Documentation and Instructions

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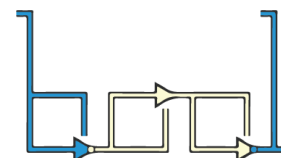
Navigating the Profile

The profile page will only be accessible when the user is logged in. Guests will not be able to view the profile page. The profile page can be accessed from the workspace, by clicking on authenticate, and then clicking profile.

Top Bar:

Left *bool* Logo – Brings the User to the splash screen

New Button – Create a new workspace

Upload – Uploads a local file and stores it into the data store

Notification Bell – drop-down that will update with notifications when another user has shared a circuit with the user

Right b*ool* Logo – drop-down with the user's login email, and the option to logout

Using the Search Bar

Users can search through the available circuits in the data store.

Search by Owner: User needs to type "owner: <user-email>" before pressing enter.

Search by Tag: User can search circuits by tag by typing: #<tag-name>

Search by Shared: User can search by shared by typing: "shared: <user-email>"

*Note that a user may enter any combination of these three search options

If any of the search criteria above were not meet, a search will be made by just Circuit name

Side Bar Filters:

All Circuit – load the table with all available Circuits in the datastore. These include circuits that are owned by the user, shared to the user, or any Circuits that have a public tag.

Owned By Me – load the table with all available Circuits that are owned by the user.

Shared With Me – load the table with all available Circuits that are shared with the user.
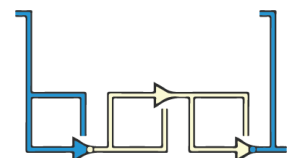
Public – load the table with all available circuits that have a public tag.

Table Listing:

Column one contains a range of options for each corresponding Circuit. This includes:

Open – Brings the user to the workspace and opens the Circuit file. Available, only If the user owns the circuit

Shareable Link - Creates a link that user can copy into his browser, which will open the workspace containing the circuit. Only available if the circuit is public.
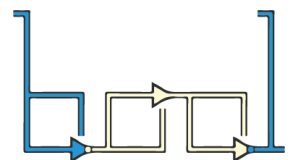

Clone – Creates a new circuit entity that has the same properties as the previous circuit. The user becomes the owner of the new circuit. Shared and tags field will be reset. Available if the user is not the owner of the circuit.

Share – User can change who can view their circuits

Delete – Deletes the circuit

<u>Navigating the Workspace</u>

The workspace allows for users to build and simulate digital circuits; convert truth tables to Booleans equations and vice versa; convert Boolean equations to digital circuits and vice versa.

<u>Toolbar</u>

Authenticate:

- Login/Logout: log's the user in and out.
- Profile: goes to user's profile page if logged in.
- Exit: goes to splash screen.

File:

- New Circuit Workspace: navigate to clean new workspace.
- Settings: allows you to toggle preset options.
- Quizlet Constraints: set constraints on the workspace.
- Save: save your Circuit file locally.
- Load: load a Circuit file locally.
- Submit: submit to the datastore, adds to profile page.
- Reset Circuit Evaluation: turns off all workspace components.

Edit:

- Undo   (control+z).
- Redo   (control+y).
- Cut   (control+x).
- Copy   (control +c).
- Paste   (control+v).
- Rotate All   (t).
- Rotate Individually   (r).
- Delete Selected   (del).

<u>Settings</u>

Loop before end evaluation

- Amount of times the evaluator should traverse through components before stopping the evaluation.
- Prevention measure against infinite loops.

Default Delay Time

- If a component has a delay value, it will have the same delay as any other component, regardless of its actual delay value.
- This value is the time in milliseconds that the component will wait before activating and outputting its signal.
- Currently a temporary feature, due issues with timing.
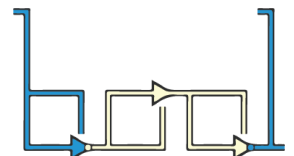
Display Delays - toggle to show/hide the components' delay value on the grid.

Display Labels - toggle to show/hide the components' label(first 3 characters) on the grid.

Display Grid Lines - toggle to render the grid lines.

Display Grid Numbers - toggle to render the column and row numbers on the grid.

Grid Interface

Selection – **right-click** and drag.

Editing attributes of a specific component – right click on a single component. Refer to **Attribute Editor**.

Moving components – Select a component and drag it or select a group of components and drag.

Adding components – Select any component from the component menu and drag-and-drop it into the grid.

Viewport movement – Use the **arrow keys** to move the viewport. Since the grid is (theoretically) unlimited, you'll be able to place components anywhere you like, so long as your browser does not crash.

Attribute Editor

Delay

- If the delay is set to a value greater than zero then the delay will be the value of **Default Delay Time** in **Settings**
- If the delay is set to zero, then there will be no delay
- The delay will be displayed on top of the components if **Display Delays** is toggled on in **Settings**.

Message

- Only available for the print-box.
- Will be printed whenever print-box's output is high.

Label

- Label to denote the name of the component.
- First 3 characters will be displayed if **Display Labels** is toggled on in **Settings**.
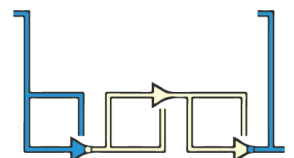
Flip - (f)
- Flips the component.
- Only effects AND, OR, and XOR gates.

Rotate - (r)

- Rotates the components 90 degrees clockwise.

Delete - (del)

- Deletes the component from the grid.

Save

- Writes the modified attributes in the **Attribute Editor** to the components attributes

Debug – contains general debugging information. Print box prints here.

Truth Table

- Format
  - ➢ First column is simply a label (not used in evaluation).
  - ➢ Last column of the row always stands for the solution.
  - ➢ First Row – variables of the Boolean equation.
  - ➢ Denote line break – slash (/)
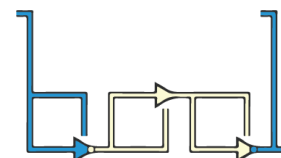 - ➢ Example:

```
- A B S /
0 0 0 0 /
1 0 1 0 /
2 1 0 0 /
3 1 1 1 /
```

- Build Table – converts the truth table in the text-box to a Boolean expression.
- Build Equation – converts the Boolean equation (in the Boolean Equations tab) to a truth table.

Boolean Equations

- Syntax
  - ➢ Not – exclamation point (!)
  - ➢ And – asterisk (*)
  - ➢ Or – plus sign (+)
  - ➢ Exclusive Or (XOR) – carrot (^)
  - ➢ End a Boolean equation – semicolon (;)
  - ➢ Set a Boolean expression equal to a label – equals sign (=)
  - ➢ Label – anything right of an equals sign (=)
  - ➢ Example: CarryIn = A * B; A0+B0 = A^B;

Statement 1	**CarryIn**	=	A	*	B	;
	Label	Assignment	Variable A	AND operator	Variable B	End Statement
Statement 2	A0+B0	=	A	^	B	;
	Label	Assignment	Variable A	XOR operator	Variable B	End Statment

- Make Circuit – takes the Boolean equation in the text-box, converts it to a circuit, and places it on the clipboard.
- Make Boolean Eq – takes the selected components and converts all those outputting into a **Boolean equation block** (grid-component) into a Boolean equation. Capable of creating multi-lined Boolean equations.

Quizlet

- Problem - any arbitrary problem given by the instructor.
  - ➢ Example: Build a half-adder with only AND gates and OR gates.
- Description – any arbitrary description by the instructor
  - ➢ Given to provide context to the problem.
  - ➢ Example: A half-adder is used in computation to add 2 binary bits together.
- Answer – solution to the problem.
  - ➢ Used to evaluate whether the circuit built matches what the instructor wanted.
  - ➢ Refer to **Boolean Equations.**
  - ➢ Example: CarryIn = A * B; A0+B0 = A^B;
- Check Solution
  - ➢ Evaluates the entire grid to see if the components match the Boolean equation(s) given in the quizlet constraints.
- Component Display – if you set quizlet constraints on components, it will display the amount of each component you have left.

Making a Quizlet

1. File -> Quizlet Constraints
2. Quizlet Constraints menu should pop-up
3. To set constraints on how many of each component you can use
   - ➢ Type the desired number in the textbox
   - ➢ +/– to increment/decrement
   - ➢ * to set it to an infinite amount
4. Then input a problem, description or answer (see **Quizlet** for details).

Component Menu:

User can click, drag and drop each component onto the grid in order to create a circuit

and	2 inputs, 1 output And gate If both inputs are high, the output is low If one or more of the inputs are low, the output is low
xor	2 inputs, 1 output Exclusive Or (XOR) gate If either input is high and the other is low, the output is high If both are high, the output is low If both are low, the output is low
or	2 inputs, 1 output Or gate If one or more of the inputs are high, the output is high If both inputs are low, the output is low
not	1 input, 1 output Not gate Negates the signal

	buffer	1 input, 1 output Buffer gate Passes through the signal
	wire	4 inputs or 4 outputs. Signal Multiplier (cross_wire) OR functionality is buggy, don't use as OR gate
	wire	2 inputs or 2 outputs Pass-through wire (i_wire)
	wire	3 inputs or 3 outputs Signal Multiplier (t_wire) OR functionality is buggy, don't use as OR gate
	wire	2 inputs or 2 outputs Pass-through wire (l_wire)
	crossing	2 inputs or 2 outputs Crossing wire Allows signals to travel over one another
	print	1 input, 1 output Print block Prints the message when signal is high and passes signal(buffer)
	switch	0 inputs, 4 outputs Switch Blue: constant low signal. Yellow: constant high signal
	light	4 inputs, 0 outputs Light block White/blue: low signal input. Yellow: high signal
	boolean eq	1 input, 0 outputs Boolean equation block Connect any circuit's output to this block. - If selected and **Make Boolean Eq** is clicked, it will convert all components outputing to this block into a boolean equation. - If an answer for Quizlet Constraints is given and **Check Solution** is clicked. It will compare all the components outputting to every Boolean equation block and determine whether it is equal or unequal to the solution.