

Lab 2: Design and Build a 2-bit Binary Adder

1 Overview

The goal of this lab is to design and build a 2-bit binary adder in the laboratory. This lab is divided in two parts:

- a. Design an **1-bit full adder** and build it using NAND and XOR gates

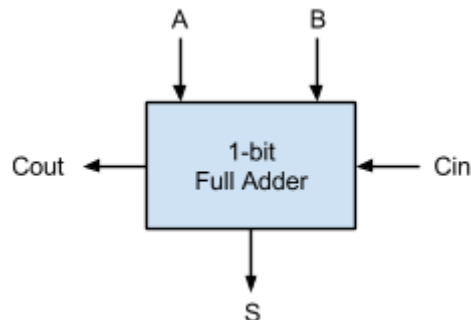


Fig. 1: 1-bit full adder

- b. Design a **2-bit binary adder** concatenating two 1-bit full adders

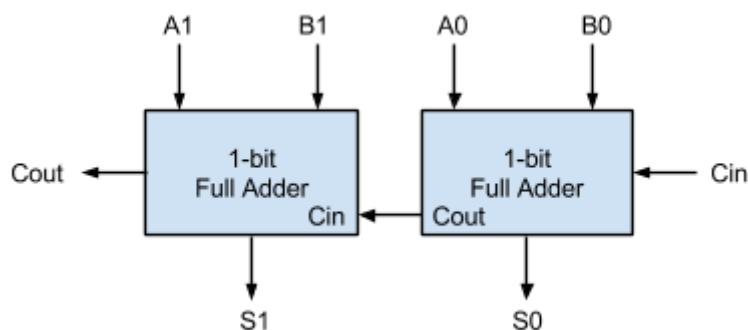


Fig. 2: 2-bit binary full adder

2 Development

2.1 Design phase

- The circuit design must be completed at home. It must be summarized in the corresponding lab notebook.
- Both 1-bit full adders must be designed using 2-input NAND gates and 2-input XOR gates.

2.2 Building and debugging phase

- Use the following ICs to mount the circuit: 7486 (4 2-input XOR) and 7400 (4 2-input NAND)
- Connect all the inputs and outputs to switches and leds, according to the order selected in the lab notebook
- Once mounted, check the whole 2-bit binary adder truth table. If the circuit does not work, debug it to find all the errors and to fix them
- If the circuit is correctly working, show the final design to you lab. professor