**King Saud University**
College of Computer and Information Sciences
Department of Computer Science

# CSC 220: Computer Organization

## Labwork - 6#

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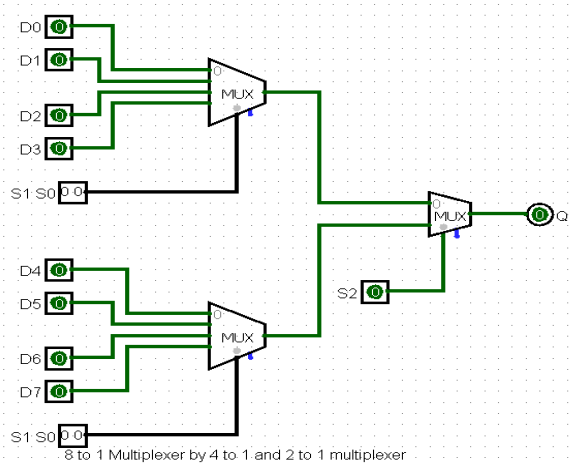
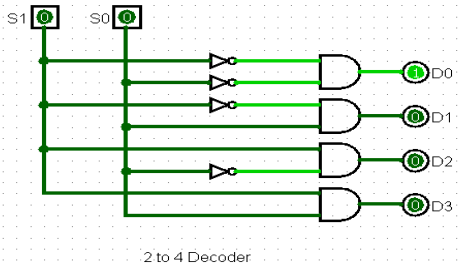
## 1. Introduction

In this lab, the goal was to design and implement different types of digital circuits, specifically focusing on multiplexers 1 to 2 and 2 to 4, decoders, and a full adder. These circuits were drawn in Logisim, and truth tables were created to verify their functionality. By analyzing how different circuits work with various input combinations, I gained a better understanding of how multiplexers select inputs

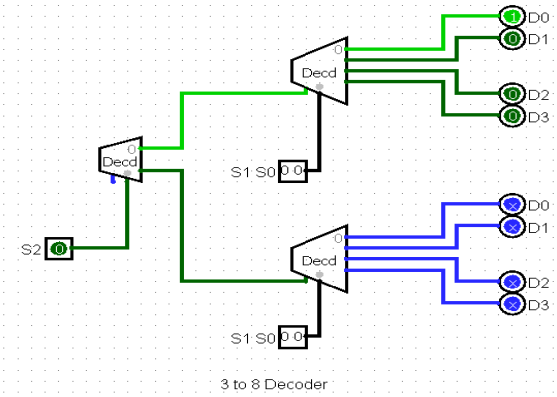
## 2. Experiments



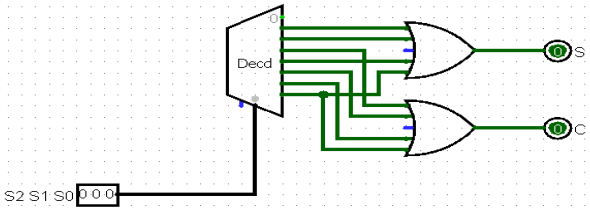
8 to 1 Multiplexer by 4 to 1 and 2 to 1 multiplexer



2 to 4 Decoder



3 to 8 Decoder



Full Adder by Decoder

## 3. Results

You should give the results of each experiment. You may use the truth table to verify the circuits you designed

| S2 | S1 | S0 | Q |
|---|---|---|---|
| 0 | 0 | 0 | D0 |
| 0 | 0 | 1 | D1 |
| 0 | 1 | 0 | D2 |
| 0 | 1 | 1 | D3 |
| 1 | 0 | 0 | D4 |
| 1 | 0 | 1 | D5 |
| 1 | 1 | 0 | D6 |
| 1 | 1 | 1 | D7 |

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## 4. Discussion

Through this lab, I learned how to design and implement multiplexers, decoders, and a full adder using Logisim. Each circuit was tested using truth tables, which helped verify their accuracy. The truth table for the 8-to-1 multiplexer confirmed that the output changed correctly based on the different input combinations of S2, S1, and S0.