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Computer Science
Submitted to:
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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:

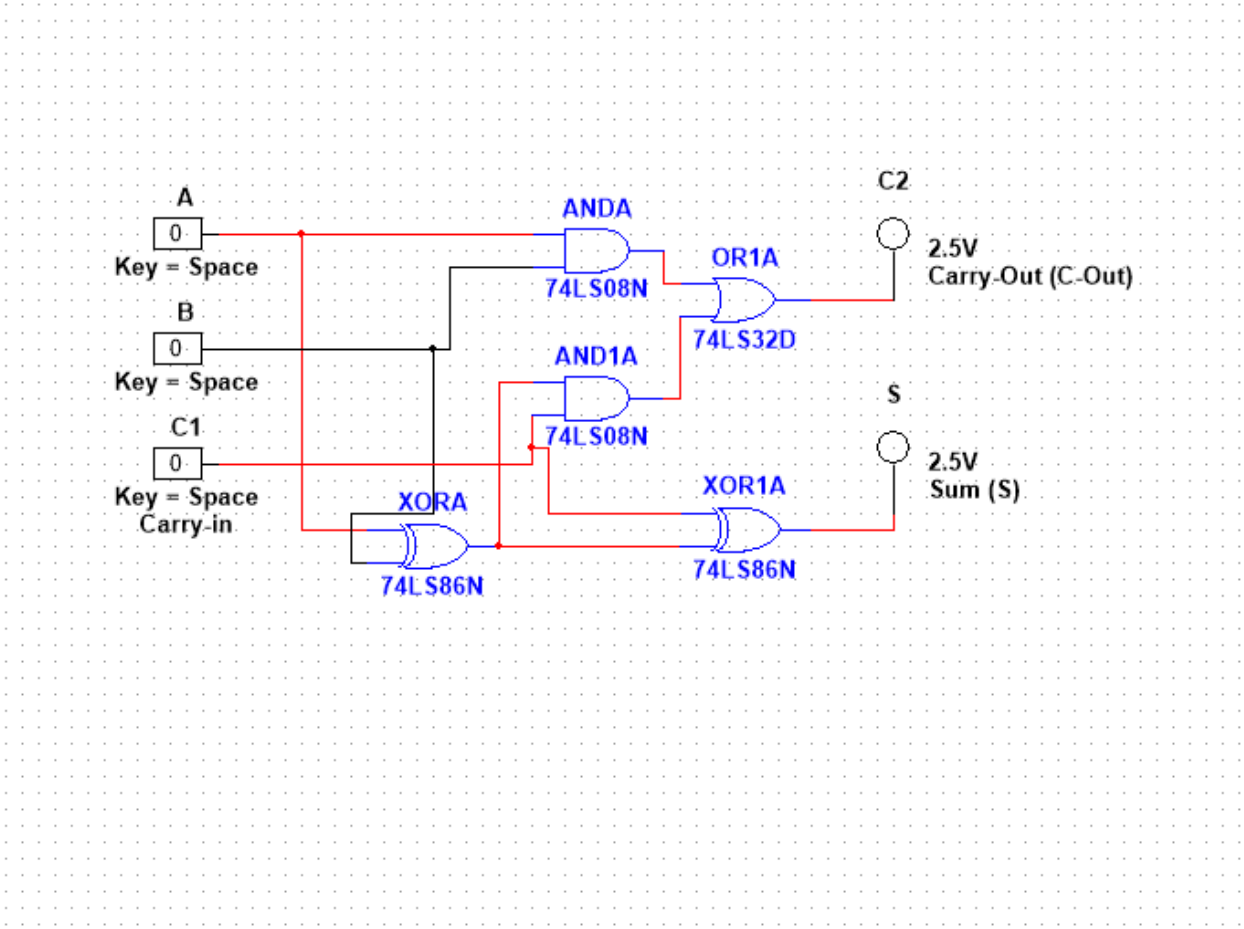
- • Collect the components necessary to accomplish this experiment.
- • Plug the IC chip into the breadboard
- • Connect the supply voltage and ground lines to the chips. PIN7 = Ground and PIN14 = +5V.
- • According to the pin diagram of each IC mentioned above, make the connections according to circuit 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.

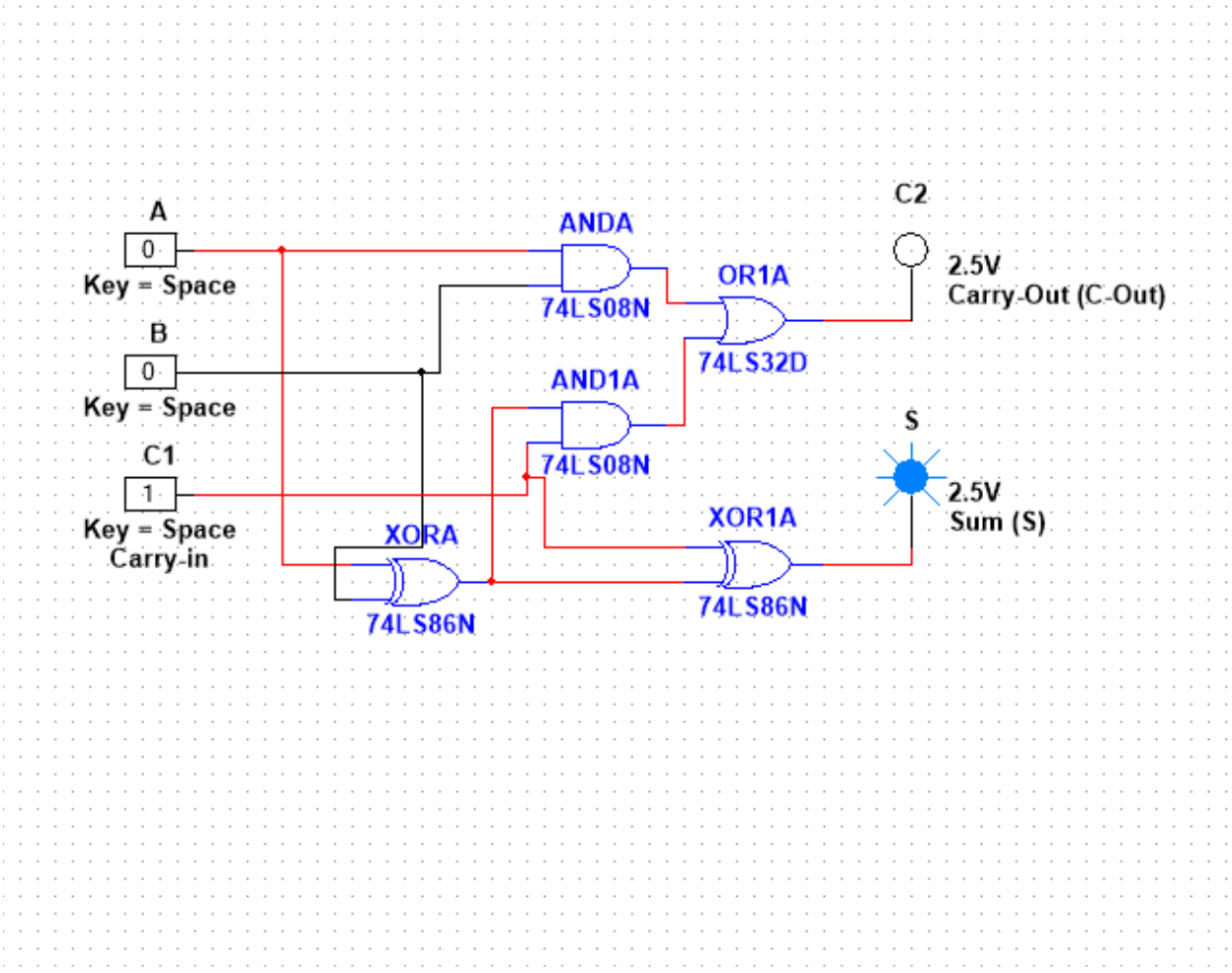
FULL ADDER:

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.

Observation Table:

A	B	Carry-in	Sum (S)	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

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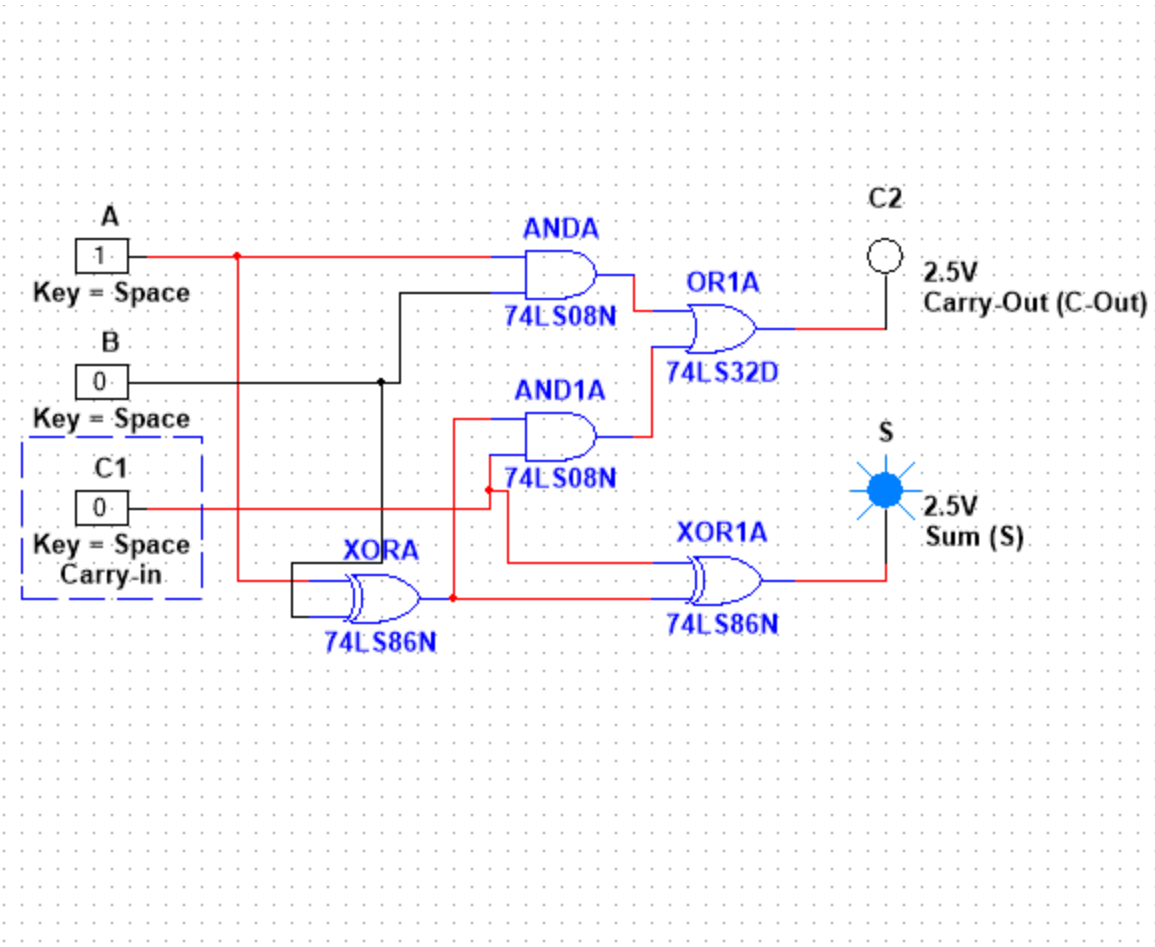
0
Key = Space
B
0
Key = Space
C1
1
Key = Space
Carry-in
ANDA
74LS08N
AND1A
74LS08N
XORA
74LS86N
OR1A
74LS32D
XOR1A
74LS86N
C2
2.5V
Carry-Out (C-Out)
S
2.5V
Sum (S)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Key = Space
B
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Key = Space
C1
0
Key = Space
Carry-in
ANDA
74LS08N
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74LS08N
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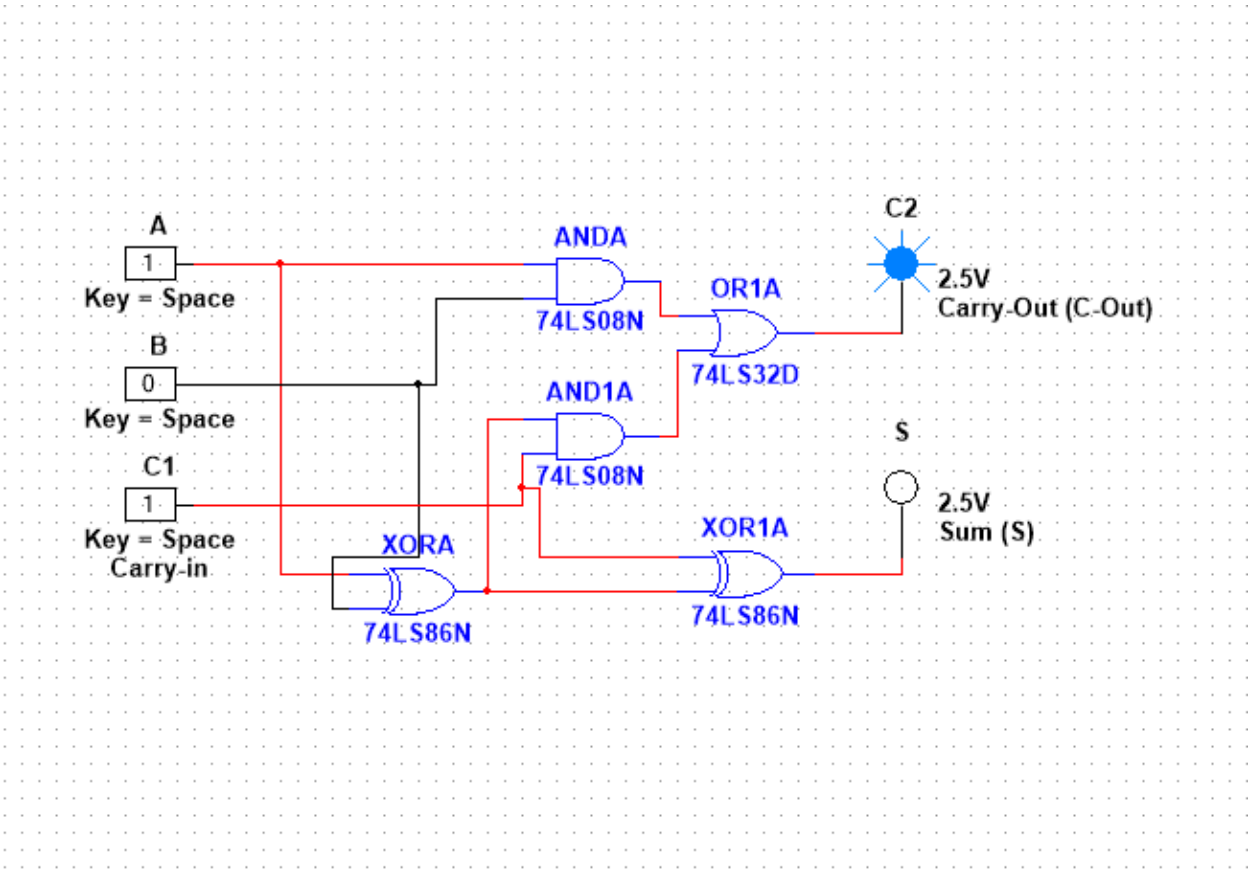
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Key = Space
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Key = Space
C1
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Key = Space
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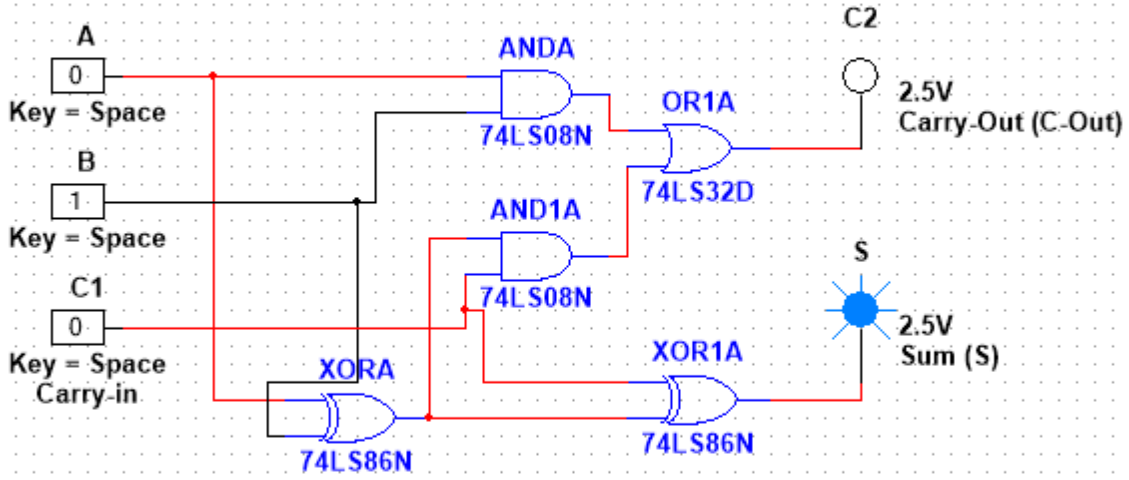
2.5V
Carry-Out (C-Out)
S
2.5V
Sum (S)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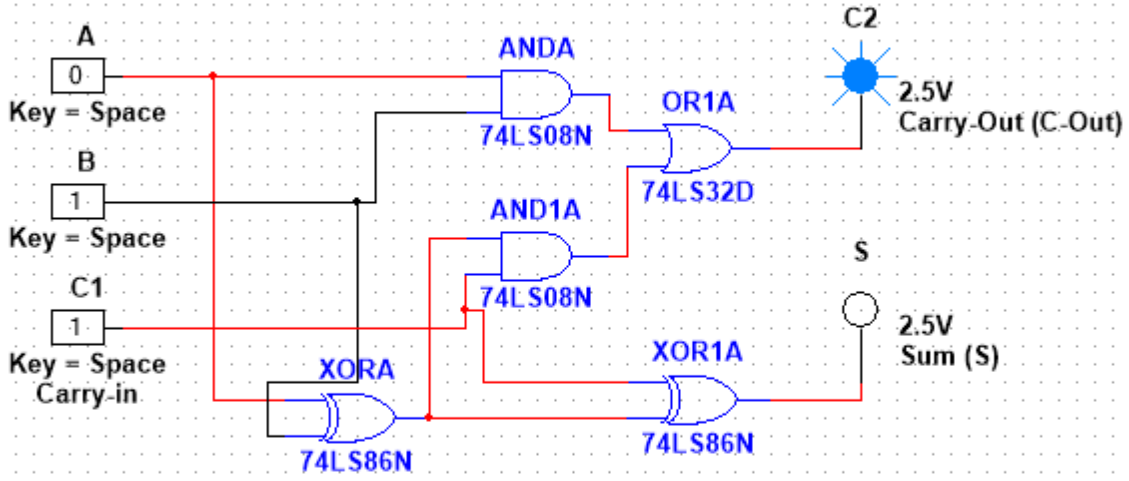
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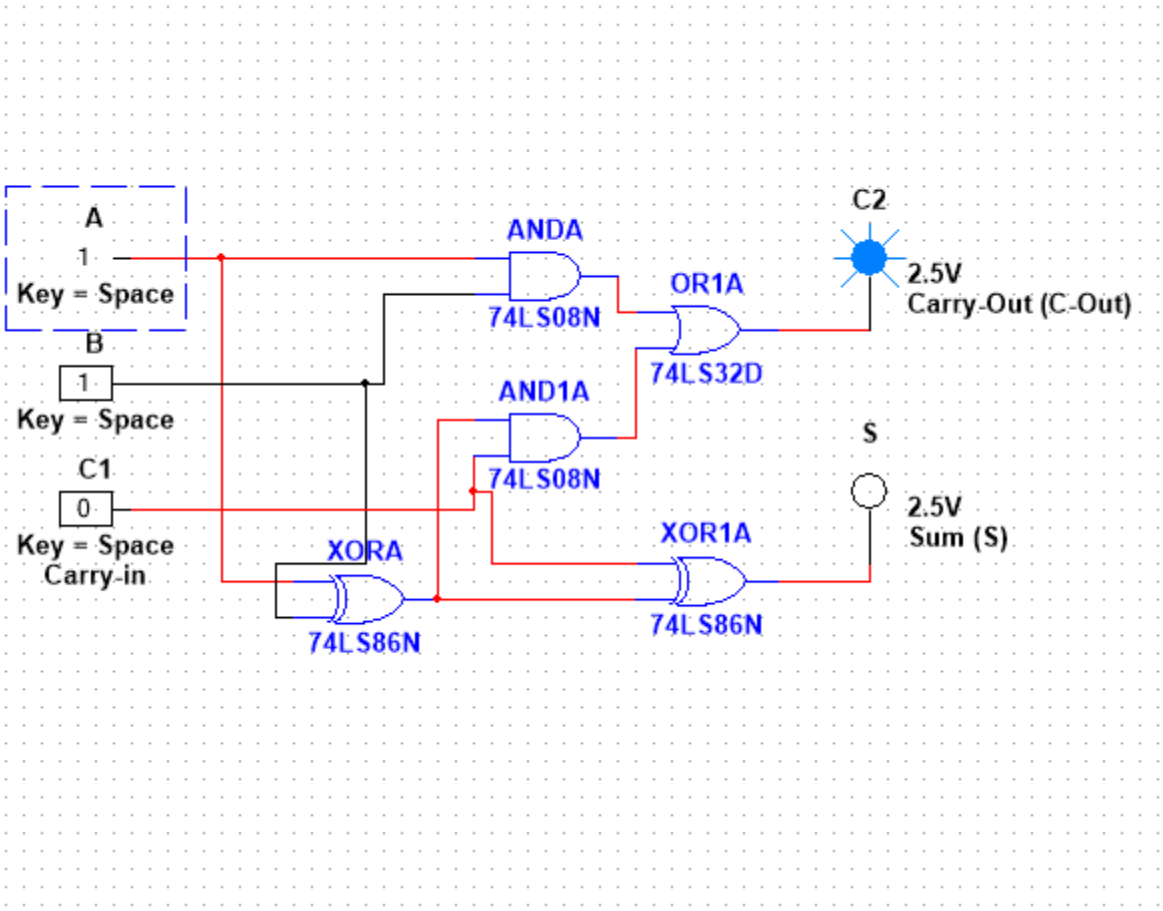
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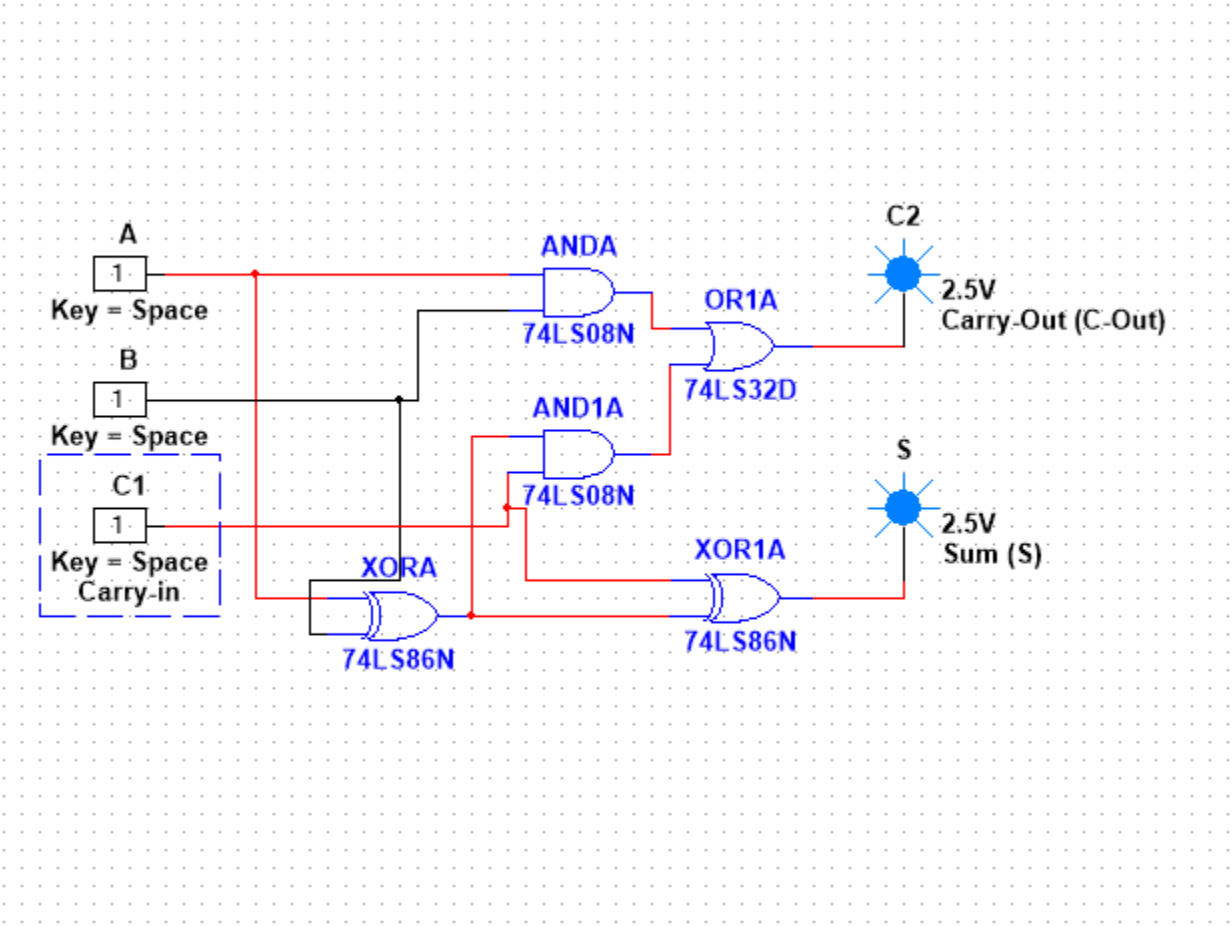

RESULTS AND ANALYSIS:

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.