EE 306 - Microprocessors

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NUMBER GUESSING GAME

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Contents

Explanation of the Project

This project is a number guessing game where the user inputs the number they guess via the use of switches and then the number is compared to the one taken from the pseudo random number generator. The user has 4 attempts to guess the correct number. In every attempt the LED lights show which attempt you are on. If the guessed number is higher than the random number, the 7-segment display displays a lower line telling the user to go lower. If the guessed number is lower than the random number, the 7-segment display displays an upper line telling the user to go higher. If the correct number is guessed all the LEDs light up and an O is displayed signifying the guessed number was correct. If the number is not guessed before the attempts run out all the LEDs shut down and an X is displayed which tells the user, they have failed to guess the number and then the program seamlessly restarts without stopping runtime.

Manual//Usage

1. Program begins to run.
2. User clicks the switches to guess a number.
3. After this, the user can check the LED display to see which attempt they are at any time.
4. User uses any push button to check if the guess was correct.
5. The 7-segment either displays a lower line to indicate to guess a lower number or a higher one to indicate guessing a higher number.

This procedure loops until the attempts are exhausted or the number is guessed.

Input

- The user inputs the guessed number via the use of switches.
- Each button of the switch is a power of 2.
- Any of the push buttons need to be pressed to continue.

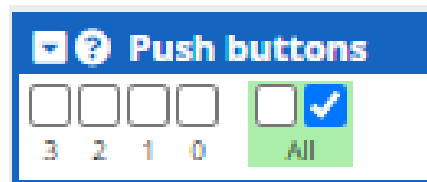*Figure 1 Switch with the number 4(2^2) pressed.*

Figure 2 Any push button will continue the program.

Example Usage Screenshots

As can be seen on the figure below, this is a first attempt with the number 6 inputted via the switches. Since it is wrong, the display shows a lower line to indicate the user to go lower.
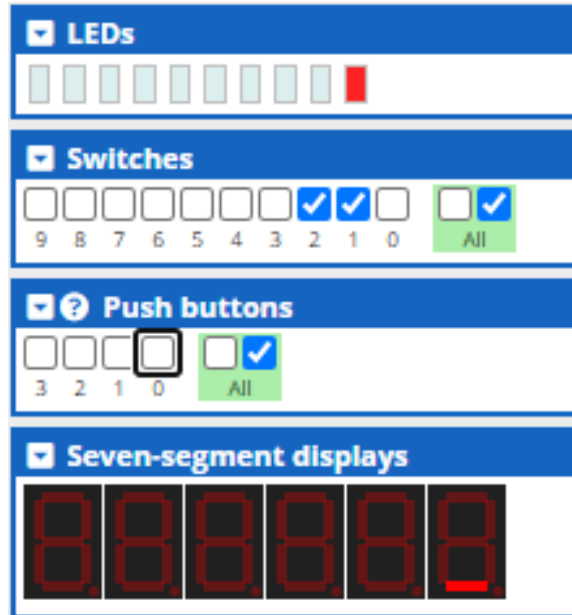

Figure 3 An example attempt.

Another wrong attempt. 2nd attempt which indicates a "guess higher" indicator.
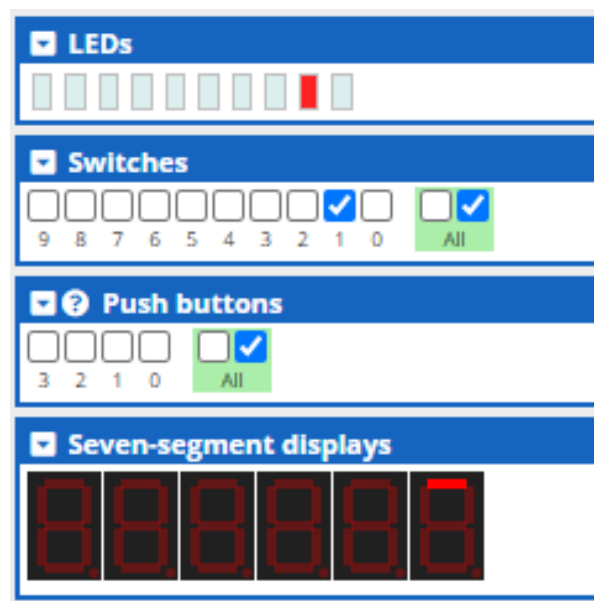

Figure 4 "Go higher" example.

An attempt where the user succeeds, and the display shows an "O", and all the LEDs light up.
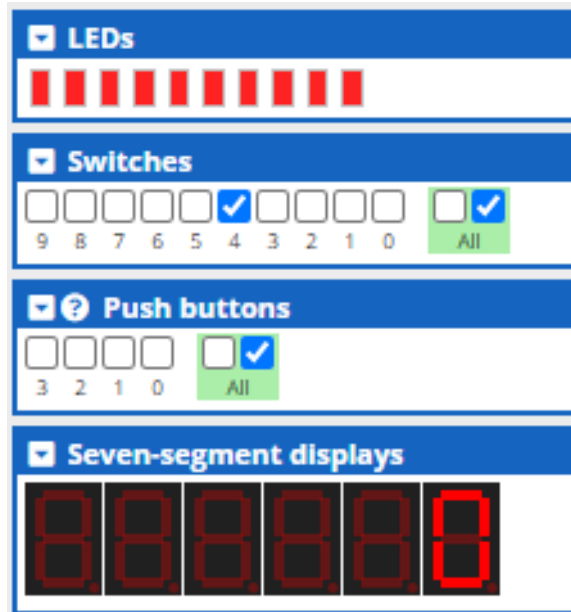

Figure 5 Successful attempt.

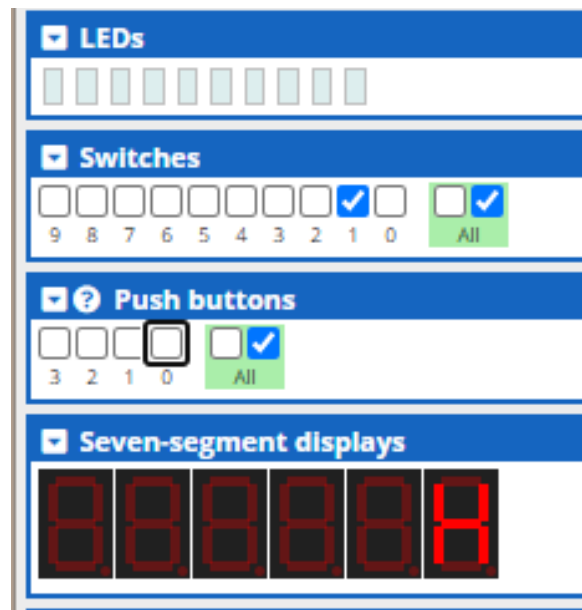An attempt where the user fails, and the display shows an "X", and all the LEDs shut down.

Figure 6 Unsuccessful attempt.

Flowchart

User attempts get reset all LEDs shut

Pseudo-random value taken from generator

All LEDs light up and 7 segment displays "O"

Is the value higher than 20? — No

Yes → Subtract 20 from the value → Is the value negative? — Yes → Add 1

Are there any attempts left? — Yes → Delay period where number guess value is taken from switches

No

Is push button pressed? — No

Yes → Is the value equal to the random value?

Yes → Are there any attempts left? — No

No → Is guessed value lower?

Attempt reflected on LED — Yes

7-Segment displays upper line

Attempt reflected on LED — Yes

7-Segment displays the lower line

Are there any attempts left? — Yes

No

7-Segment displays "X"