# Homework 5

CDA3103: Digital Logic and Computer Organization

Due Friday, March 8, 2019 (11:59 PM)

1. **(40 point) Design a single-bit ALU, an 8-bit ALU and a 8 by 8 multiplier**

   a) **Design a single-bit ALU** in Logisim and add it as subcircuit to Logisim. Name it 1-bit ALU. (It's block diagram is available in your lecture notes.)

   b) **Design a 8-bit ALU using 8 single-bit ALUs** designed in part A and add it as subcircuit to Logisim (name it 8-bit ALU).

   c) **Design a multiplier version 3** (discussed in the class) using an 8-bit ALU and add it as subcircuit to Logisim. Name it "multiplier_8.8".

   d) On the main page use the multiplier designed in part C to multiply two 8-bit unsigned integers, A and B. The product should be displayed using hex-displays.

   **Note:** you are not allowed to use built-in multiplier. But using the other built-in gates in the Logisim is allowed.

   At the end, submit just one single Yourname_HW5.circ file including all of subcircuits and circuits above. (In the following figure, a decimal probe has been used to show the product value, but you should use Hex-display.)