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CedarLogic 2.0 Update

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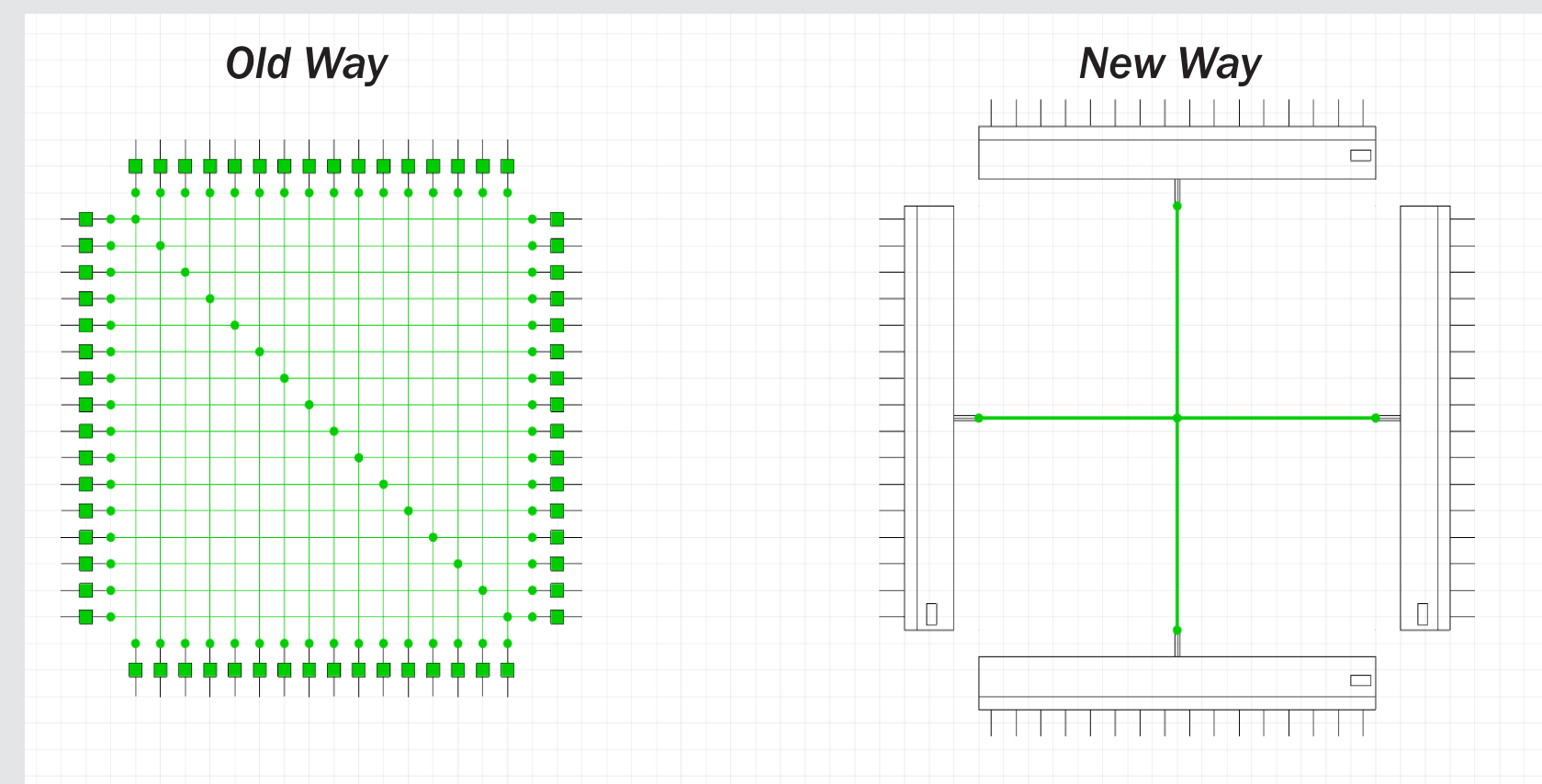
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Broberg, Colin; Pernia, Julian; Drake, Tyler; and Von Eiff, James, "CedarLogic 2.0 Update" (2017). *The Research and Scholarship Symposium*. 24.

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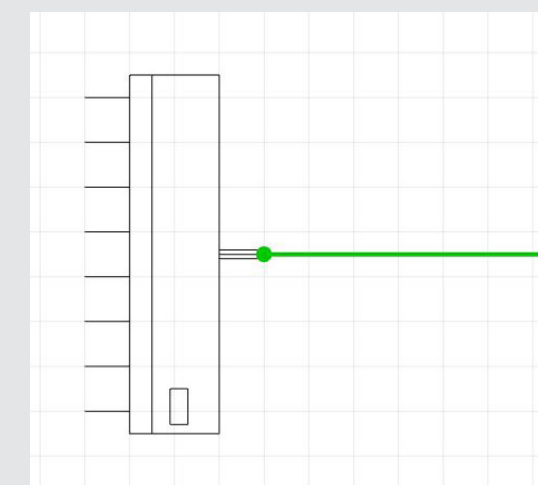
Buses



Bus Ends

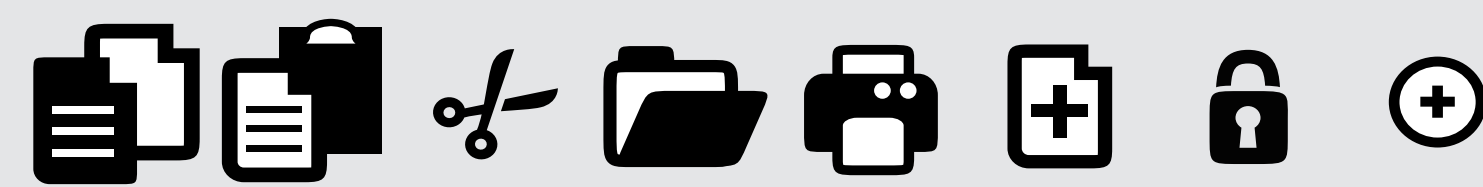
Buses allow users to connect large buses of wires between bus-ends as a single wire, for logical and visual simplicity.

Multi-way bus connections used to be time consuming to implement. With CedarLogic 2.0 bus-ends, it is very quick and easy.



UI Improvements

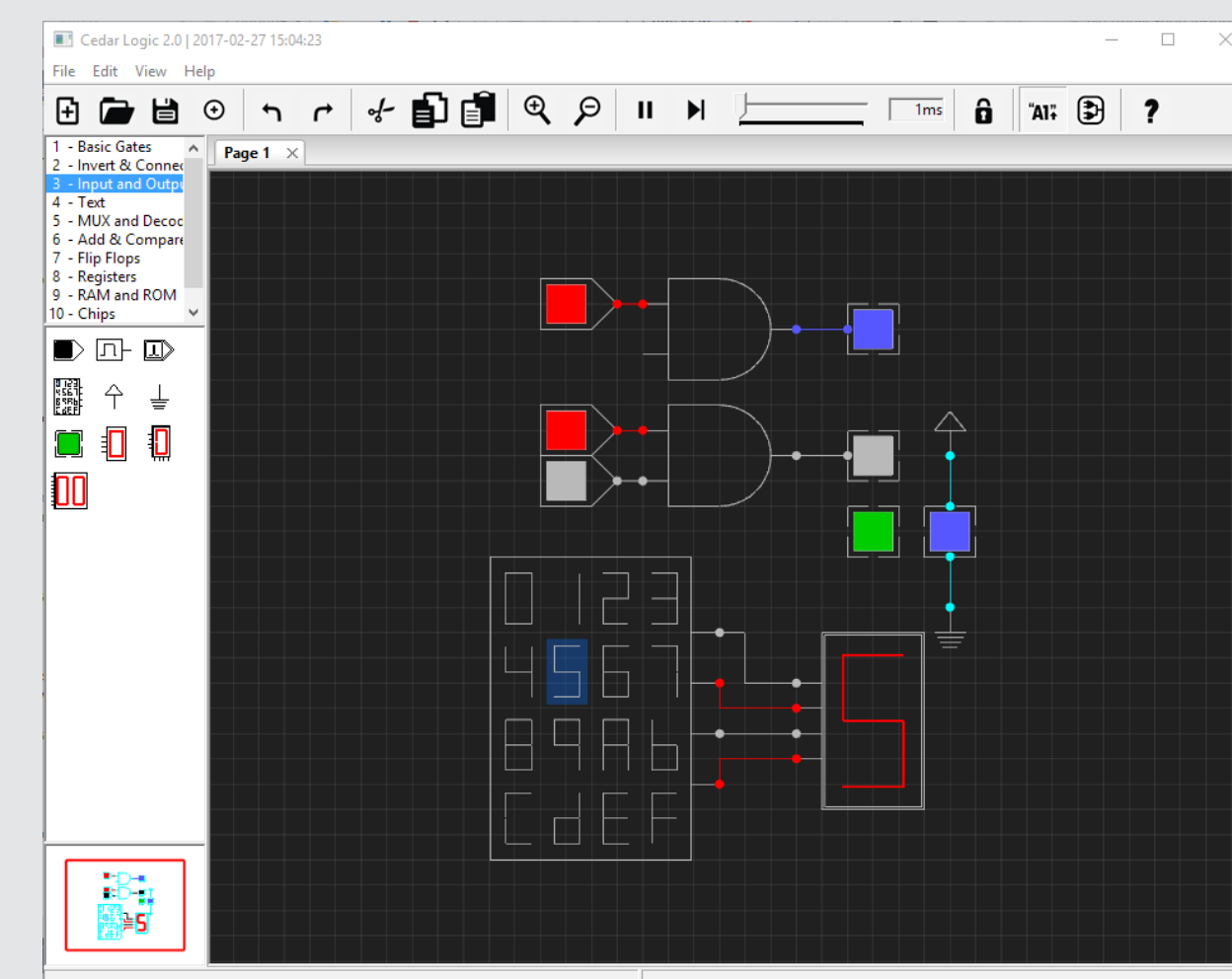
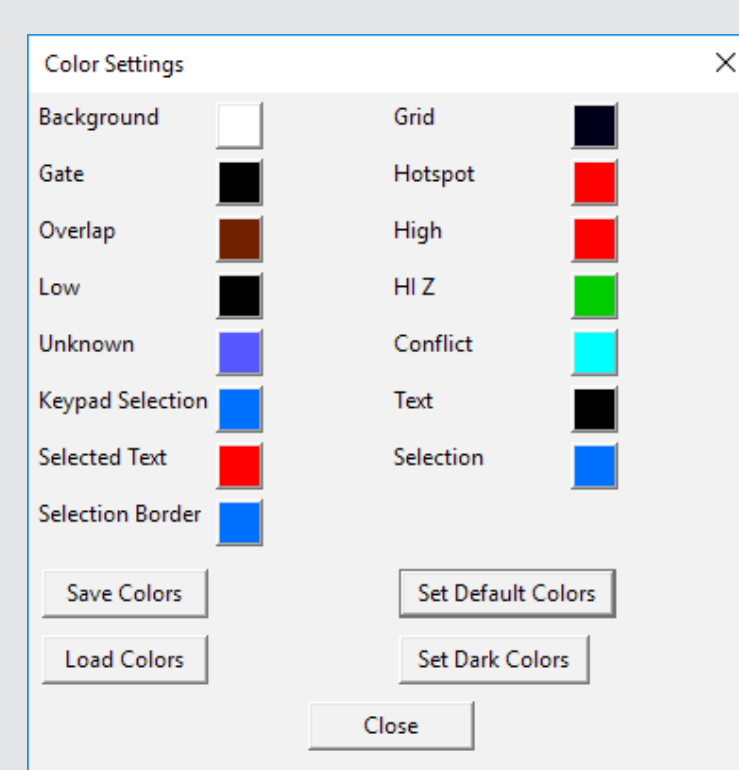
New GUI Buttons



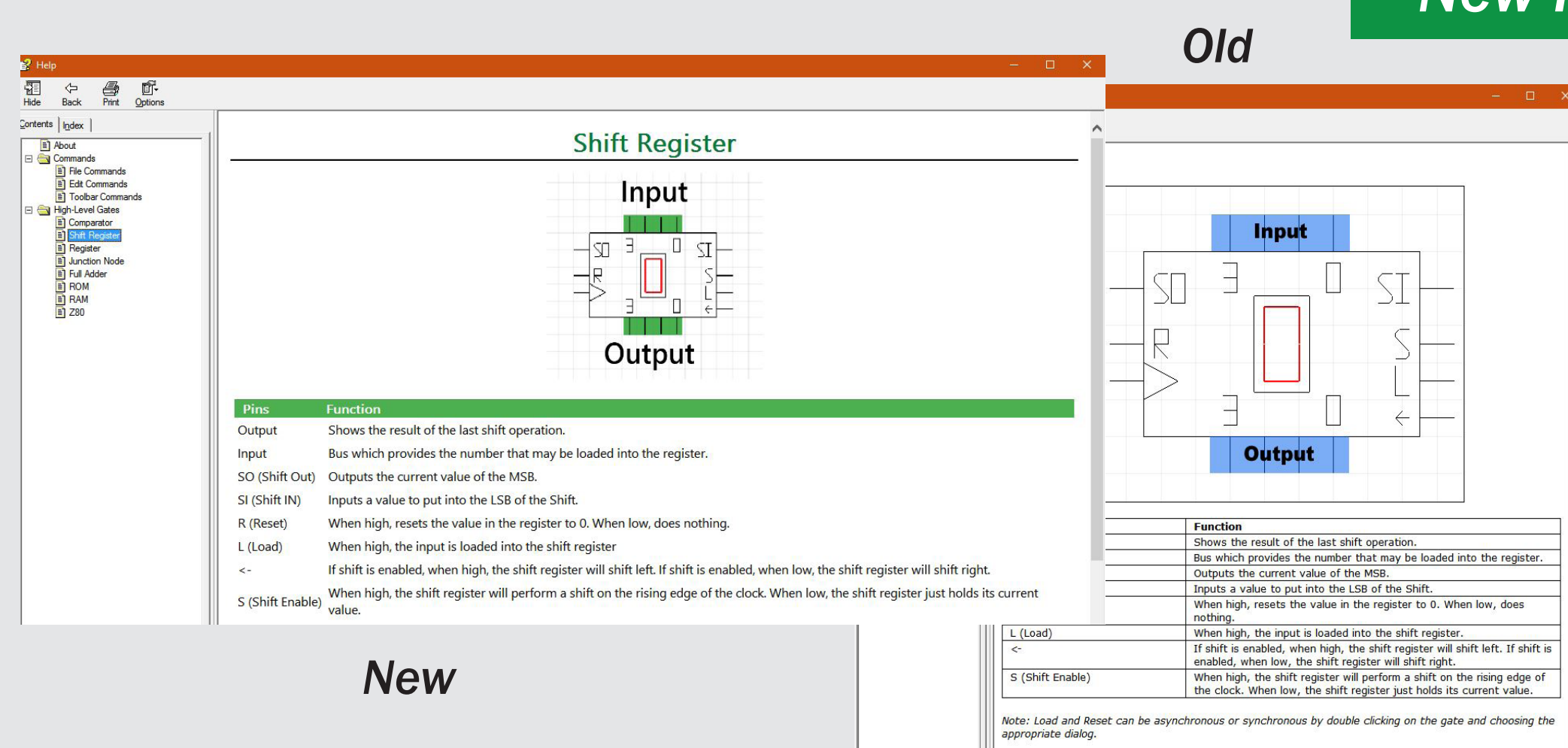
New Visual Identity



Color Picker



New Help Menu

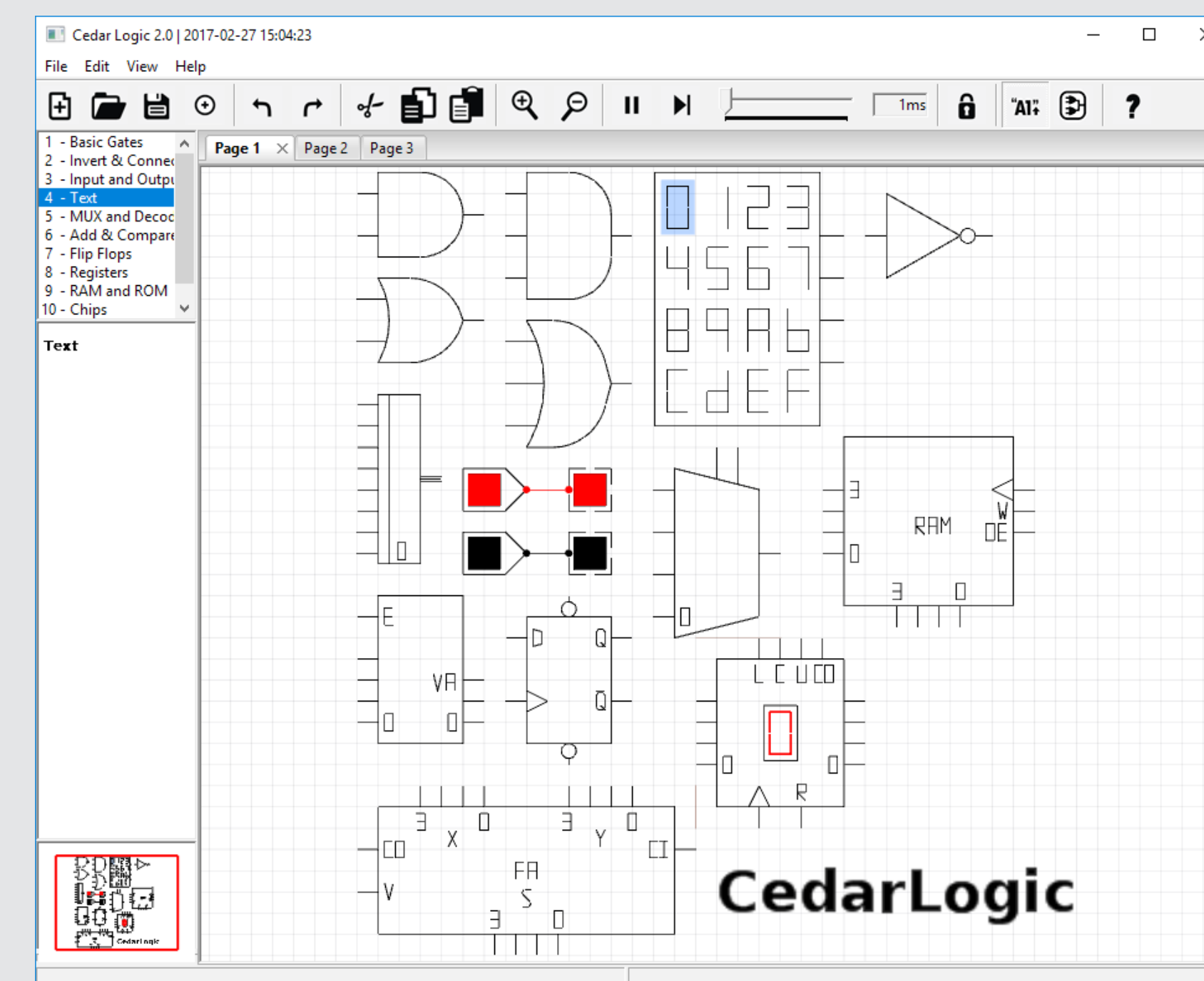


Project Goals

CedarLogic is the Cedarville University's student-developed, digital logic simulator. Engineering and Computer Science students use this software for several of their classes. Our primary goal for this update is adding black boxes, buses, and cross-platform compatibility. Our additional improvements in user-friendliness and functionality will give students an improved CedarLogic experience.

What is CedarLogic?

Cedarville Engineering Students use CedarLogic for designing and simulating low-level computer hardware. The program has many gates and chips available for implementing all kinds of circuits and simple computers. Often the first class students will be introduced to CedarLogic is Digital Logic Design (DLD) in which they design a digital watch, a full adder, and a 4x4 sorting stack. CpE and CS students will also design small computers called Mano Machines in Computer Architecture.



The CedarLogic Program

Results / Future Plans

CedarLogic was our 2016-2017 Computer Science Senior Design project. The project builds off the existing legacy code from past teams. CedarLogic (formerly DigLog) was first designed in 2006. Our update is the first major feature-rich update to the program. Below we discuss the success of our project as well as what we would add if we had more time.

Black Boxes

Black boxes, or heirarchy, was the most time-consuming element of this project. While we managed to implement this feature to have basic functionality, we had plans to make black boxes more robust and versatile. Given more time, this is something we would love to improve.

Buses

Buses, while not too difficult to implement, were one of the most requested features for CedarLogic. Their implementation was well received by students using the program. For additional functionality, we would like to add bus To/From gates to allow for further consolidation of wires.

Stability

Due to its nature of being a student-made program, CedarLogic has never had the stability of a commercially available product. Our first task for this project was to improve stability of the program to enhance user experience.

Cross-platform Compatibility

As the project nears completion, we hope to optimize our build for Linux. Adding this compatibility will make it easier for linux-users to use the program, as well as further ensure the correctness of the CedarLogic code.

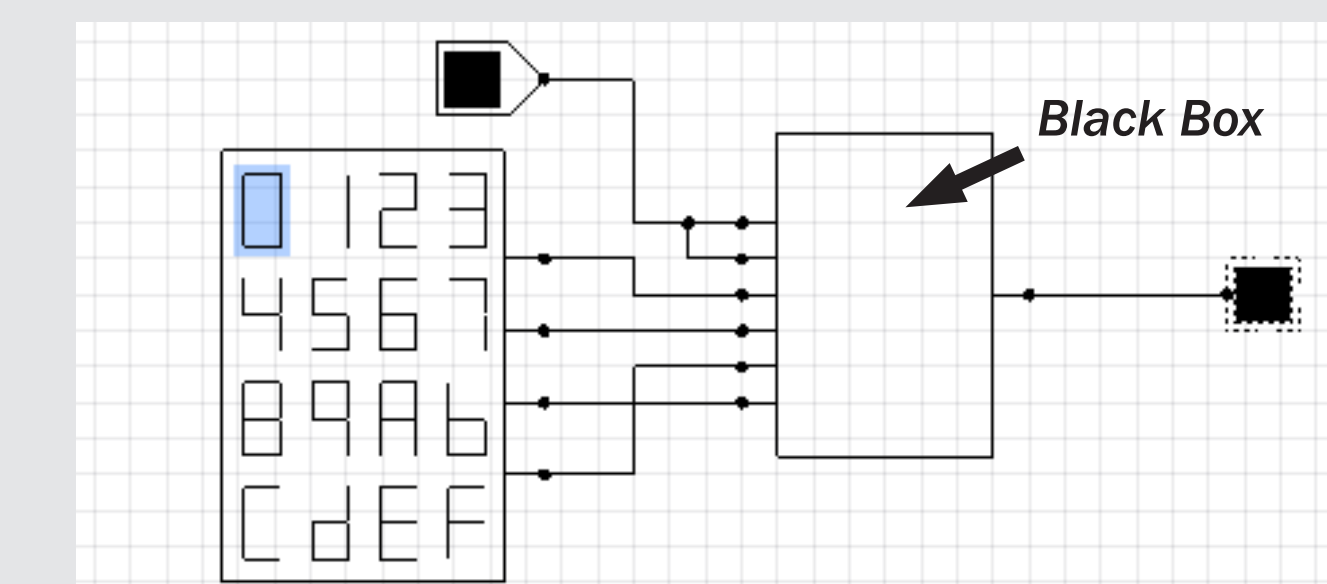
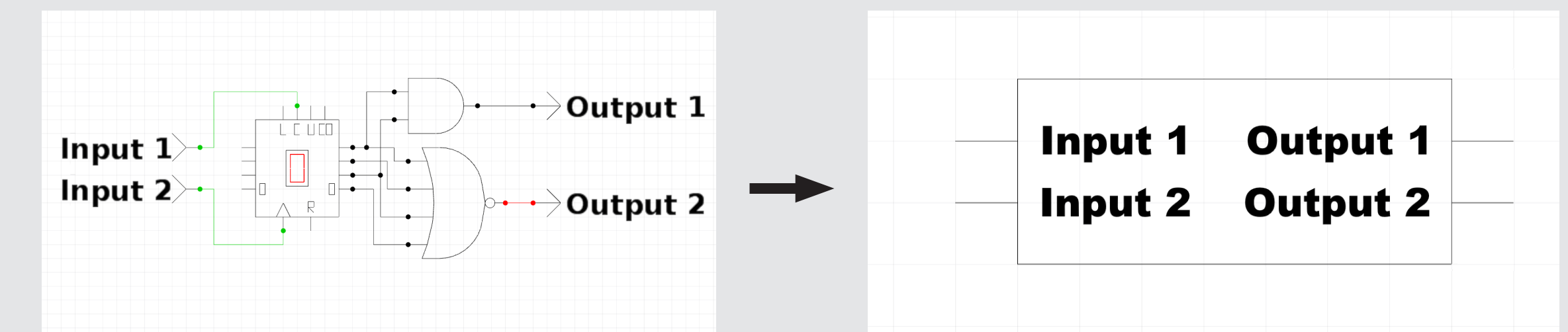
UI Improvements

While the visual improvements to CedarLogic were not a project requirement to us, we believe these additions dramatically improve the CedarLogic experience. Future teams working on CedarLogic could further improve it by updating to a newer version of OpenGL.

Hierarchy with Black Boxes

Black Boxes

With the addition of black boxes, users can encapsulate connected elements into a single visual and logical unit that can then be used elsewhere in their file.



Cross-platform Compatibility

Linux

One of our project requirements was to port CedarLogic to Linux to provide more compatibility and support for users. While we currently have a build working for Linux, it has some quirks we are hoping to work out.



CedarLogic in the Classroom

CedarLogic is used in several engineering classes here at Cedarville. It serves as a way to virtually simulate digital circuits. In this way it enables students to visualize the internal logic of circuits in a way that isn't possible using hardware.



Design Environment and Tools



Git – git was used as the version control system for this project.

Visual Studio – Visual Studio is the IDE we are using to develop this project.

Wix – The WIX toolset is a set of tools that can be used to create an installer for the Windows installation engine. cause it is easily integrated into projects and Visual Studio supports it.

OpenGL – OpenGL is a 2D and 3D graphics API that is compatible with almost all platforms.