GREEN UNIVERSITY OF BANGLADESH

Department of Computer Science & Engineering

Lab Report-07

Course Code: CSE-204

Course Title: Digital Logic Design Lab

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Submitted to:
Name : Md. Atikuzzaman
Designation : Lecture
Dept : CSE
Green University Of Bangladesh

Submitted by:
Name : Jakirul Islam
ID : 193002101
Section : 193(DC)
Dept. : CSE

Remark

EXPERIMENT NO: 7

EXPERIMENT NAME: Construct Half Adder and Full Adder using Half Adder and To construct and check the truth tables for Half-Adder, Full-Adder.

AIM: To construct and check the truth tables for Half-Adder, Full-Adder. To construct a Full Adder using two Half Adders.

APPARATUS REQUIRED:

COMPONENTS: IC 7408, 7432, 7486, LED - 2 no's, 330 Ω resistor-2 no's.

EQUIPMENT: Power supply, Bread board, Logisim software, Tinkercad online stimulation.

THEORY:

HALF ADDER:

When two binary digits are added the output will be sum and carry. The two input variables are A and B, the outputs are taken as sum - S and carry -C. The logic symbol of Half-adder is shown in fig 1.

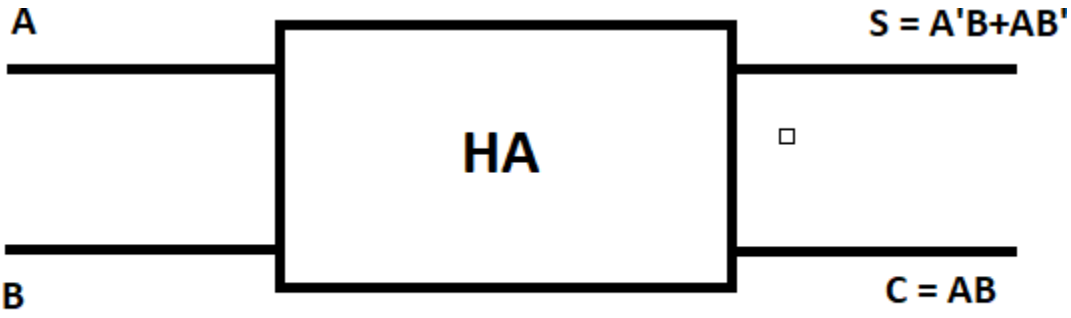


Fig 1. Half- adder Logic Symbol

The combinations for the sum and carry are written by the formulae are given as.

S = A'B+ AB'& C =AB.

The Half- adder can be constructed by using two logic gates named as EX-OR Gate and AND Gate. The EX-OR output is sum –S and output of AND Gate is a carry
- C. The combinational circuit is as shown in fig-2.

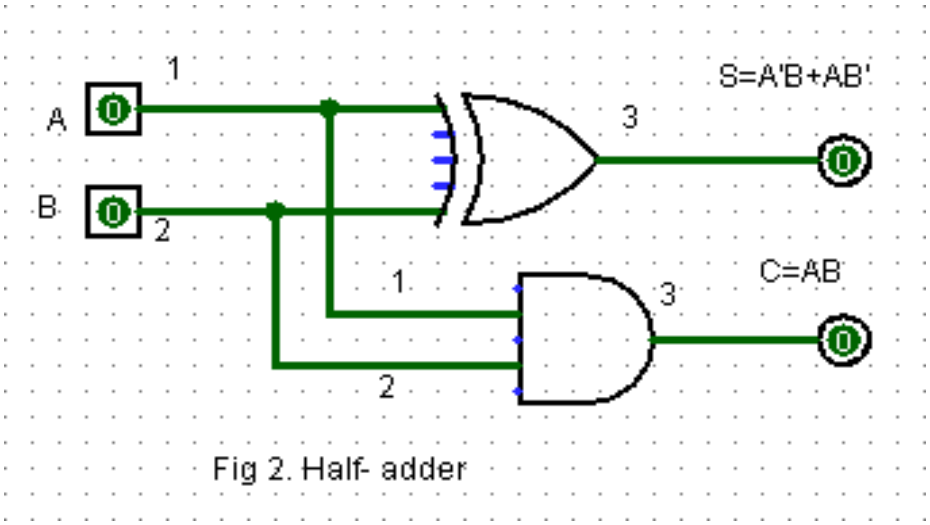


Fig 2. Half- adder

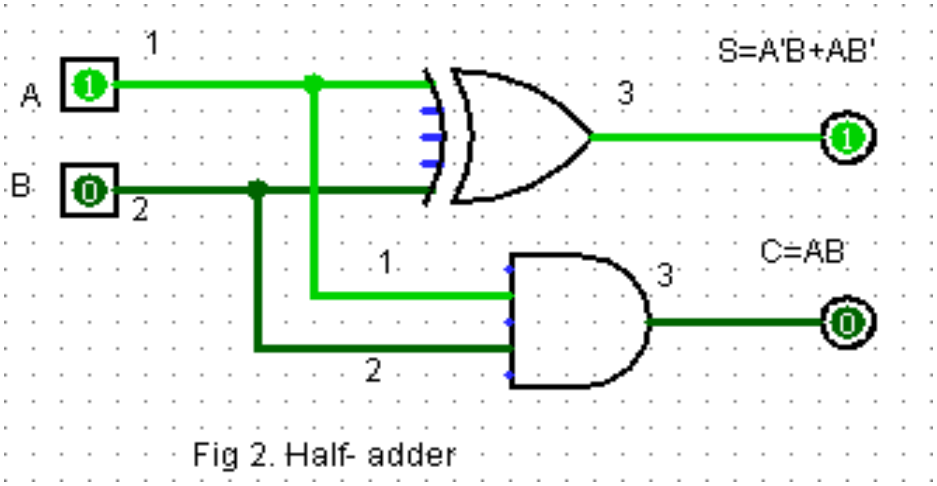
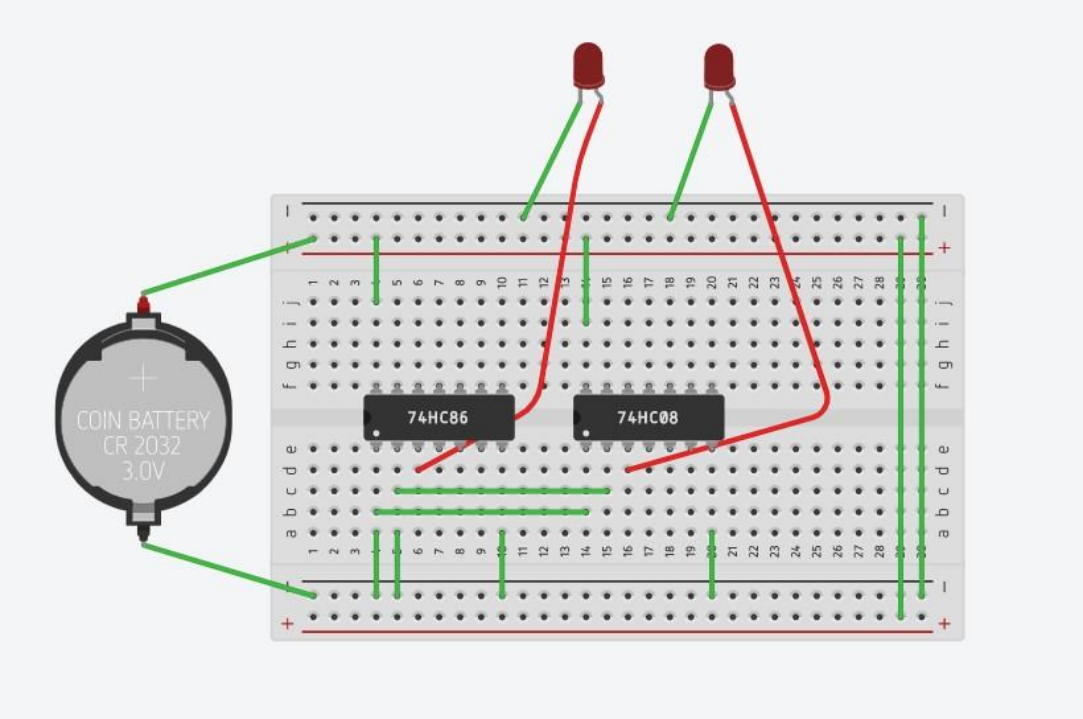
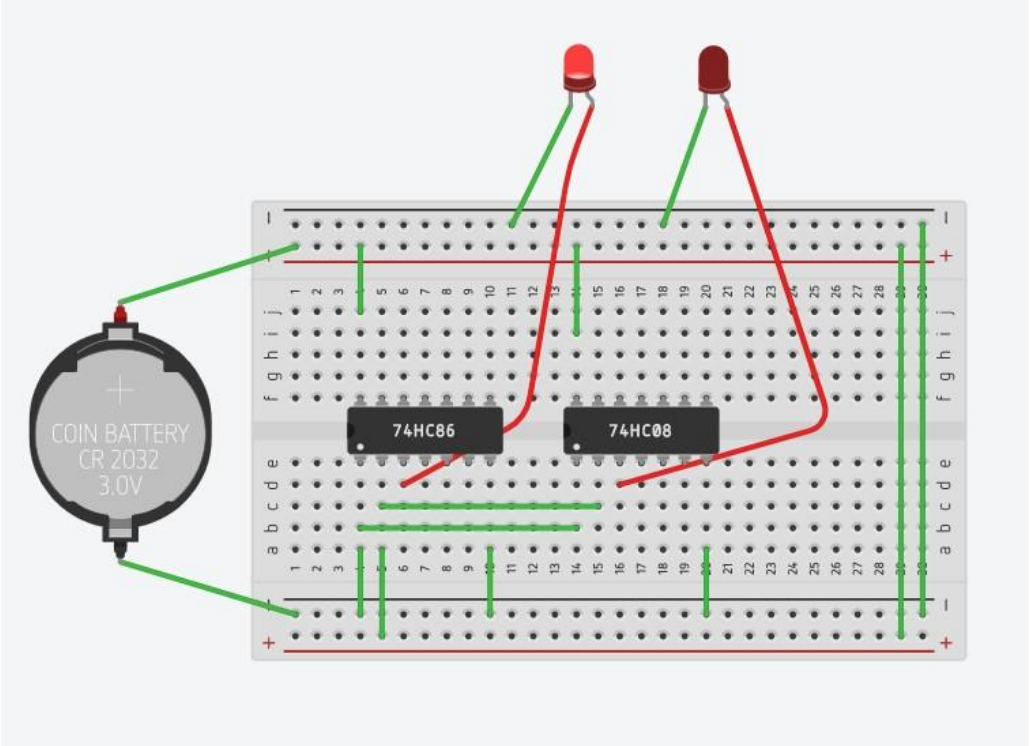


Fig 2. Half- adder

Connection in TINKERCAD:





FULL ADDER:

The Full –Adder circuit is used to add three binary digits. The two outputs are sum- Sand carry-C. The three inputs are input A, input B and carry input C. The outputs are sum Sand carry out X. The truth table is as shown in table-2.The combinations for sum and carry output is given as

S = A'B'C + A'BC'+ AB'C' + ABC X

= AB + BC + AC

The construction of Full adder using two EX-OR Gates, two AND Gates and one OR Gate is as shown in fig-4. The IC numbers are 7486, 7408 and 7432.

Fig 3. Full- adder Logic symbol

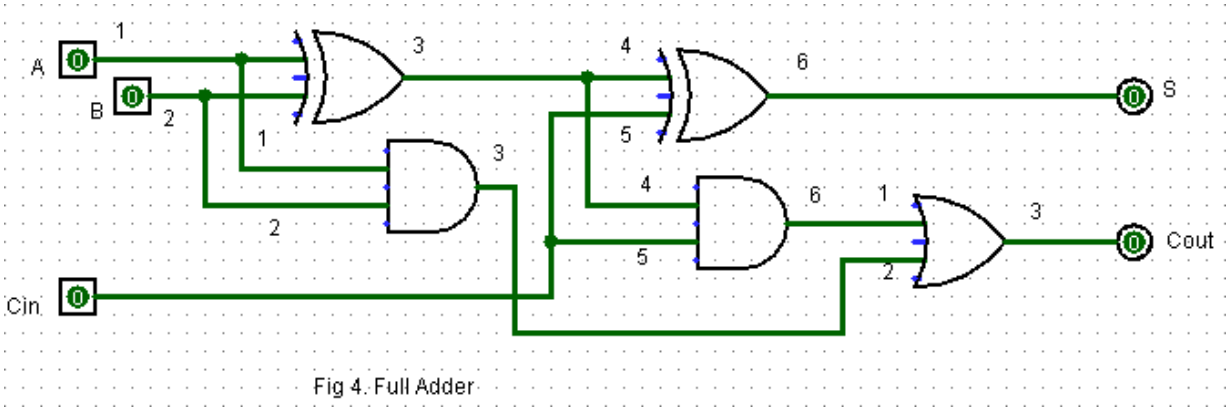


Fig 4. Full Adder

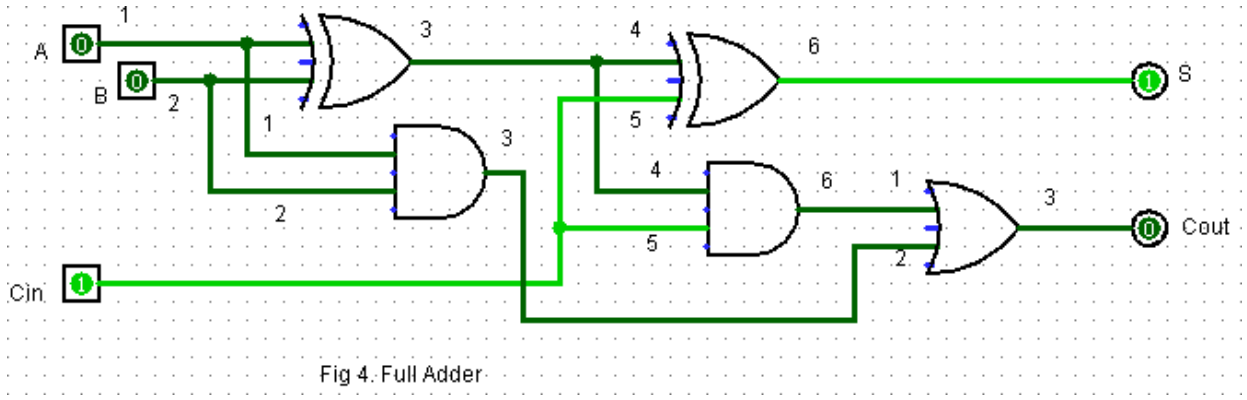


Fig 4. Full Adder

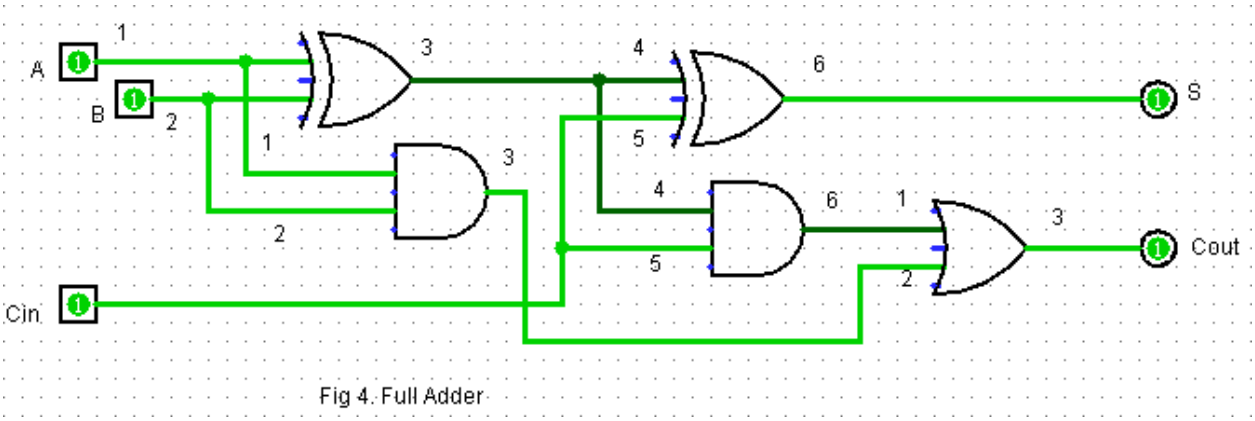


Fig 4. Full Adder

The construction of Full adder using two Half Adders is as shown in fig-5.

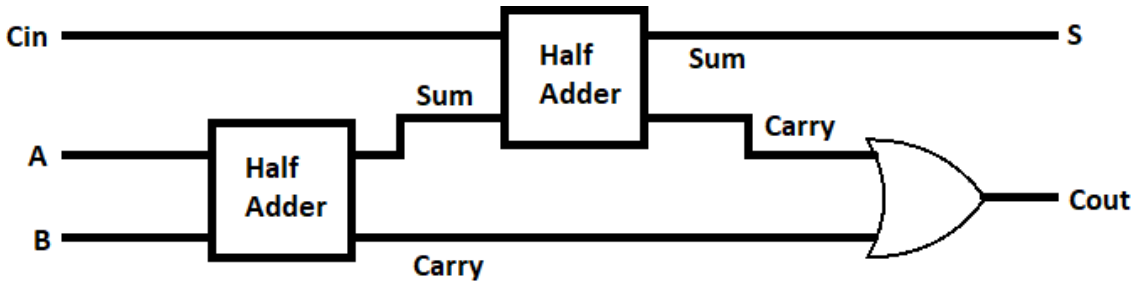
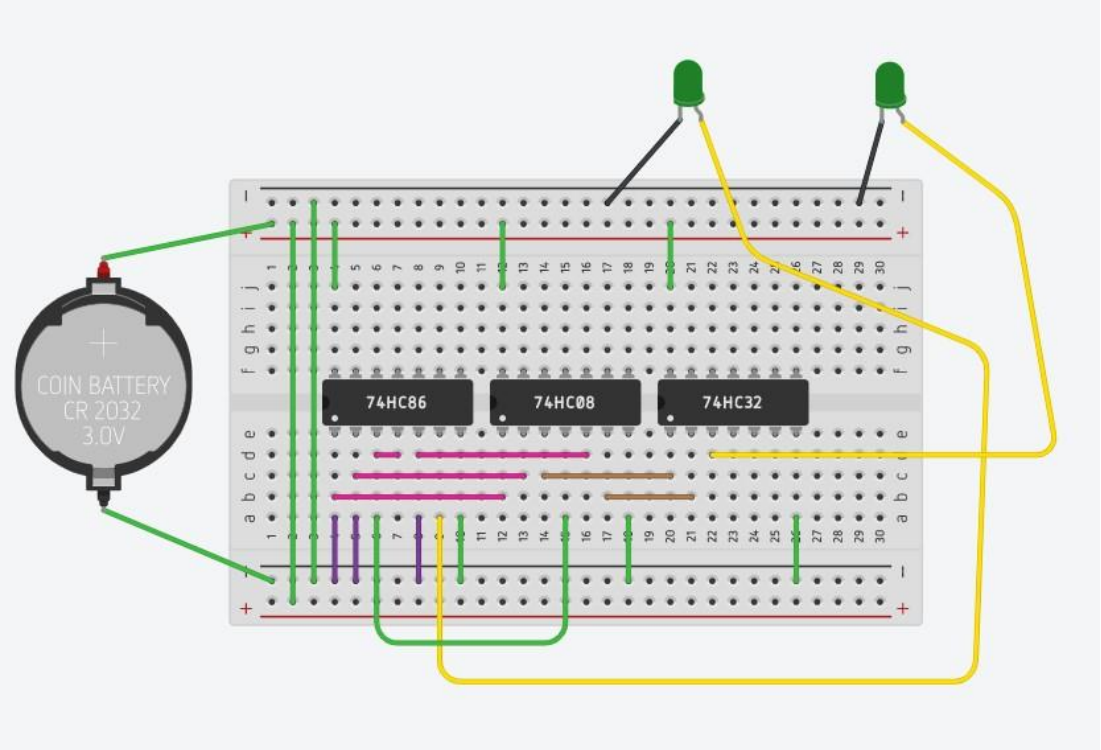
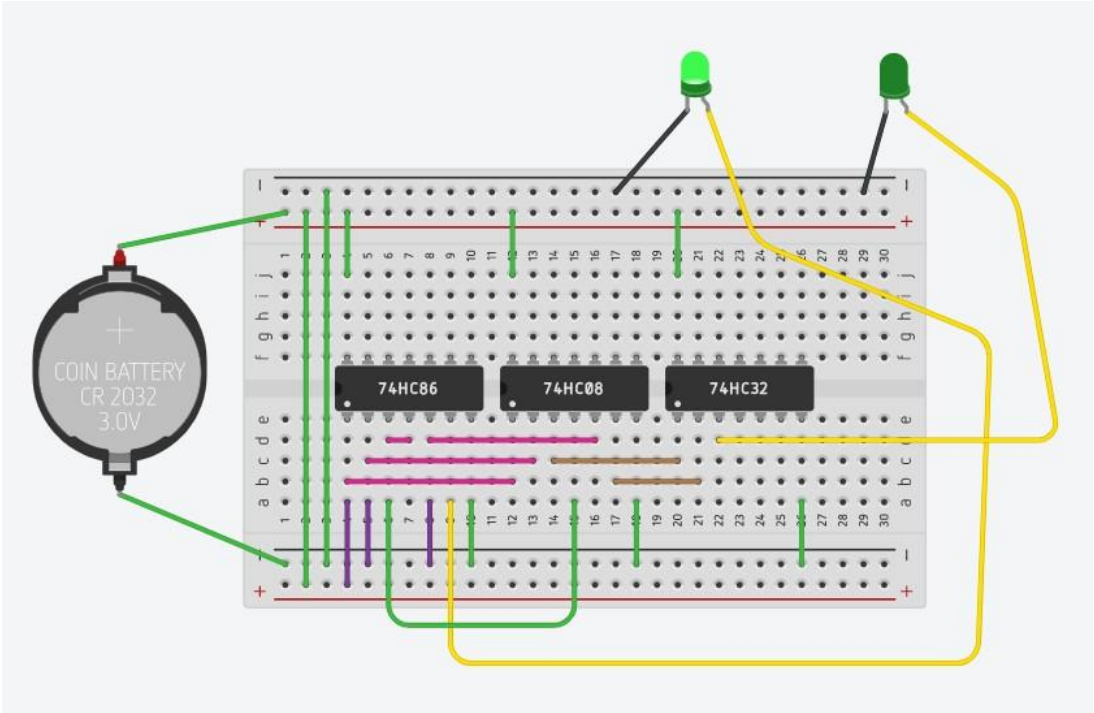
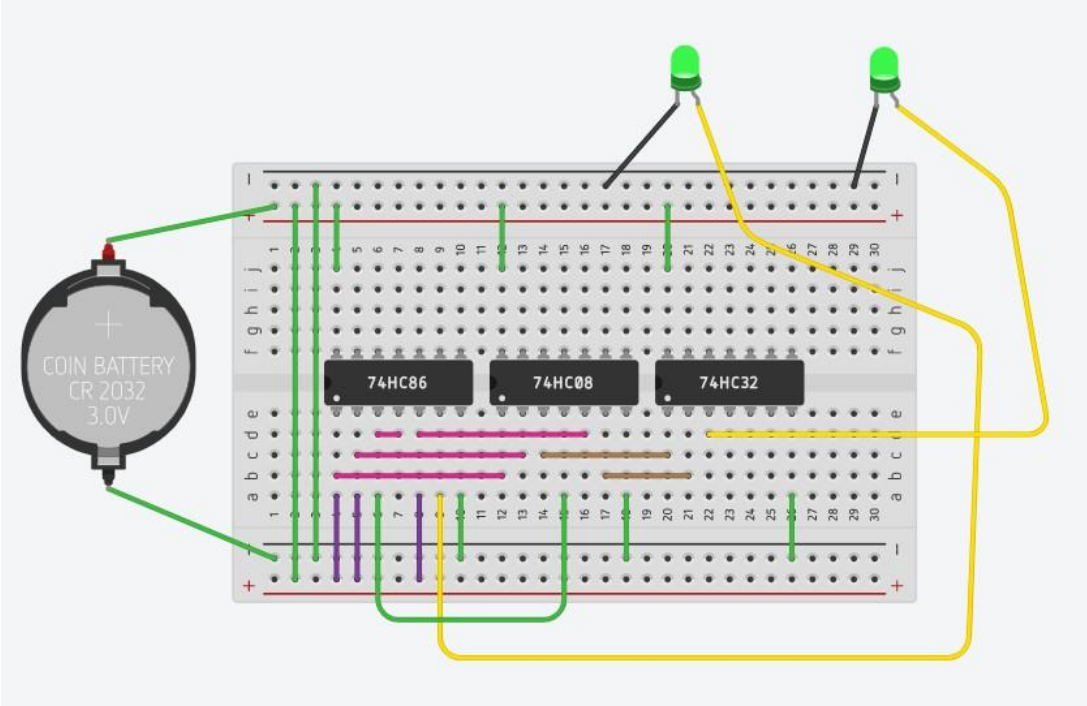


Fig 5. Full Adder Using Two Half Adders

Connection in TINKERCAD:







PROCECURE:

1. Firstly open logisim software.
2. Construct the circuit in logisim software and then give them number accordingto the pin diagram.
3. After that open tinkercad online simulator and take the necessary equipment for the experiment such as bread-board, IC, battery, led light etc.
4. And then with the help of pin diagram number construct the circuit on bread- board for each gate as shown in logisim software by inserting the appropriate IC
5. Check the combinations of various inputs from the logisim software for eachgates.
6. If the input is low then connect input to the ground, which indicates logic 0.
7. If input is high or logic 1 then connect the input to the power supply.
8. When output is high the LED will glow, which indicates the output as high, if the LED is not glowing then the output is low.

DISCUSSION:

This experiment was done by us from our home using some online tools such as logisim software and tinkercad online platform.In this experiment we use our devices such as laptop or computer for build the circuit and connection. And all of this work are done by us from home without touching any equipment such as bread-board or IC etc.This lab experiment is a little bit different than the previous lab because in this lab we use 2 bread-board for one circuit and a IC which ic can take 3 inputs and this thing is totally new for us and we learned it very well, our honourable teacher helps us a lot to realize how this types of ic works. And then we did it.Although this lab is on the online platform by using Logisim software and Tinkercad online stimulation. For this we can not do this experiment in real life.

But using this online stimulation system we can do our lab work at home.

In this lab we learned a lot of things such as how a 3 inputs IC work and 2 bread-board works etc. Above all of this things the lab experiment was really helpful for us.