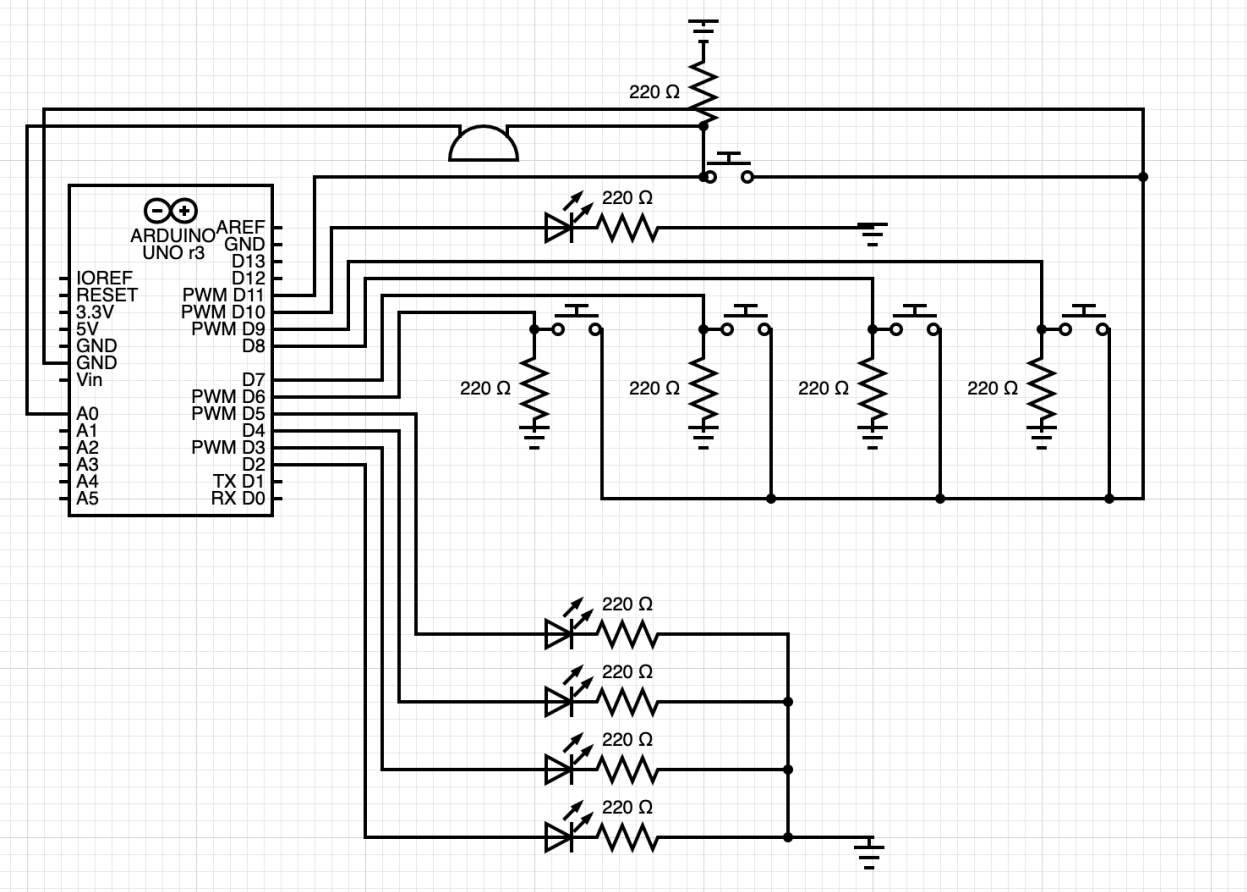
ISTA 330 – Assignment 1 – Simon Says

Circuit Schematic…



Led Calculations…

Voltage in: $5\ V$
Led mA rating: $20\ to\ 25\ mA$
Resistor ohms: $220\ \Omega$

Voltage = Current * Resistance

$$5V = 23\ mA * R5$$
$$R = \frac{5\ V}{23\ mA}$$
$$R = \frac{5\ V}{0.023\ A}$$
$$\frac{5\ V}{0.023\ A} = 220$$
$$R = 220$$

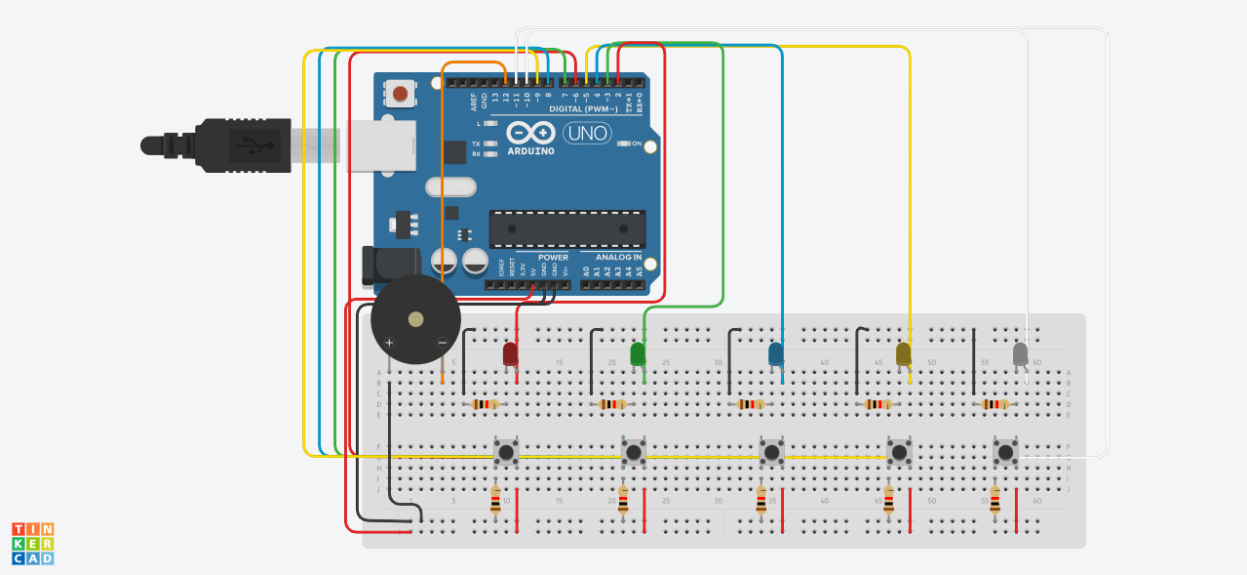
Push Switch Calculations…

Voltage in: $5\ V$
Led mA rating: $20\ to\ 25\ mA$
Resistor ohms: $220\ \Omega$

Voltage = Current * Resistance

$$5V = 23\ mA * R5$$
$$R = \frac{5\ V}{23\ mA}$$
$$R = \frac{5\ V}{0.023\ A}$$
$$\frac{5\ V}{0.023\ A} = 220$$
$$R = 220$$

Circuit.io Simulation…



How to play…

Step 1: Use the circuit.io image to recreate the circuit on either a physical bread board or some circuit simulation.

Step 2: Download the Arduino code and upload it to you Arduino.

Step 3: Press the push switch under white LED to start the game

Step 4: Observe the pattern that is displayed on the LEDs

Step 5: Repeat the same pattern using the push switches

Step 6: The game will continue to add one more move to the sequence, if you reach level 40 you will win the game, if you input an incorrect sequence, you will lose the game.

Step 7: After this, the game will restart.a

Demos

Start Tune & Gameplay demo
https://youtube.com/shorts/y53MfwiIMWY

Loss demo
https://youtube.com/shorts/3A3DxLtDG9g

Win Tune demo
https://www.youtube.com/shorts/8TZJ934hJsE

Extensions

- In addition to meeting the project requirements, I also added a piezo buzzer to the board
- This buzzer has multiple uses during the lifespan of the gameplay
- First, the buzzer is used in addition to the sequence of LEDs being played. Each LED is mapped to a unique frequency, which will be played whenever the LED is lit up.
- Second, there are three different themes which play throughout the game.
- When the player first starts up the game, they will hear a tune which represents the game starting.
- If the player loses the game, they will hear a rather eerie tune which lets them know they have lost
- If the player wins the game, they will hear a cheery tune which lets them know they have won
- In addition to the 4 LEDs and 4 push switches needed to play the game, I added an additional push switch which are used to wait for the player to start the game, and an additional LED which is on as long as the game is running