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HALF ADDER

AIM:

Design and verify the logic circuit of Half adder using logic gates .

OBJECTIVES

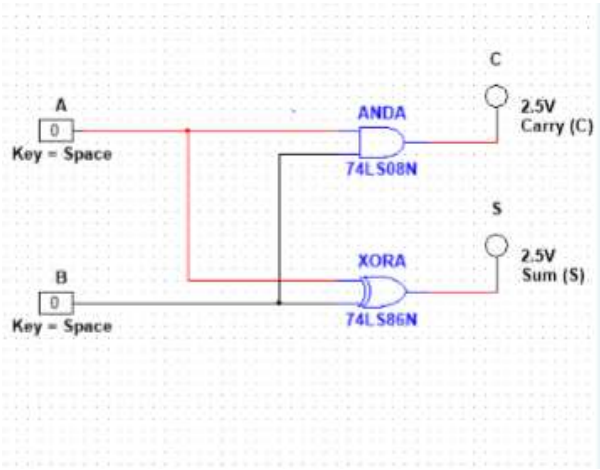
: • To understand the principle of binary addition. • To understand half adder concept. • Use truth table and Boolean Algebra theorems in simplifying a circuit design. • To implement half adder circuit using logic gates

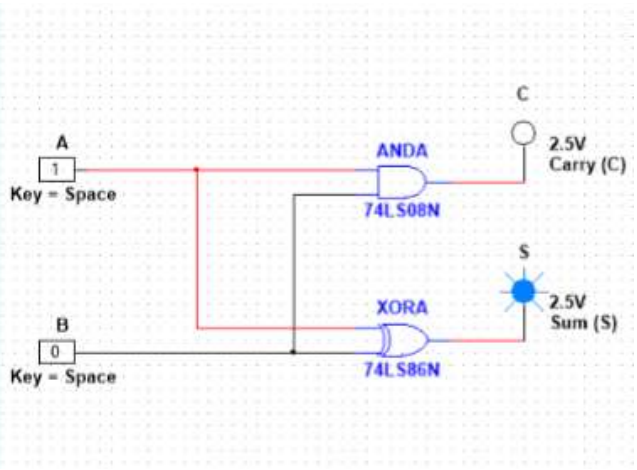
PROCEDURE:

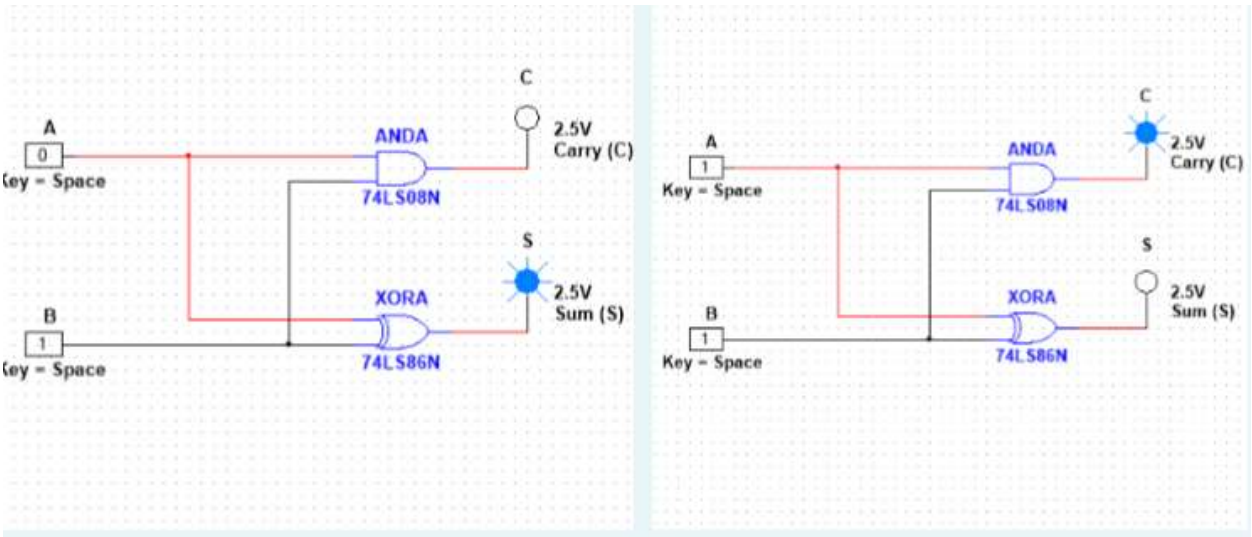
1. collect the components necessary to accomplish this experiment.
2. Plug the IC chip into the breadboard.
3. Connect the supply voltage and ground lines to the chips. PIN7 = Ground and PIN14 = +5V.
4. According to the pin diagram of each IC mentioned above, make the connections according to circuit diagram.
5. Connect the inputs of the gate to the input switches of the LED.
6. Connect the output of the gate to the output LEDs.
7. Once all connections have been done, turn on the power switch of the bread-board
8. 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. HALF ADDER: Half Adder: A half adder is a logical circuit that performs an addition operation on two binary digits. The half adder produces a sum and a carry value which are both binary digits.

OBSERVATION TABLE.

INPUTS		OUTPUTS	
A	B	X1	X2
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1







HALF SUBTRACTOR

AIM

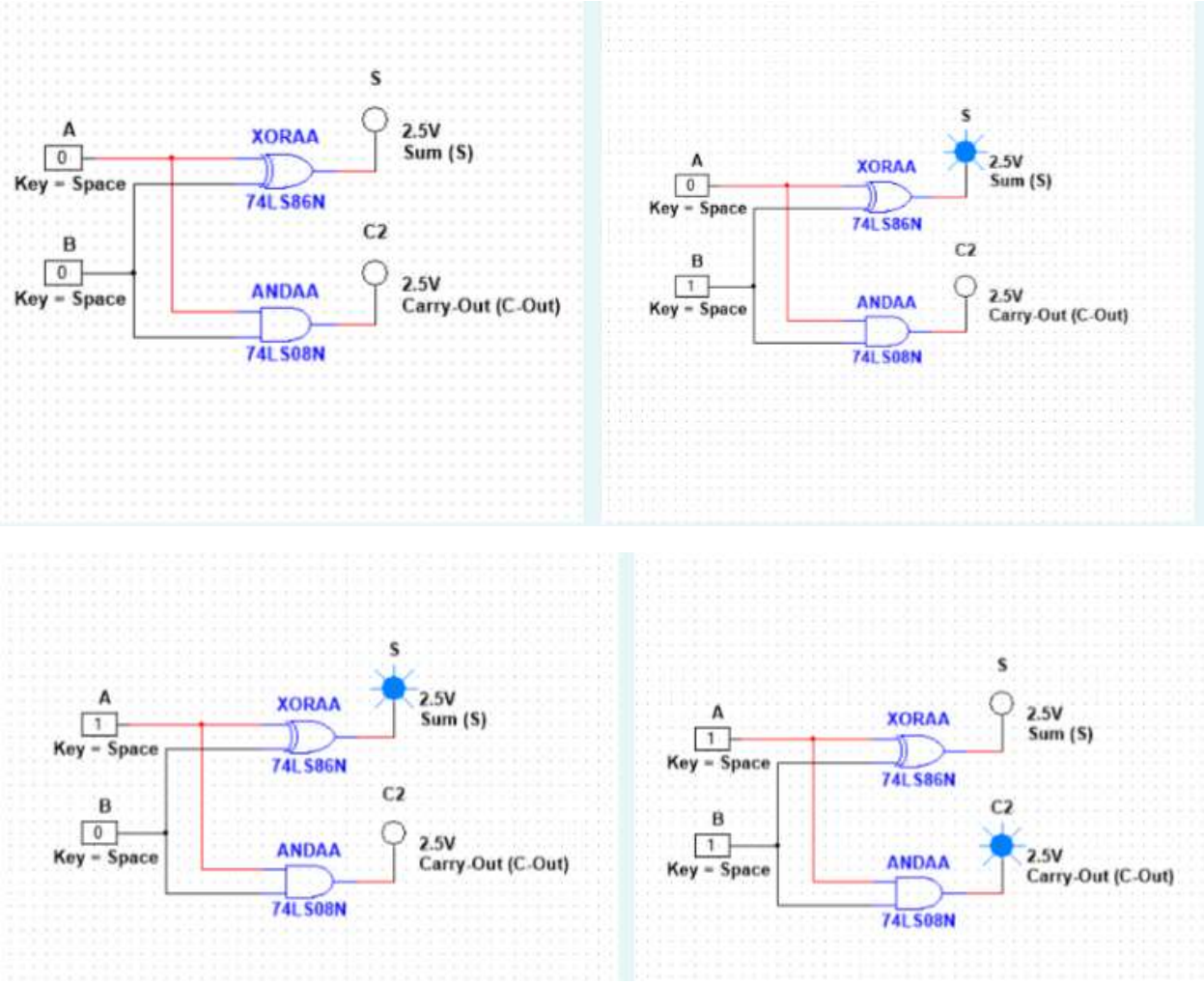
Design and verify the logic circuit of Half-subtractor using logic gate. OBJECTIVES:

- To understand the principle of binary subtraction.
- To understand half-subtractor concept.
- Use truth table and Boolean Algebra theorems in simplifying a circuit design.
- To implement half-subtractor 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 bread-board
- 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.

HALF SUBTRACTOR:

The half-subtractor is a combinational circuit which is used to per-form subtraction of two bits. It has two inputs, X (minuend) and Y (subtrahend) and two outputs D (difference) and B (borrow).



OBSERVATION TABLE.

A	B	D	B0
0	0	0	0
0	1	1	1
1	0	1	0
1	1	0	0

JK FLIP FLOP

AIM:

To Design and verify the truth table of J K Flip flop using IC 7473.

OBJECTIVES:

- To understand the principle of operation of sequential circuit
- To differentiate between combinational circuit and sequential circuit

. • To get familiar with basic Flip flops

- Determine the logic operation of JK flip flops.
- Connect and observe the state transition of JK as connected to the clock generator circuit.

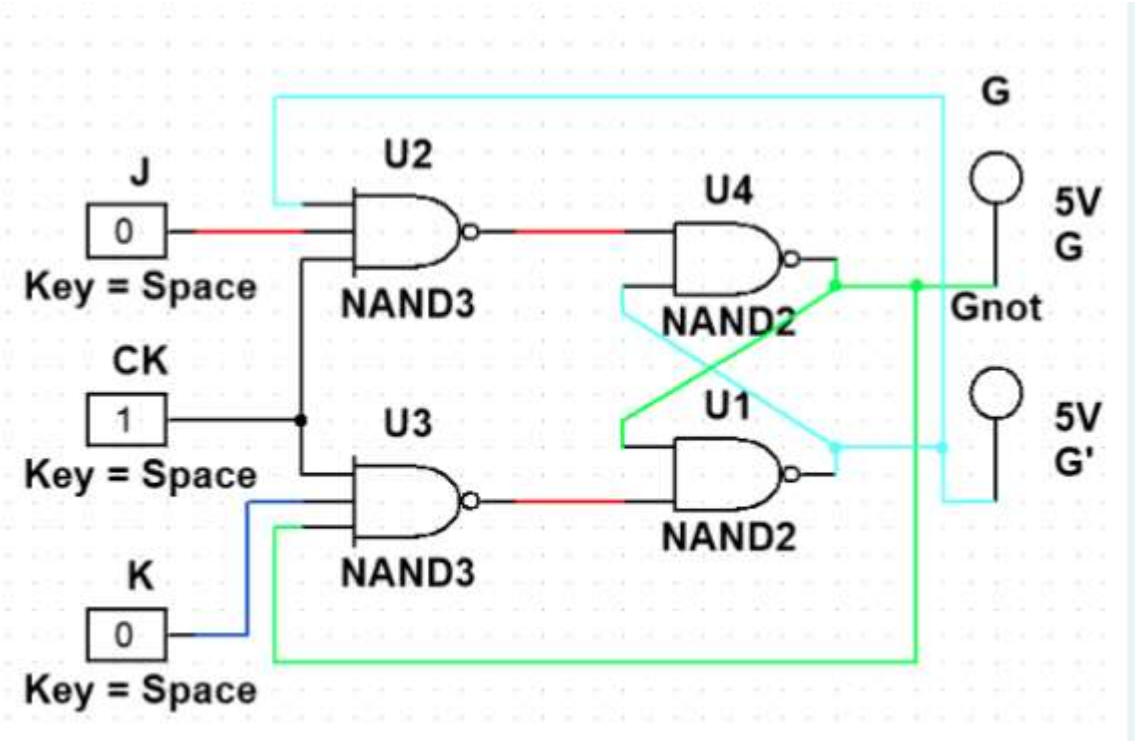
PROCEDURE:

- 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.

JK FLIP FLOP:

A flip-flop is a circuit that has two stable states and can be used to store state information. The circuit can be made to change state by signals applied to one or more control inputs and will have one or two outputs



OBERVATION TABLE.

CK	J	K	Q	Q.
1	0	0	-	-
1	0	1	0	1
1	1	0	1	0
1	1	1	0	1

Serial-In Serial-Out Shift Register (SISO) –

The shift register, which allows serial input (one bit after the other through a single data line) and produces a serial output is known as Serial-In Serial-Out shift register. Since there is only one output, the data leaves the shift register one bit at a time in a serial pattern, thus the name Serial-In Serial-Out Shift Register.

The logic circuit given below shows a serial-in serial-out shift register. The circuit consists of four D flip-flops which are connected in a serial manner. All these flip-flops are synchronous with each other since the same clock signal is applied to each flip flop.