View the original document including screenshots in French: https://reds.heig-vd.ch/share/logisim-evolution/tutoLogisim.pdf

# Introduction to Using Logisim

## 1. Introduction

Logisim is an open source program which allows you to design and simulate logical circuits.[1]

This document is a tutorial which describes how to establish a digital system with the help of the schematic diagram editor. We will explain the necessary steps to design, simulate, and implement a project based on the Altera EPM 25p-25p.

There are different ways to formally describe digital systems: hardware description languages (HDL,) truth tables, state diagrams, or schematics. Logisim allows us to work only with schematics. The first chapter will explain how to make our first diagram. In figure 1, you can see the Logisim user interface.

One of the features of Logisim is that it allows simulating and editing schematics at the same time. We will explain later in this document how to simulate a circuit and how to implement it on the laboratory card.

Open Logisim and you will be prompted to enter a username - see Figure 2. It will be used to tag each component you create, to prevent plagiarism.

1. Click *Change User*
2. Enter your first and last name in the *Add New User* box in the same form as your *Heig-vd* login, without special characters, separated by an underscore.
3. Click *Add*
4. Click *Close*
5. Click *Accept Conditions*

The list of users is saved on the machine. On subsequent uses, simply click *Accept Conditions* and select your active user from the list.

## 2. Edit Mode

1. To use edit mode, simply select the arrow, as shown in Figure 1.
2. You can then select a component from the library on the left. To add it into the schematic, simply cluck on the desired component, then click on the diagram.
3. Every component you will use has modifiable attributes un the lower left area in Logisim. For example, if we set an AND gate, we can modify the number of signals it takes as an input, or invert one of its inputs.
4. It is also possible to copy/paste one or more components. In that case, pasted components retain all of the attributes that we previously defined.
5. Here is a list of the items you'll need for this tutorial:
   - For input, the *pin* and *wiring*.
   - For output, *pin* and *wiring* and the “output” attribute set to *yes*.
   - Logic gates are in the *Gates* library.
   - *Splitter* and *wiring.*
   - The *ground*, *power*, *and wiring.*

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[1] The latest version of Logisim can be downloaded at https://reds.heig-vd.ch/share/ logisim-evolution/logisim-evolution.t.jar. Logisim contains an auto-update mechanism. As soon as a new version is available, you will receive a notification and you will have the option to update your copy.

6. Once we lay out all of the components, we must connect them. To do this, simply place the mouse on one of the gates. Click and drag to the destination gate.

**3. Creating the first Circuit**

All circuits made in Logisim can be used in other circuits. To create a new circuit, navigate to *Project* -> *Add Circuit*... -> and then name the circuit. The newly created circuit will become available in the library.

### 3.1 Add1bit

Implement the schematic shown in Figure 4. Name it *Add1bit*. Notes:

- The currently edited circuit is the one that has a small magnifying class below the name of the project.
- Don't worry about the color of the wiring or the value of the input pin. The most recently added pin is blue by default.
- You can change the orientation of the components by changing the *Facing* attribute.

**4. Simulate Mode**

Logisim is capable of simulating the circuit and showing the values of the signal directly in the diagram. The user can then define the input bit values and observe the reaction of the design.