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Class BS(SE)

 **FULL ADDER**

 **AIM:**

 Design and verify the logic circuit of Half-subtractor using logic gate. OBJECTIVES:

* To understand the principle of binary addition.
* To understand full adder concept.
* Use truth table and Boolean Algebra theorems in simplifying a circuit design.
* To implement full adder circuit using logic gates. PROCEDURE:
* Collect the components necessary to accomplish this experiment.
* Plug the IC chip into the breadboard
* Connect the supply voltage and ground lines to the chips. PIN7 = Ground and PIN14 = +5V.
* According to the pin diagram of each IC mentioned above, make the connections according to circuit diagram.
* Connect the inputs of the gate to the input switches of the LED.
* Connect the output of the gate to the output LEDs.
* Once all connections have been done, turn on the power switch of the breadboard
* Operate the switches and fill in the truth table (Write "1" if LED is ON and "0" if LED is OFF

. • Apply the various combination of inputs according to the truth table and observe the condition of Output LEDs.

 FULL ADDER:

 Full adder is a logical circuit that performs an addition operation on three binary digits. The full adder produces a sum and carry value, which are both binary digits. It can be combined with other full adders or work on its own



 

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Observation table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | b | Carry in  | Sum  | Carry out |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 | 1 |
| 1 | 1 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 |

RESULTS AND ANALYSIS:

 Verified the truth table as follows. Full Adder: Verified the truth table of Full Adder as S = 1 i.e. LED which is connected to S terminal glows when inputs are A, B, Ci Verified the truth table of Full Adder as Co = 1 i.e. LED which is connected to Co terminal glows when inputs are A, B, Co.

 CONCLUSION:

* To add two bits, we require one XOR gate (IC 7486) to generate Sum and one AND (IC 7408) to generate carry.
* To add three bits, we require two half adders.