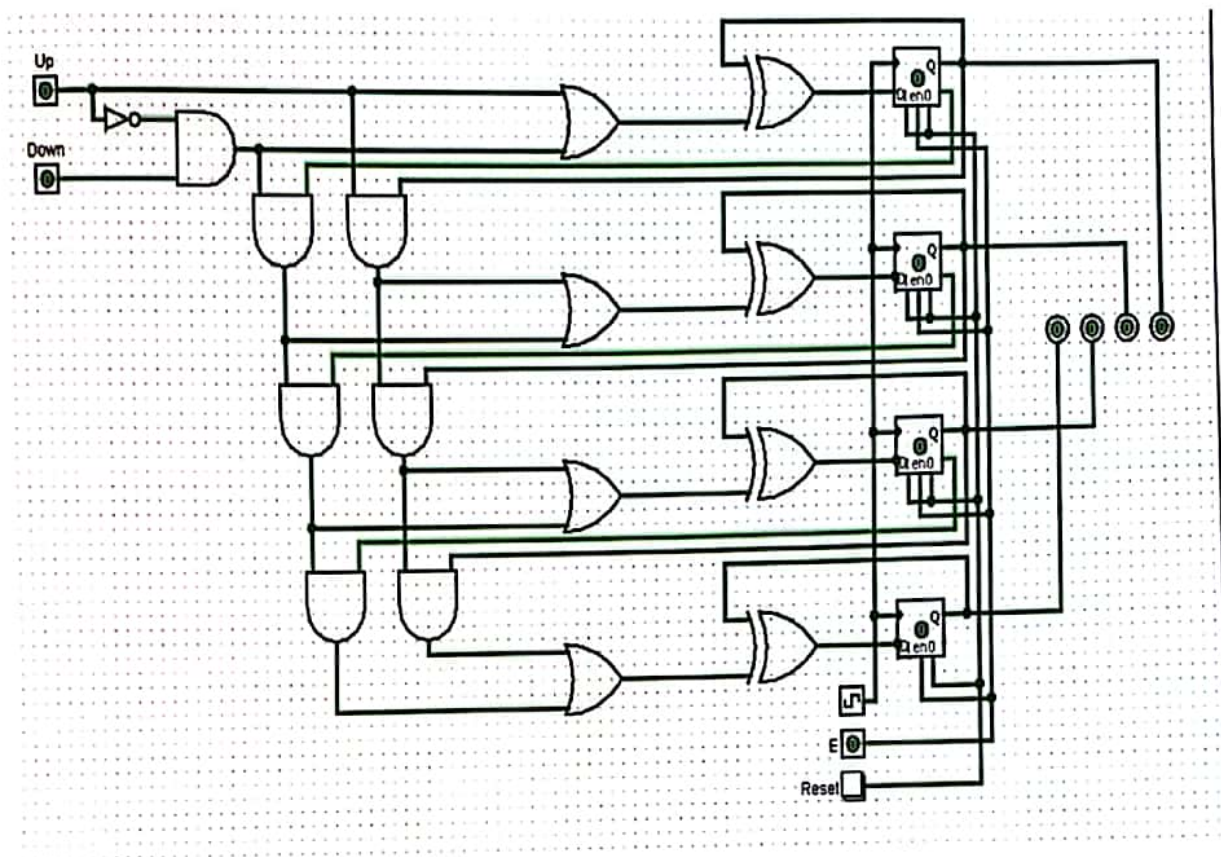
Theory :

A register that goes through a predetermined sequence of states upon the application of input pulses, is called a counter.

A 4-bit binary up/down counter goes from 0000 to 1111 and back from 1111 to 0000. It uses 4 T flip-flops, which toggle their output when the input is 1, and stay the same when the input is 0. All flip-flops share the same clock pulse. For counting up, the next flip-flop changes when the state goes from 0 to 1. For counting down, the next flip-flop changes when the state goes from 1 to 0.

Logic Diagram of 4-Bit Binary up Down Counter





Truth Table :

clock pulse	A	B	C	D
P0	0	0	0	0
P1	0	0	0	1
P2	0	0	1	0
P3	0	0	1	1
P4	0	1	0	0
P5	0	1	0	1
P6	0	1	1	0
P7	0	1	1	1
P8	1	0	0	0
P9	1	0	0	1
P10	1	0	1	0
P11	1	0	1	1
P12	1	1	0	0
P13	1	1	0	1
P14	1	1	1	0
P15	1	1	1	1

Discussion:

In the lab we build a 4-bit Binary Up-Down counter. first we collect Dual D flip-flop IC (7474). we need 4 D flip-flop. so, we collect 2 IC. Then we check the IC and these IC was OK. After that we take IC 7404, 2x-7408, 7432 and 7486. we placed the IC on our trainer board. Then we draw the circuit diagram in logisim and start with our hardware, connect all the wires with ICs. After that we connect power supply. After And we saw that the light of output D is not working. Then we checked the values for 3 output. output for first 3 its working perfectly. But we can't complete our counter. we think there was some issues with wire. thats why we can't get

any value for output D. Then we checked the wires, but still couldn't fix it. Due to running out of time, we stopped. From the next class we will be more careful with everything and try to complete our task.

Clock pulse	A	B	C	D
P0	0	0	0	0
P1	0	0	0	1
P2	0	0	1	0
P3	0	0	1	1
P4	0	1	0	0
P5	0	1	0	1
P6	0	1	1	0
P7	0	1	1	1
P8	1	0	0	0
P9	1	0	0	1
P10	1	0	1	0
P11	1	0	1	1
P12	1	1	0	0
P13	1	1	0	1
P14	1	1	1	0
P15	1	1	1	1

data issue
[Signature]