**Design Document**

**Overview**

This document will describe the design of an educational game titled whatever. The contents outline the character design, game objective, gameplay design, and the tools and design approach.

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**1.**  **Game Objective**

The main objective of the game is to feature a number of electrons within a setting that resembles a circuit (for example; within the wiring of a house.). This game is meant to be a challenging puzzle game that encourages the player to use different components of electrical circuits to manipulate the movement of electrons.

Players will be given a time limit they must beat in order to succeed in completing the puzzle as fast as they can. In order to achieve a great time and earn a high score, the player must use any available components in their inventory to efficiently direct the electrons through the maze like circuit and power up as many light bulbs as they can while leading all electrons to the positive side of the battery. Players must also use their available components to avoid if possible or counter the effects of these obstacles such as (grounding,circuit breakers, and open switches or gaps within the wiring) that may result to game over.

**2. Component,Obstacle and Level Design**

**Component Design**

Diodes => These components when placed in a circuit will not allow the electron to flow a certain direction (basically used for flow redirection).

Inductors => These components when placed in a circuit will allow electrons to pass through it but it will also generate a magnetic field which can be used as a separate power supply(i.e battery).Inductors resist change in current/flow.

Resistors => This component when placed in the circuit, it will control the flow of electrons as they pass through the resistor (basically it will slow down the electron).

Capacitor => This component when in the circuit will let electrons pass through it, it will resist the change of volts and is made up of two conducting plates with an insulator in between them that will generate an electric field

**Obstacle Designs**

Switches => Players should be aware of open switches that will affect electron flow

Relays => An electrically powered switch that will only close if an electron can power its source

Grounding => Electrons tend to flow to these things because it is the quickest way to the ground. Players must divert electrons away from grounding or else they will not receive maximum points per level.

Circuit Breakers => Will break the circuit if it detects the current/flow of an electron that passes it is too much.

Power Surges => Will increase the amount of volts the electron is being pressured by

**Electron Design**

There will be tutorial levels that will introduce all these components and how they affect electrons.

**3. Game Design**

**Main Gameplay**

The game starts with the electrons coming from the negative side of the battery, the background of the level will feature wires and generators in background. electrons are constantly moving unless an obstacle affects its movement. The player can select any component available by clicking on it, there current component selection will appear at the side letting the player know that they are about to place that component within the circuit.

Players must also try to turn on as many light bulbs in the level by directing an electron to it in order to achieve a higher score and they also must direct the electrons to the positive side of the battery in order to complete the level. Throughout the multiple levels of the game it will get increasingly difficult as more of the obstacles such as switches, grounding and power surges start to appear. If the player loses all of his electrons, trips a circuit bresker or runs out of time the game is over. Also levels will be pre-built with obstacles and are not randomly generated.

**Player Motivation**

Since this is a puzzle type game the levels could get pretty complicated for some players, it will be designed for players of age 13+, which means the goal will probably be communicated to the player before the game starts unless the player is already aware of how electron flow works. However the time limit will encourage players to use the available tools they have in order to create an efficient electron flow that will power all light bulbs and make it to the negative side of the battery in the fastest time. This will also encourage players to be creative and make quick choices and the replayability of the game.

**Connection**

Since the player will be working with many tools in order to create an efficient electron flow they will also learn how these tools and obstacles can become an important part in the creation of a circuit. This will teach and create curiosity to how an electrical circuit can run through different medians.