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| **EECS 2070 02 Digital Design Labs 2020**  **Lab 1** |
| **學號：123456789 姓名：XXX** |

// This is the template of the report. Remove all the comments before submission.

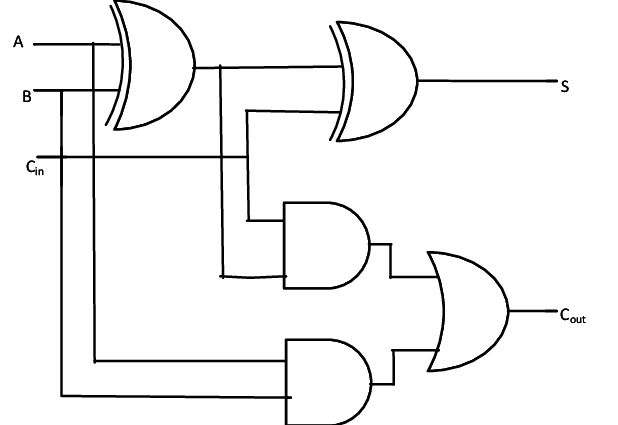
// 繳交前記得移除藍色註解部分

// You may extend the sections or add additional one.

// 你可以延伸以下內容，或加入額外章節。

1. 實作過程

// Problem description with the block diagram



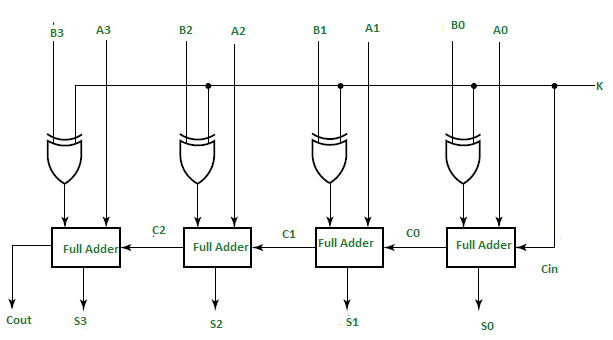
1. Full Adder

In this block diagram, A=a, B=b, Cin=c, S=d, Cout = e.

From this homework full adder regulations, we have to use the sub as a signal to toggle the value of b.

So, according to the circuit diagram, I used 1 xor gate and 2 and gates. By using the behavioral modeling, I, then use a switch case of the value of the sub to determine when to toggle the value of b.

Once the value of d and e has been assigned correctly, the output and input value, is then connected to the test bench to check whether the implementation is correct by simulating the 2n possible output.



1. 4-bit Adder using 4 1-bit full Adder

In this block diagram Ai = ai, Bi = bi, K =Sub Si = di,. My implementation process is simple, since I have previously implemented a 1-bit full adder, I just make an interconnection between my previous full adder and the 4 bit –adder by importing the filename of the previous full adder followed by the module name of each different adder. I also use a 4 xor gates which helps determine whether to toggle b or not.

lab1\_1 full\_adder1(.e(e[0]),.d(d[0]),.a(a[0]),.b(b[0]),.c(sub),.sub(sub));

lab1\_1 full\_adder2(.e(e[1]),.d(d[1]),.a(a[1]),.b(b[1]),.c(e[0]),.sub(sub));

lab1\_1 full\_adder3(.e(e[2]),.d(d[2]),.a(a[2]),.b(b[2]),.c(e[1]),.sub(sub));

lab1\_1 full\_adder4(.e(e[3]),.d(d[3]),.a(a[3]),.b(b[3]),.c(e[2]),.sub(sub));

in this snippet of code, each value is being passed to the full adder inside brackets. The reason that sub is passed to c, is because the c value implemented which is the Cin of the previous full adder is being used to toggle the b in this implementation and this same sub become the Cout of the 4-bit adder.

// Any skills used in this lab

1. Full Adder

Skills of basic C programming language referring to the switch statement, using conditional operator in the if statement and function call of test and printerror.

1. 4-bit Adder using 4 1-bit full Adder

Skills of basic C programming language referring to function call of test and printerror, use of flag.

// 建議多用圖片佐以文字輔助說明

1. 學到的東西與遇到的困難

// Any problems encountered and solved

1. Full Adder

I was unable to use the variable declare with wire inside the always.

1. 4-bit Adder using 4 1-bit full Adder

I learned how to import and use the full adder inside the 4-bit adder.

// ex. 學會如何分辨wire & reg

1. 想對老師或助教說的話

// Any suggestions to the course

// ex. 對課程或lab課的建議

// ex. 提供笑話給老師

// ex. 想對老師或助教告白(?)