ASSIGNMENT-3

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Contents

1 Question

1) The figure below shows the i^{th} full-adder block of a binary adder circuit.C_i is the input carry and C_{i+1} is the output carry of the circuit. Assume that each logic gate has a delay of 2 nanosecond, with no additional time delay due to the interconnecting wires. Of the inputs A_i , B_i are available and stable throughout the carry propagation, the maximum time taken for an input C_i to produce a steady-state output C_{i+1} is _____ nanosecond.

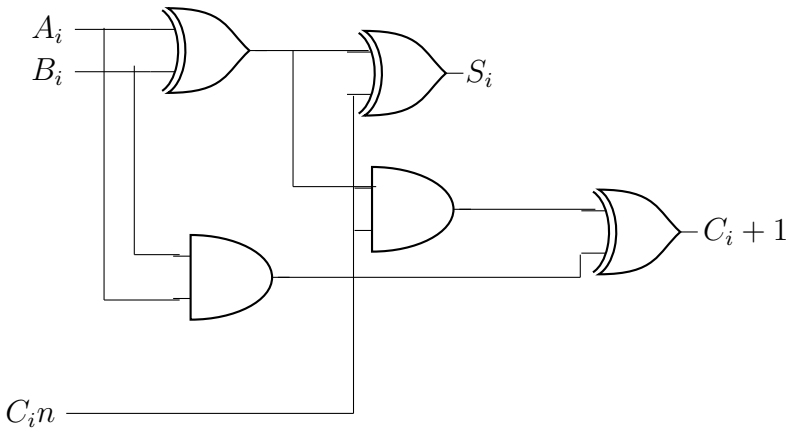


Fig. 1: full adder

2 Components

Component	Values	Quantity
ArduinoUNO		1
JumperWires	M-M	5
Breadboard		1
LED		5
Resistor	220ohms	5

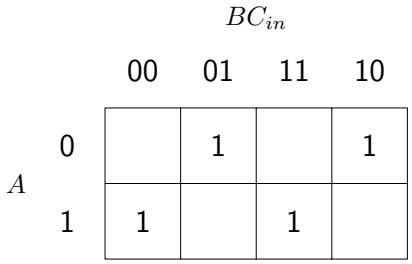
figure.a

3 TruthTable

A	B	C_{in}	S	C_{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

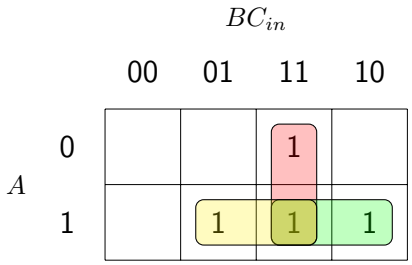
TABLE I: Truth Table for "full adder"

4 K-Maps



K-Map for sum equation.

$$S = A \oplus B \oplus C_{in} \tag{1}$$



K-Map for carry equation.

$$C_{out} = AB + C_{in}(A \oplus B) \tag{2}$$

5 Implimentation

Arduino Pin	resistor	input	output
5	resistor	A	
4	resistor	B	
3	resistor	C_{in}	
8	resistor		S
9	resistor		C_{out}

TABLE II: implementation

6 Procedure

1) Connect the circuit as per the above table.
2) The leds 1, 2 and 3 represent the values of inputs A, B and C_{in} respectively.
3) The leds 4 and 5 represent the output values i.e S and C_{out} respectively.
4) Execute the circuits using the below code.

https://github.com/komatinenicharan/FWC/blob/main/platformia/code/ch.cpp