

Solutions PDF Generated from: solutions-openai-generated/labs/lab-02-solutions-set-01.json

Question A

Fill out the truth table, which describes the operation of a full adder. We use the inputs A, B, CI and the outputs are called S and CO.

A	B	CI	S	CO
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

Question B

Derive the Boolean equations for both outputs of a full adder. Apply logic minimization techniques to come up with a simplified full adder circuit.

Full Adder Boolean Equations:

Output S = $A \oplus B \oplus Cin$

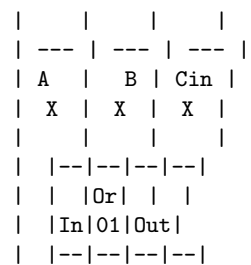
Output Cout = $(AB) + Cin (A \oplus B)$

Logic Minimization:

Output S = $A \oplus B \oplus Cin$

Output Cout = $AB + Cin (A \oplus B)$

Simplified Full Adder Circuit:



```

|   |   |   | | |
|   |   |   |
| |--|--|--|--|
|   |And|   |
| |In|02|Out|
| |--|--|--|--|

```

Question C

Draw the schematic of the full adder circuit according to the equations you have derived.

![Full Adder Schematic](full_adder_schematic.png)

Question D

Generate full adder Verilog code for outputs co (carry out) and s (sum)

```

module full_adder( input a,input b,input ci, output co,output s);

    //assign the variables with their respective values
    assign s = a ^ b ^ ci;
    assign co = (a & b) | (ci & (a ^ b));

endmodule

```

Execution Time

0:00:28.109315

OpenAI Parameters

Model: text-davinci-003, Max. Tokens: 1024, Temperature: 1, N: 1