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ROLL No : SU92-BSAIM-F24-200

SECTION: BSAI-2C

THE SUPERIOR UNIVESITY, LAHORE

TOPIC:

Digital Logic Design

Question no : 01

Half Subtractor:

A Half Subtractor is a combinational logic circuit that performs the subtraction of two binary bits. It has two inputs (minuend A and subtrahend B) and provides two outputs.

Full Subtractor:

A Full Subtractor is a combinational logic circuit that performs subtraction of three binary bits: two input bits (A and B) and a Borrow-in (Bin) from the previous stage.

Question no : 02

➢ Truth Table of Half Subtractor

A	B	D	Bin
0	0	0	0
0	1	1	1
1	0	1	0
1	1	0	0

➢ Truth Table of Full Subtractor

A	B	C	D	Bin
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	0
1	1	1	1	1

Question no : 03

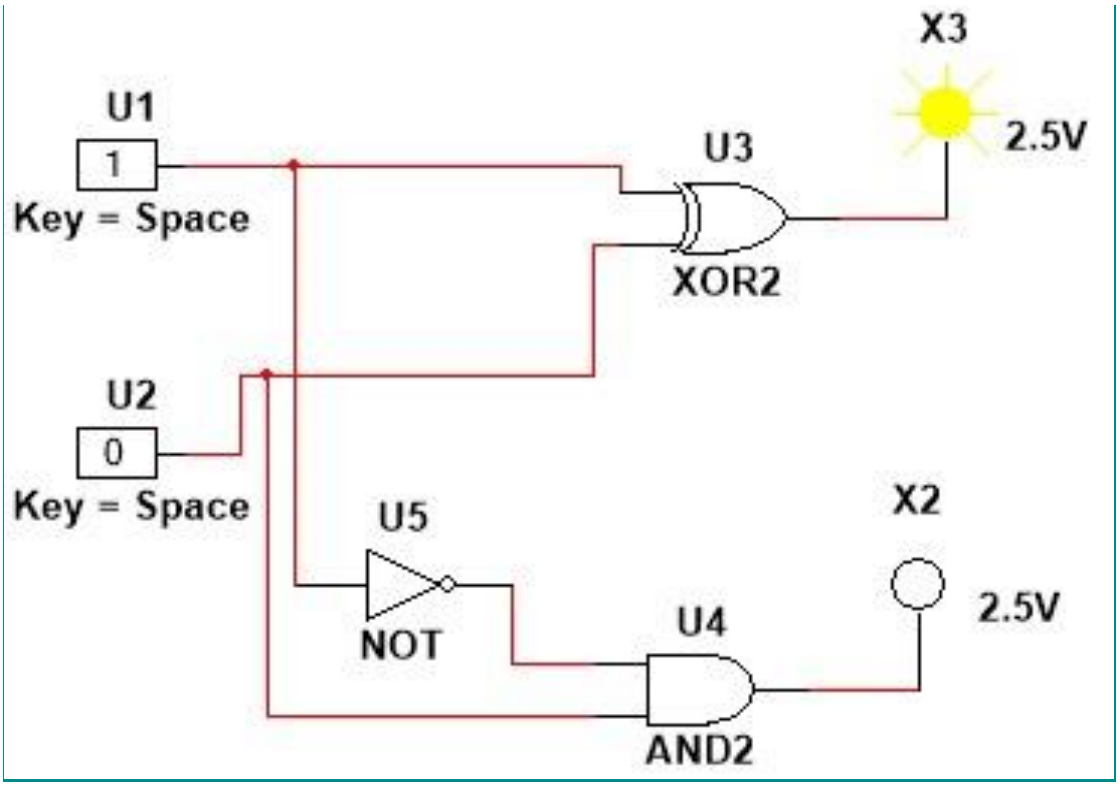
➢ Boolean Expression :

(1)

❖ Half Subtractor :

- Difference = $A \oplus B$
- Borrow = $A' \cdot B$

❖ Circuit :

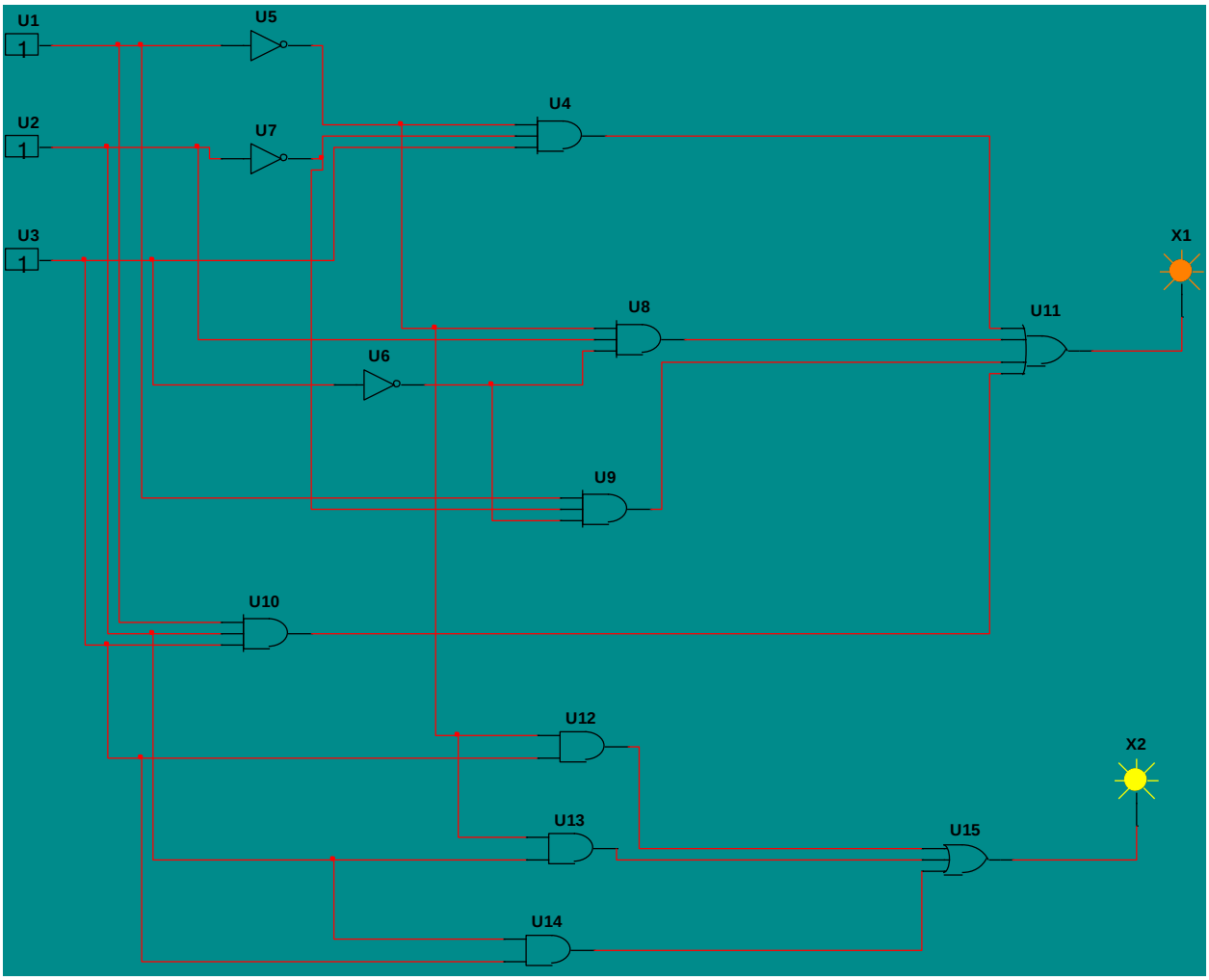


(2)

Full Subtractor :

- D = A ⊕ B ⊕ Bin
- (B · Bin) + (A' · (B + Bin))

Circuit :



Question no : 04

➢ Why We Take Difference and Borrow Outputs:

When subtracting binary numbers:

- The **difference** shows the result of subtracting the current bits.
- The **borrow** tells us if the current bit couldn't subtract properly and had to borrow **1** from the next higher bit.