Easy Circuit

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Project Goal

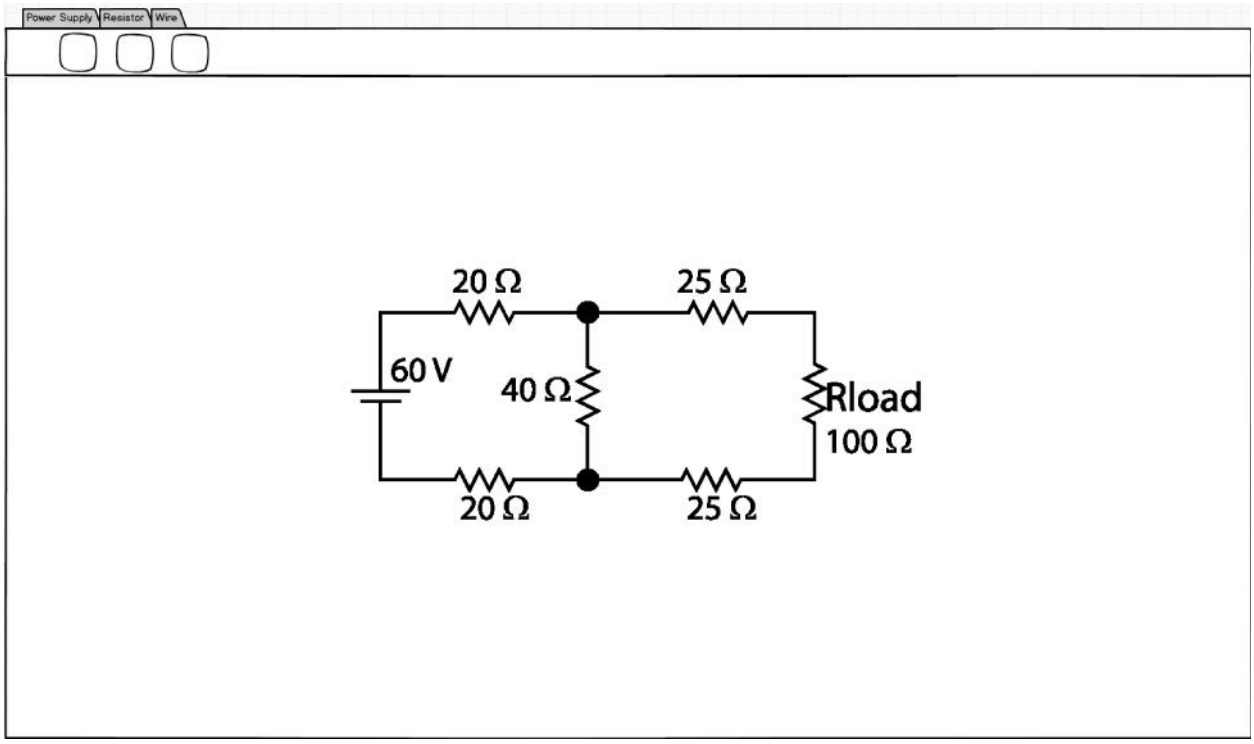
We will be creating a web application that will give the user a way to learn the basics of circuit theory, in a simple and interactive setting.

Program Features

The site will use lessons that will start slow and build on each other. This will teach the user while not over whelming them. This will go along with a circuit building tool to give the user a more interactive role in the learning process. The user will be able to keep track of the lessons they have done by making a profile so they don't have to keep track of it themselves. If time allows there will be a tool made to give a teacher the option to make their own lesson for a class they are teaching.

Circuit Building Tool

The circuit building tool will allow the user to build a circuit right on the web page. This will be done by giving them a tool bar that has different components on it such as power supplies, resistors, and wire. They will be able to drag and drop the component from the toolbar and place it on the canvas were they would like. Also the values of the components will be able to be changed to the values that are desired. After the circuit is built, information such as voltage and current at all the point will be calculated and given to the user in the form of a chart. The basic layout for the circuit builder can be seen below.



The Goal of the interface for the circuit builder is to make it as simple as possible for the user so that there is a quick learning curve. One way that this will be done is to add in error handling to tell the user when they have made a mistake such as forgetting to put a ground onto their circuit.

Required Software Components

The required software to get this done is a circuit builder, a database to store the user's login, and if time allows a lesson building tool. The circuit will be built using a HTML canvas along with JQuery UI. The canvas will be were the circuit is drawn and JQuery UI will be used to create the tool bar. This will have to be done by us due to there being no API out there. The user account will use java script along with PHP to access a database to retrieve and send the user data. If time allows a lesson building tool will be made using the HTML canvas along with jQuery UI to let the user drop in text fields and images to build a webpage that they can use for a lesson.

Software that can be modeled

When it comes to the circuit building tool there are a few out there, looking at the interface has given some insight into what user interface elements work and what ones do not work. Unfortunately there are no places that really show how they do the processing of the circuit to calculate values for each component. For the lessons sites that have been used in classes as learning sites has given a good idea on how the lessons should be laid out to the end user to make it easier for them. For the lesson building tool sites that let you build a mockup of the site you want gives the general idea of how the lesson build will let you drag and drop so it is easy for the user.

Intended Audience

The intended user of the site will be kids from middle school and up. It will focus on being a tool that can be used in schools to help teach students the basics of circuit theory. It can also be used by people that just want to gain a basic understanding of circuit theory even if they are not in school. The circuit building tool can also be used by students that need a way of building a circuit so they can take an image of it to use in a lab for class.

Development Timeline

Date	Goal	Responsibility
2/7/14	Have all code being put up on GitHub.	all
2/11/14	Have the basic drag and drop for the circuit builder working.	Caravetta
2/11/14	Basic layout for the front page to be done.	Mutunga
2/22/14	Alpha for the front page to be done.	Mutunga
2/22/14	Have all the circuit components in the circuit builder tool.	Caravetta
2/28/14	Have simple resistors in series working in the circuit building tool.	Caravetta
3/5/14	Have the basic layout for the lessons done.	Mutunga
3/7/14	Have simple parallel resistors working in the circuit building tool.	Caravetta
3/12/14	Have lesson 1, 2, 4, and 5 done and ready to go.	Mutunga
3/14/14	Have power supplies done along with ground done.	Caravetta

3/23/14	Have a beta of the site up and running	All
4/1/14	Have a beta test to test how the site works.	All
4/10/14	Look at the feedback and fix issues that came up.	All

Issues to Address

There has been feasibility testing to make sure that we can make a circuit builder tool for the site. We have made a simple builder that was able to put resistors and wires on the canvas using drag and drop. The future programming of the circuit building tool is to make it look at the circuit that is made on the canvas and be able to analyze the circuit and give valid voltages and currents for the circuit. Another issue that can come up is making the lessons simple enough for everyone to understand them. The lessons are going to have to be split up and move slow so it is not overwhelming for the user and they are able to have a good overall experience.

Release Requirements

At the time the site is released we want to have the circuit building tool working along with the ability to make a user account. Also we would like to have a least five lessons made for the user to start learning. The GUI will be complete for all lessons that are made along with the user's page and the front page. All the lessons that are made should be complete without any errors.

Future Features

We would like to if time would let us implement a lesson building tool. This tool would be a very nice and easy GUI for people such as teachers so they can build their own lessons that are tailored to their class. This would be done using the same drag and drop features to a canvas that is used in the circuit building tool. Another feature that would be nice is to have a forum that people would be able to post questions that they have about circuit theory and the community would be able to answer them.