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

**CSC 220: Computer Organization**

**Lab Project 1.1**

**Name: Abdulrahman almyman ID: 441170135**

**Project Description:** The aim of this project is to design the **8-bit** Function Unit Combining Arithmetic Logic Unit (ALU) and a Shifter that can perform the operations given in table 1 below.

1. Use X and Y as 8 bits input and F as 8 bits output as shown in Figure 1.
2. S0,S1,S2 and S3 represent the selction code in the operation set table
3. Three statue bits V (over flow), C (carry), N (negative) and are related to arrithmatic operations and statue bit Z (zero) is relataed to both arrithmatic and logic operation.
4. Test your designed Function Unit with necessary tables.

**Marking:** Total marks for the project is five (5). Each student needs to submit the project and demonestrate it individually.

A

B

Function Unit

(ALU+Shifter)

F

Z

N

C

V

FS

**8**

8

8

4

X

Y

S

G

**Figure 1: Block diagram of 8-bit Function Unit**

 **Table1 : Set of operations**

**Diagram, schematic

Description automatically generated**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S3** | **S2** | **S1** | **S0** | **OP** | **A** | **B** | **F** | **Z** | **N** | **C** | **V** |
| **0** | **0** | **0** | **0** |  | **10101010** | **01010101** | **10101010** | **0** | **1** | **0** | **0** |
| **0** | **0** | **0** | **1** |  | **10101010** | **01010101** | **10101011** | **0** | **1** | **0** | **0** |
| **0** | **0** | **1** | **0** |  | **10101010** | **01010101** | **01010100** | **0** | **0** | **1** | **1** |
| **0** | **0** | **1** | **1** |  | **10101010** | **01010101** | **01010101** | **0** | **0** | **1** | **1** |
| **0** | **1** | **0** | **0** |  | **10101010** | **01010101** | **11111111** | **0** | **1** | **0** | **0** |
| **0** | **1** | **0** | **1** |  | **10101010** | **01010101** | **00000000** | **1** | **0** | **1** | **0** |
| **0** | **1** | **1** | **0** |  | **10101010** | **01010101** | **10101001** | **0** | **1** | **1** | **0** |
| **0** | **1** | **1** | **1** |  | **10101010** | **01010101** | **10101010** | **0** | **1** | **1** | **0** |
| **1** | **0** | **0** | **0** |  | **10101010** | **01010101** | **00000000** | **0** | **X** | **X** | **X** |
| **1** | **0** | **0** | **1** |  | **10101010** | **01010101** | **11111111** | **0** | **X** | **X** | **X** |
| **1** | **0** | **1** | **0** |  | **10101010** | **01010101** | **11111111** | **0** | **X** | **X** | **X** |
| **1** | **0** | **1** | **1** |  | **10101010** | **01010101** | **01010101** | **0** | **X** | **X** | **X** |
| **1** | **1** | **0** | **0** |  | **10101010** | **01010101** | **10101010** | **0** | **X** | **X** | **X** |
| **1** | **1** | **0** | **1** |  | **10101010** | **01010101** | **01010101** | **0** | **X** | **X** | **X** |
| **1** | **1** | **1** | **0** |  | **10101010** | **01010101** | **10101010** | **0** | **X** | **X** | **X** |

**Project link:** [**https://github.com/PYTHON01100100/CSC220\_KSU\_1443/tree/main/lab%20project**](https://github.com/PYTHON01100100/CSC220_KSU_1443/tree/main/lab%20project)