

Lab Topic 01 - User Interface for the Lights Out Game

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Background

The Lights Out Game was released in 1995 by Tiger Electronics. It is played using a 5×5 grid of lights, a random selection of which are switched on. The goal is to turn all of the lights off.

Mechanics

Given a 5×5 grid of lights, when a light is pressed, it and the four lights adjacent to it are toggled (off \rightarrow on, or on \rightarrow off). An optimal solution is achieved by reaching the goal of turning all the lights off in the fewest possible button presses.

Example

Given the following light configuration where black cells indicate off-lights and white cells indicate on-lights:

	0	1	2	3	4
0					
1					
2					
3					
4					

Fig. 1. A sample initial state for Lights Out.

If the cell on row 1, column 2 is pressed, the resulting grid will be:

	0	1	2	3	4
0					
1					
2					
3					
4					

Fig. 2. The resulting state after the cell at row 1, column 2 is pressed.

Exercise

Create a **user interface** for this game using **Java** (use javax.swing components) or **Python** (using any component library you are comfortable with). This will serve as a review on the Java/Python programming.

The **initial state of lights** must be read from an input file called **lightsout.in**. Each initial state will be represented by five lines with five bits separated by spaces. For example, the input file for the initial state illustrated in Fig. 1 is:

1	1	0	1	0
1	0	1	1	1
1	1	0	1	1
0	1	1	0	1
1	0	0	0	1

Fig. 3. The **lightsout.in** file for the initial state in Fig. 1.

Grading:

Criteria	Points
Read the initial state correctly and render it on the UI	2
Store the current state of the game properly	2
Correctly toggle lights upon pressing a cell	4
Detect the winning condition	2
Total	10

Deadline: Within lab hours.

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