The Fire Alarm Challenge (Simplified 2021-2022 version)

You are to build and program a model fire alarm. The fire alarm will have two pull boxes, one on each floor.

There is also a Piezo speaker for the alarm. The terminal is used to display the state of the system as follows:

> "System Normal" is displayed when all is well.
> "First Floor" is displayed if the first floor pull box has been activated.
> "Second Floor" is displayed if the second floor pull box has been activated.
> Red and green LEDs are also used to display the state of the system (do not forget the resistors).

How it functions:

Button 1 represents a "pull box" on the first floor.
Button 2 represents a "pull box" on the second floor.
When there is a fire, someone pushes button 1 or button 2. That begins the alarm cycle.

Requirements:

1. When no button has been pressed, a steady green light indicates all is well. "System Normal" is displayed on the terminal.

2. If button 1 is pressed, "First Floor" is displayed on the terminal, the green LED goes off, a red led blinks and an alarm sounds intermittently (beep, pause, beep, pause, beep, pause ...). This continues forever.

3. If button 2 is pressed," Second Floor" is displayed on the terminal, the green LED goes off, a red led blinks and an alarm sounds intermittently (beep, beep, pause, beep, beep, pause...). This continues forever.

Summary:

Normal State: Green led is on, "System Normal" on the terminal, no audible alarm.
Alarm State: Green led is off, Red LED is blinking, alarm sounds indicating which box was pulled.
Terminal indicates which pull box has activated the alarm.
The program is loaded into the EEPROM. That way, you can use the reset button on the activity board to "reset" the system.

Evaluation:

You will demonstrate the project for your instructor and hand in a complete report. The report will contain all the following parts:

1. Description of the project.
2. A physical diagram or picture of the breadboard.
3. Schematic diagram.
4. Printout of the blocks. (SVG file.)

5. Flowchart.
6. Any other documentation or commentary you think is pertinent.

Guidelines for your BlocklyProp program:
1. Your program should start with comments including the following: your name, the purpose of the program, notations of which device is connected to which pin.
2. The names of functions and variables should be indicative of the purpose of the function or variable in order to make the program easier to read and understand.
3. Your program should be organized top to bottom and left to right.

Note on grading: **Late submissions will receive reduced credit or no credit at all. Everything should be very neat. "Presentation quality".**

Sequence: (Be sure to include your name on anything you submit to be graded.)
1. Draw a schematic diagram of the circuit. It should contain standard symbols and be **very neat**. The keyword for everything you hand in is presentation quality. Submit this to Google Classroom. (10 points)
2. Wire up your breadboard according to your schematic. Make the layout and wiring neat. Be sure users can push the buttons without disturbing anything. Make sure bare wires such as resistor leads do not touch anything else. Take a picture with your phone. Save the picture for inclusion in your final report. (10 points)
3. Draw a flowchart for the program using correct symbols. Submit it for grading in Google classroom. (10 points)
4. Write a test program which checks each button and prints out on the terminal if a button has been pressed. If anything does not work, make corrections to your wiring and/or the program. Submit a copy of the program to Google Classroom. (3 points)
5. Write a test program which checks each LED and the piezo speaker. If anything does not work, make corrections to your wiring and/or the program. Submit a copy of the program. (3 points)
6. If you have made any changes in the schematic and/or the breadboard, submit a new schematic or picture to be graded. IF NO CHANGES HAVE BEEN MADE submit a simple statement to that effect. (4 points)
7. When you have a working breadboard, write the alarm system program. Test the program. If it does not work perfectly, note what problems exist and fix them. (10 points)
8. Demonstrate your system in a manner determined by your instructor. An mp4 movie will probably work best if in-person demonstration is impossible. (5 points)
9. Write a complete report as indicated in the **Evaluation** section above. Submit it. (15 points)