Istanbul Technical University

Department of Computer Engineering

BLG 231E - Digital Circuits

Assignment 4

Due Date: Friday, December 16, 2021, 23:59.

- Please **write and draw <u>neatly</u>**.

- Please prepare your homework using the Logisim tool. Points will be taken off for handwritten submissions.

- **Consequences of plagiarism:** Any cheating will be subject to disciplinary action.

- **No late submissions** will be accepted.

- **Submissions:** Submit your solution as a Logisim .circ file to Ninova. Please **write your full name** (first name and last name) **and Student ID** into your solution file.

If you have any questions, please e-mail **Mert Sülük (suluk20@itu.edu.tr).**

The combinational circuit shown on the right performs arithmetic operations on three 4-bit integers, A, B, and C based on the values of inputs x and y, as explained in the table given below. We ignore carry, borrow, and overflows for this circuit.

xy	Operation
00	Z = A + B
01	Z = B
10	Z = A - C
11	Z = C
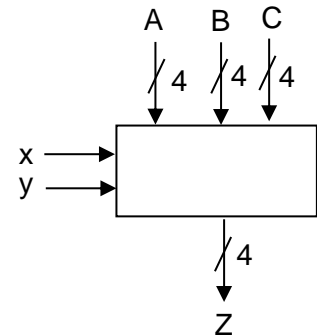
Design this circuit using **<u>only</u> a single** parallel adder and other necessary logic units (i.e., gates and devices that were explained in the lectures). Use the <u>fewest</u> possible number of logic units with <u>smallest</u> possible sizes to make your circuit design as simple as possible.

Implement and test the circuit using the Logisim tool. Do not show the internal structure of the parallel adder; show it only as a block. <u>Fully label</u> all inputs and outputs. <u>Write your name and student ID</u> at the top of the **.circ** file.