

# CSC258H Lab 1: Introduction to the Design Tools

## 1 Introduction

This week, we introduce the hardware design tools we will use in this course. You should spend as much time as necessary in this lab to make sure you are comfortable with these tools. If you run into problems or have questions, ask the TA or see if another student near you can help.

After this lab, you should be able to:

- Use Logisim-Evolution to build a circuit.
- Test and understand your circuit design.

**Required Submissions:** This lab requires the submission of a circuit file (“lab1.circ”) and a lab report (“lab1report.pdf”) to MarkUs by **Tuesday, January 19, 10:00 PM**. Please read the syllabus regarding the late policy. All submitted work must be completed **individually**.

**Before the lab, read through the Logisim-Evolution beginner’s tutorial and download the reference document provided in the next section** so that you have a high-level understanding of the steps required for the lab. The TA will be available to answer questions during lab or to help you if you get stuck, but you must be familiar with the steps to complete the lab in two hours.

## 2 Obtain the Software

With Logisim-Evolution, it is easy to work on the labs on almost any computer. The software can be downloaded free at this link:

<https://github.com/reds-heig/logisim-evolution/releases/download/v3.4.1/logisim-evolution-3.4.1-all.jar>

The software simply needs a working Java installation (version 9 or newer). More information is available in the reference document linked in the next section.

## 3 Logisim-Evolution Tutorial

Before the lab, you should be familiar with the basics of creating a simple logic circuit in Logisim-Evolution. Logisim-Evolution has a built-in beginner’s tutorial available on the menubar: **Help → Tutorial**.

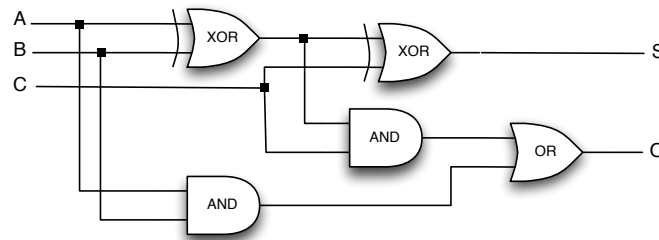
**Before the lab, complete the Logisim Beginner’s Tutorial (step 0-4).**

In addition to a built-in tutorial in Logisim-Evolution, there is a reference document specifically made for this course with instructions on how to program the DE2 board available at the following link:

[https://mcs.utm.utoronto.ca/~258/files/logisim\\_reference.pdf](https://mcs.utm.utoronto.ca/~258/files/logisim_reference.pdf)

This contains a birds-eye view of the main sets of features you will find useful during the semester.

## 4 Mystery Circuit



Investigate the operation of the circuit shown in the figure. In lab, create a new project, populate it with a schematic, and test the circuit to determine how the circuit behaves. On a sheet of paper or in a text document, create a truth table of all possible inputs to the circuit and the resulting outputs.

## 5 Lab Report

Include the following in your lab report named “`lab1report.pdf`”.

- Your name and student number.
- A screenshot of the circuit diagram that you created in Logisim
- The truth table of the mystery circuit.
- A concise description of the operation performed by the circuit.

## 6 Summary of TODOs

Below is the summary of the steps to be completed for this lab:

1. Before the lab, read through the Logisim Beginner’s tutorial, download the reference document, and/or install the tools on your own computer.
2. Meet your TA and your labmates.
3. Predict the behaviour of the mystery circuit before implementing it.
4. Implement the mystery circuit using Logisim-Evolution. Save it as “`lab1.circ`”.
5. Test the circuit, and create a truth table for all possible input combinations.
6. Using Logisim-Evolution’s poke tool and your truth table, explain the operation of the circuit.
7. Complete the lab report.
8. Submit `lab1.circ` and `lab1report.pdf` to MarkUs before the deadline.

### Evaluation (2 marks in total):

- 1 mark for the completeness of the circuit.
- 1 mark for the completeness of the lab report.