Department of Computing and Information System

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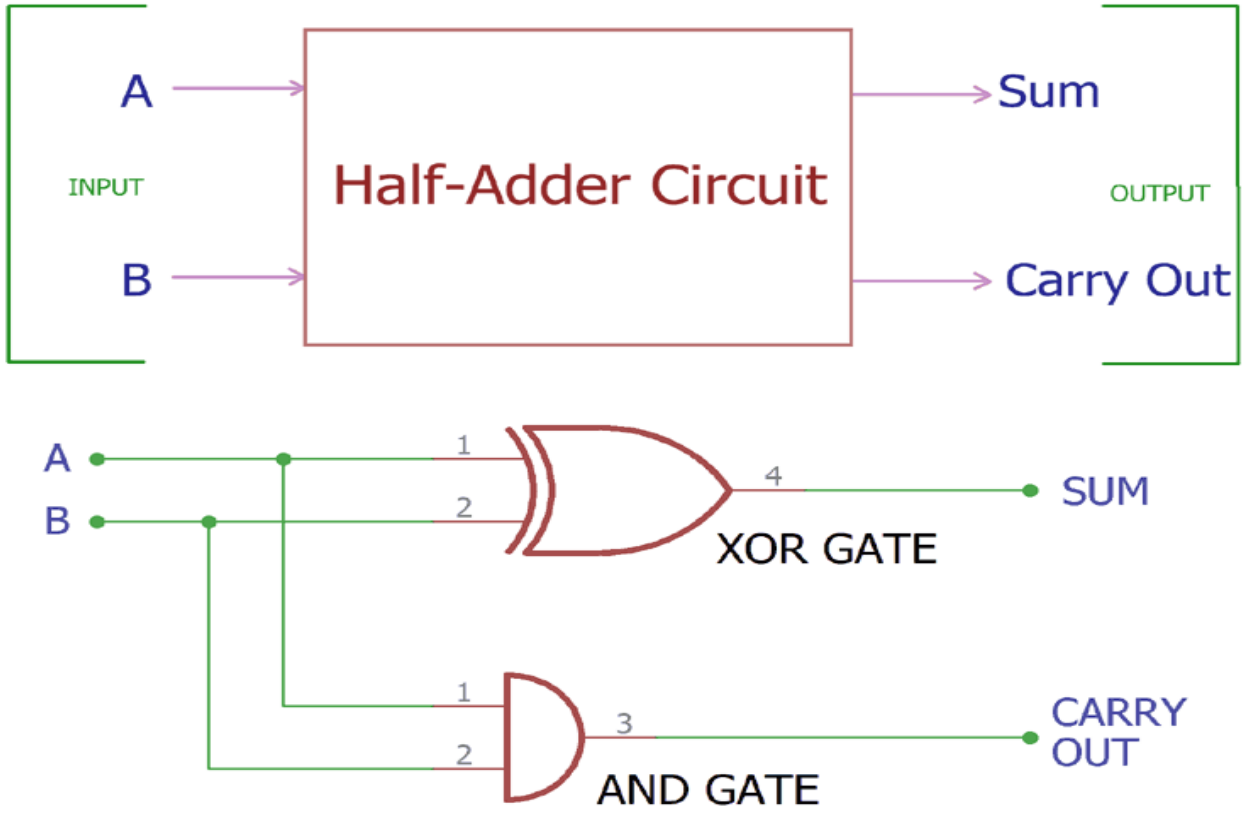
Sequential And Combinational ALU

TYPES OF DIGITAL LOGIC CIRCUITS IN ALU

- COMBINATIONAL CIRCUITS
- SEQUENTIAL CIRCUITS

BLOCK DIAGRAM OF A COMBINATIONAL CIRCUIT



Half-Adder & Full-Adder

- Half-Adder :
  - A half-adder is a combinational circuit that performs the addition of two bits.

- Full Adder :
  - This type of adder is a little more difficult to implement than a half-adder.
  - The main difference between a half-adder and a full-adder is that the full-adder has three inputs and two outputs.

x	y	z	S	C
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

$S = x'y'z + x'yz' + xy'z' + xyz$

$= x'(y'z + yz') + x(y'z' + yz)$

$= x'(y \oplus z) + x(y \odot z)$

$= x'A + xA'$

$= x \oplus A$

$= x \oplus ((y \oplus z)$

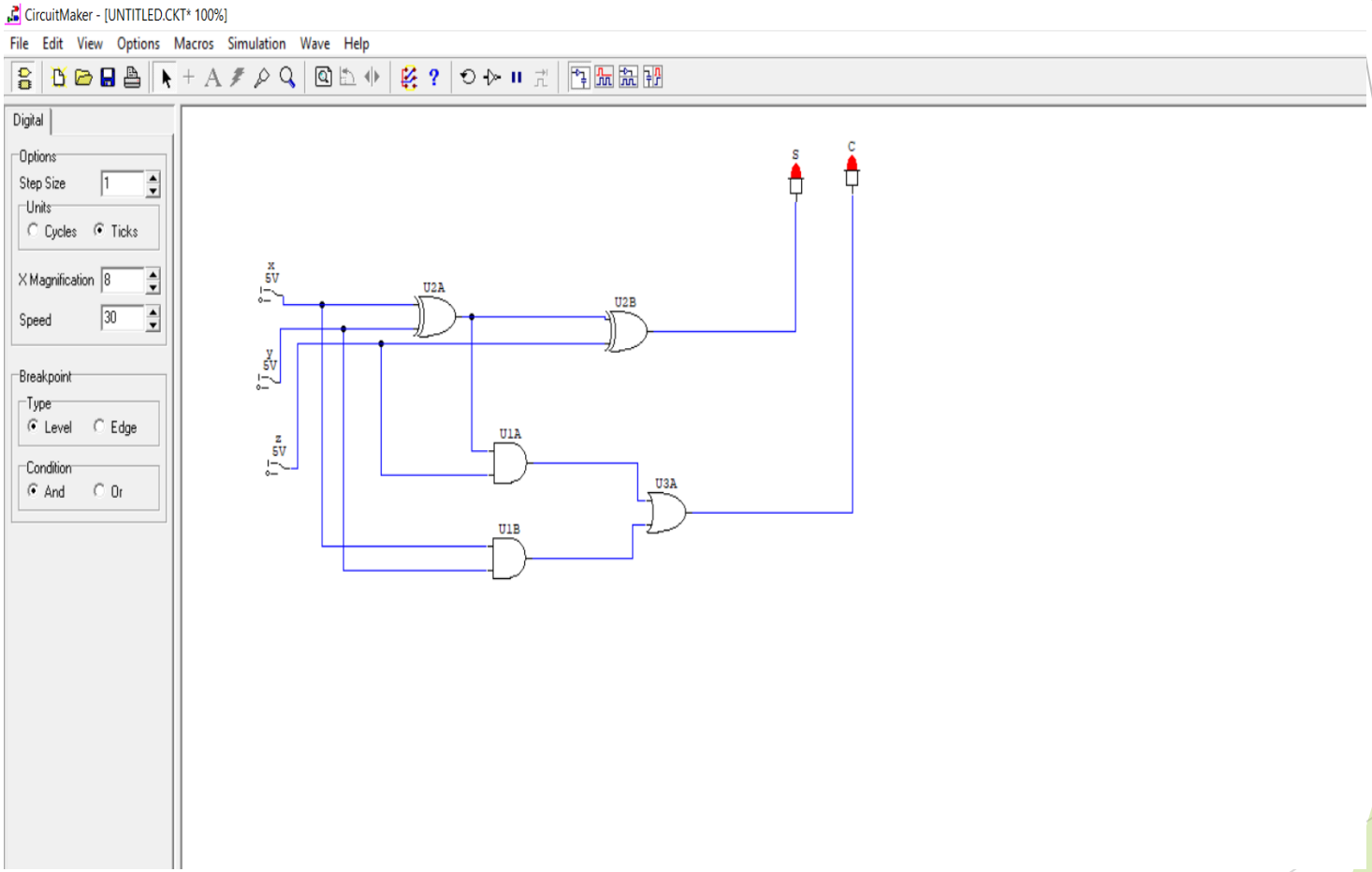
$A = y(+)z$

$C = x'yz + xy'z + xyz' + xyz$

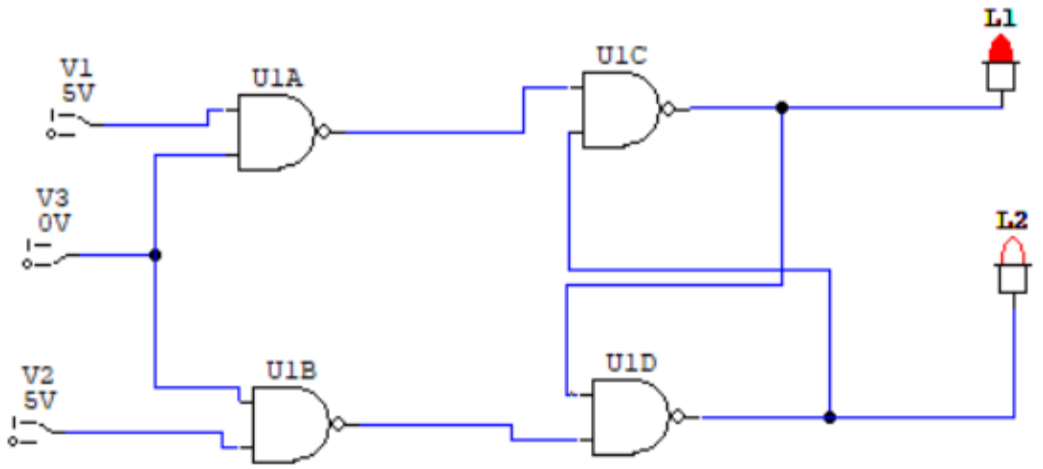
$= z(x'y + xy') + xy(z' + z)$

$= z(x(+)y) + xy$

$z(x \oplus$


CircuitMaker - [UNTITLED.CKT* 100%]
File Edit View Options Macros Simulation Wave Help
Digital
Options
Step Size 1
Units
Cycles Ticks
X Magnification 8
Speed 30
Breakpoint
Type
Level Edge
Condition
And Or
x
5V
y
5V
z
5V
U2A
U2B
U1A
U1B
U3A
S
C

BLOCK DIAGRAM OF A SEQUENTIAL CIRCUIT



Thanks to All

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