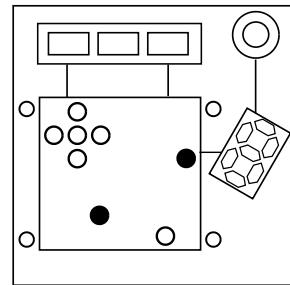


## On the Subject of Faulty RGB Mazes

*Now you too can experience... wait, where am I?*

This module consists of an 7x7 grid of LEDs, a crooked seven segment display, and flickering keys.



On this 7x7 grid are three mazes, one with red walls, one with green, and one with blue.

Each of these mazes contains a key. All three of these keys are initially shown on the grid.

There are 4 pieces of information that the module will provide:-

1. The coordinates of the key. - This provides the coordinates you need to reach before advancing to Stage 2.
2. The number from the 7-segment display - This provides the layouts are used for each maze. (Refer **Maze Layouts**)
3. The color of the LEDs on the edge of the maze - This provides the orientation of the mazes. (Refer **Maze Layouts**)
4. The flashing sequence on each key - This provides the condition before changing the mazes. (Refer **Maze Change Avoidance**)

Pressing any of the LEDs will reveal the starting location, a white LED, somewhere within the red maze.

The keys are then hidden but will not be moved from their original locations.

**IMPORTANT:** This process is irreversible, thus information 1 and 4 must be noted before any LED is pressed.

Press an adjacent grey LED to move. Avoid hitting the walls of the mazes.

Press the white LED to switch between mazes, the mazes is cycled in the order Red, Green, Blue.

**Note:** As opposed to regular RGB Maze, when swapping the mazes, the white LEDs will move by a fixed number of spaces left/right and up/down, provided that the maze swap is the same.

(eg. The white LED (current position) will always move left by 2, up by 2 when swapping from R maze to G maze)

Please contact Fang#1217 on Discord if there're any disambiguiities.

**Life hack:** You will automatically pick up the key (of the next color) when you are on the same coordinate of the next key before cycling into the next maze (provided that defective rule is valid).

### Maze Change Avoidance

The keys will flicker, giving a sequence of four bits each, **in order of least to most significance.**

For each of the four bits: If the key is visible, the bit is a 1. Otherwise, the bit is a 0.

The keys will be visible for a full second between repeats of the sequence.

**Note:** X spaces from center refers to the minimum distance (not diagonally) between centre and the point. (e.g. A4 are 3 spaces from center while C3 are 2 spaces from center.)

**Note:** To help you, the sequence in the table below is shown from LSD to MSD which is exactly shown on the module.

Mazes cannot be switched if the white LED is defective (when the corresponding rule is true).

| Sequence | DO NOT change maze when you are ...                             |
|----------|-----------------------------------------------------------------|
| 1000/1   | on odd columns.                                                 |
| 0100/2   | either 0/3/6 spaces from the center of the grid.                |
| 1100/3   | on (odd,odd) or (even,even) coordinate.                         |
| 0010/4   | either 1/4 spaces from the center of the grid.                  |
| 1010/5   | on even rows.                                                   |
| 0110/6   | either 2/5 spaces from the center of the grid.                  |
| 1110/7   | on the edge of the grid.                                        |
| 0001/8   | on odd rows.                                                    |
| 1001/9   | on the same row as the location the maze was entered from.      |
| 0101/10  | on (odd,even) or (even,odd) coordinate.                         |
| 1101/11  | more than 3 spaces from the location the maze was entered from. |
| 0011/12  | on even columns.                                                |
| 1011/13  | on the same column as the location the maze was entered from.   |
| 0111/14  | on the center row or column.                                    |

## Maze Layouts

Each colour component of the seven segment display is a hexadecimal number corresponding to one of the mazes below.

Refer to **Appendix I: Stage 1** for the possible alphabets.

The seven segment display shows three numbers that correspond to each of the mazes, which also overlap and mix additively.

Refer to **Appendix II** for the color components.

Each component may be shown normally or inverted, it's possible for the grey segment (segments that are not red) will be shown on the module instead of the red segments.

Refer to **Appendix I** again for what are the possible red segments and grey segments.

Each of the mazes has an LED at one of its corners that is the same colour as the maze itself, identifying the orientation of that maze.

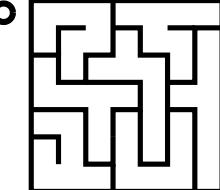
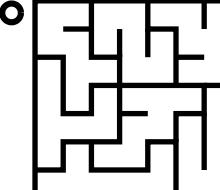
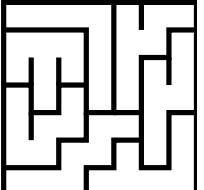
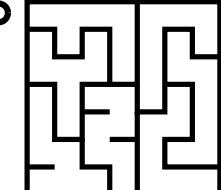
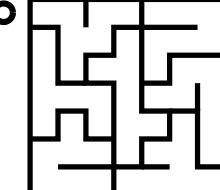
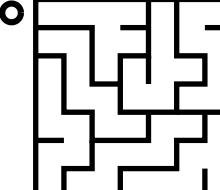
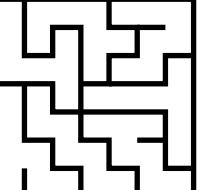
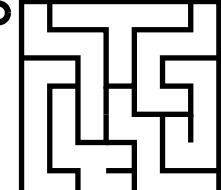
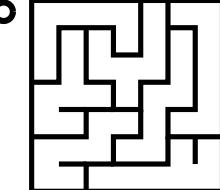
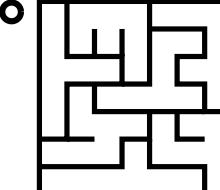
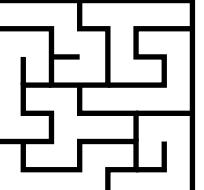
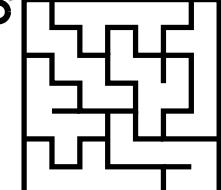
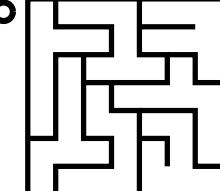
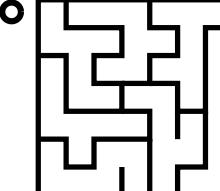
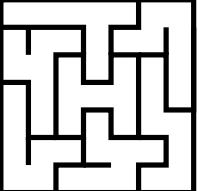
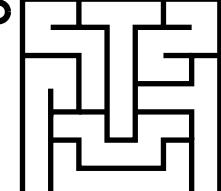
The mazes may have been flipped horizontally and/or vertically such that the LEDs are flipped onto the appropriate corners of the grid.

The colours of the LEDs mix additively if their respective mazes have the same orientation.

**Note:** Always flip the mazes, do not rotate the mazes.

In the manual, each of the mazes below have their LEDs at the top left corner of the grid, flip the mazes (either horizontally or vertically or both) until the position of LED matches the position on the module.

Maze Layouts (cont.)

|                                                                                     |                                                                                     |                                                                                      |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 0                                                                                   | 1                                                                                   | 2                                                                                    | 3                                                                                     |
|    |    |    |    |
| 4                                                                                   | 5                                                                                   | 6                                                                                    | 7                                                                                     |
|    |    |    |    |
| 8                                                                                   | 9                                                                                   | a                                                                                    | b                                                                                     |
|   |   |   |   |
| c                                                                                   | d                                                                                   | e                                                                                    | f                                                                                     |
|  |  |  |  |

## Stage 2

Once all three keys are collected, the seven segment display will change. Refer to **Appendix I: Stage 2** for all possible alphabets.

Each of the three colour components give a coordinate of the location of the exit:

- One of the components is a number, which signifies the row of the exit.
- One of the other components is a letter, which signifies the column of the exit.
- The remaining component is a random pattern that is neither a number or a letter.

To solve the module, you must move to the given coordinates in the maze that is the same colour as the component with a random pattern.

Appendix I: All possible alphabets on 7-segment display

Stage 1:

| A | B | C | D | E | F |
|---|---|---|---|---|---|
|   |   | C |   | E |   |
| B | B | d | E |   |   |

Stage 2:

| A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|
| R | C | E | F | F | O |   |
| B | B | B |   |   |   |   |

Appendix II: Addition of color