

The final project that I chose to do is the Simon Project. The Simon Project is based on the popular children's game "Simon Says." A person gives an action and the other players must perform that action correctly. In this case the action to be completed is to correctly input a pattern of LEDs. This project contains nine LED patterns that the user must memorize and then input the correct sequence using the provided buttons.

In this project an LCD screen with a potentiometer was used. The LCD screen is used in order to visually relay messages to the user about the status of the game. The user is prompted by the screen to press a button to start the game, display their current score and whether they won or lost. A potentiometer is used in conjunction with the LCD screen to adjust the brightness of the screen.

Next the LCD was connected via jumper cables to the ATMEGA1284. The ATMEGA1284 is the microprocessor that was used in order to handle the computation of this project. It controlled the game's logic as well as the LEDs, screen messages, and the user's score.

Then four LEDs were connected to the microcontroller using jumper cables. Furthermore, resistors were used in order to protect the LEDs. Next four buttons were connected to the microcontroller using jumper cables as well. These buttons will serve as the input to the game.

The internal logic of this project is simple. The user is given nine light patterns using the LEDs. For every given pattern, the user must input the correct sequence from memory using the four buttons on the breadboard. If the correct sequence is entered, the score of the user is increased by one. The user must correctly input nine LED sequences in order for a message to display on the screen declaring them the winner.

It is also possible to lose in this game. If a sequence of LEDs is given and the user does not correctly input the sequence using the provided buttons, then a message declaring that they lost the game will appear in the LCD screen.

This project took 5 days to complete as there were other classes and assignments that took some of my time. The project was first thought out on paper such as the materials that were needed, the logic of the game, and possible features to improve the game. Then the building of the project by connecting all of the mentioned hardware onto a breadboard.

Once I had the project's hardware connected and assembled, I moved to using the software ATMEL Studio in order to program the microcontroller. The chosen programming language for this project was C. Having used C during this whole class, increased my knowledge of the language and confidence.

I used an incremental approach to this project. I focus on something simple small, such as generating an LED pattern first. Then using the buttons to gather the input, consequently be able to compare that input to the given pattern. I took things step by step in this project.