

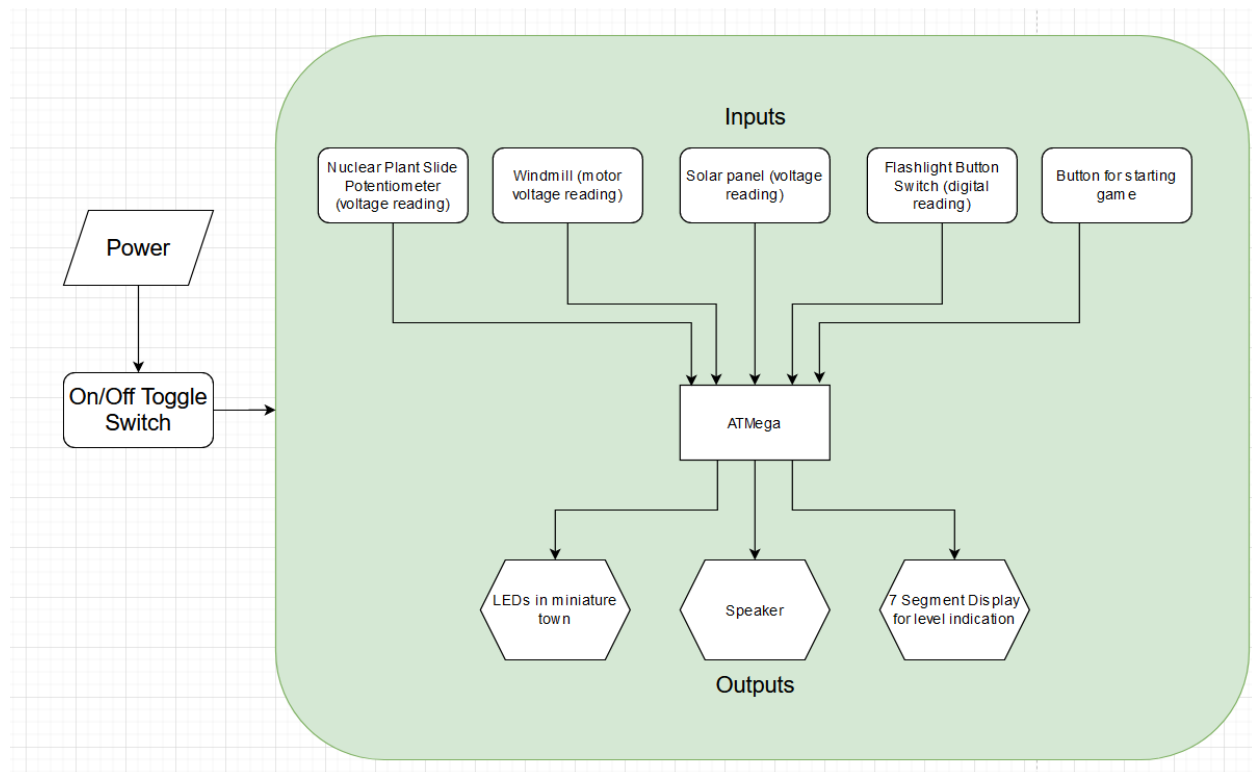
Assignment 12: Design Project #2 Proposal

Overview:

For this project, we will design a Bop It game called *Power It* that will be themed around alternate energy sources. The object of the game is to power a town using different energy sources including solar, wind, and nuclear power. Commands are played out of a speaker for a user to use a different energy source. Each action generates a MW of power. The game ends when the user either uses the wrong source, waits too long to use the source, or when the user beats 99 rounds, representing generating 99 MW of power. Seven segment displays will show the user their score. As the game is played more LEDs will light across the board showing the user's progress. When a user wins, all of the LEDs will light up. A speaker will output a beep indicating a success or failure after each round. Here is how the user will interact with the game.

1. Light it: the user will momentarily push on a flashlight to shine on a solar panel.
2. Spin it: the user will blow or spin the blades of a miniature wind turbine.
3. Nuke it: the user will slide nuclear rods down the side of a reactor.

Block Diagram:



Pseudo-code:

```
main()
{
```

Configure digital input pins for start button, flashlight button, and power plant input
Configure analog input pin for wind turbine input and solar panel input
Configure digital output pins for seven segment displays and LEDs in town
Configure analog output pin for speaker

Record current voltage level off of solar panel at ambient lighting
Set initial time to complete command

}

Loop

If start button is not pressed, skip to end of loop
Pick a random command from state machine

Command State Machine:

State Turbine():

Set interrupt to trigger when voltage is generated by generator
If interrupt trigger, go to win state and disable interrupt
If not, trigger loss state and disable interrupt

State Solar():

Set interrupt to trigger when connection is made in flashlight/receive light
on panel(Depending on which method we use in the end)
If interrupt trigger, go to win state and disable interrupt
If not, trigger loss state and disable interrupt

State Nuclear():

Trigger interrupt to either connectivity made between fuel and reactor
bottom or threshold on slide potentiometer, depending on which method
If interrupt trigger, go to win state and disable interrupt
If not, trigger loss state and disable interrupt

Win/Loss States:

Win():

Increase score by 1 and decrease time for command
If score=95, go to victory state

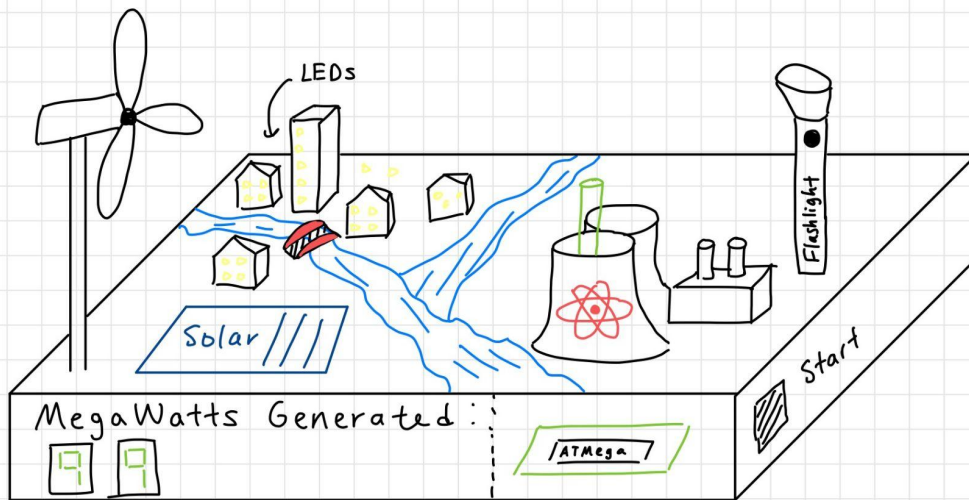
Loss():

Game end, play sad music

Victory():

Game won, play good music

Preliminary Sketch of Enclosure Design:



Team Roles:

Here are the team members and their assumed leadership roles:

Killian Rush - Code Design and Testing

Bronco York - Enclosure Design and Fabrication

Jack Carnovale - PCB Design and Fabrication