User Documentation for Simon Game in RIPES:

Author: Mohamad Sabagh

Welcome to the Simon Game! This game will display a sequence of colors on an LED grid and ask you to match it. Please follow the instructions carefully to get the most out of the game.

A1: How to Configure Your System:

- Make sure you have RIPES installed and running on your computer.
- Load the source file "simon starter.s" onto RIPES.
- Select the I/O tab on the left side of the screen.
- Double-click on the "LED Matrix" device to initialize an LED grid. Then on the right side, on the panel that has "LED Matrix 0", set "Height" to 10, set "Width" to 10, and "Size" to 30.
- Double-click on the "D-Pad" device to initialize the D-Pad inputs.
- The I/O page should look like Figure 1.

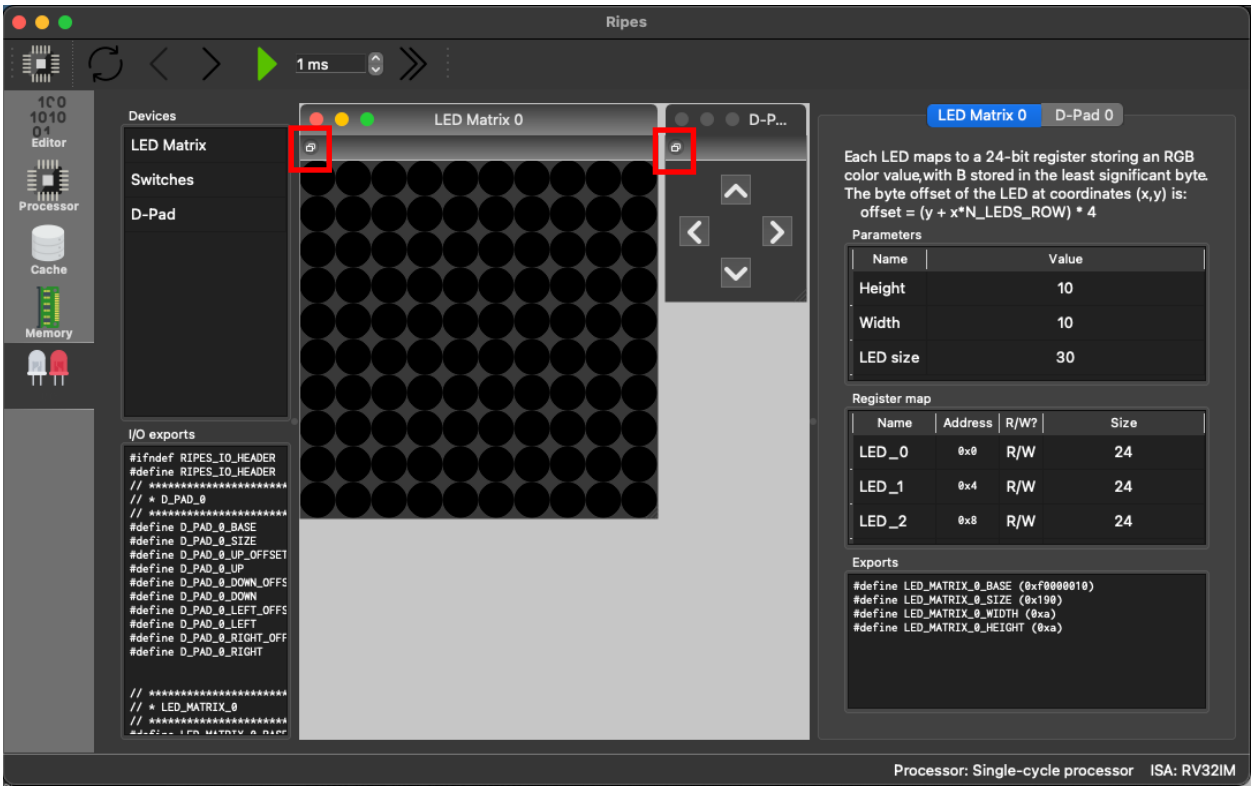

Figure 1. The I/O page after configuration as outlined in A1. Note that pressing the windowed view (red squares) for both windows can make them accessible from the editor tab.

A2: How to Start the Game:

- While on the I/O tab, press the windowed view on the “LED Matrix” and “D-Pad” as outlined in red squares on Figure 1.
- Switch to the editor tab to see the messages and instructions outputted to the console (white window on the editor tab).
- Make sure you run the code using the fast execution  on the top of the window.
- Follow the instructions on the console output, and the final window should look like Figure 2.
- Note that during testing, RIPES made errors while compiling the code for a 10x10 LED Matrix. If, during play, the LEDs were showing weird outputs, please restart RIPES to fix this issue.

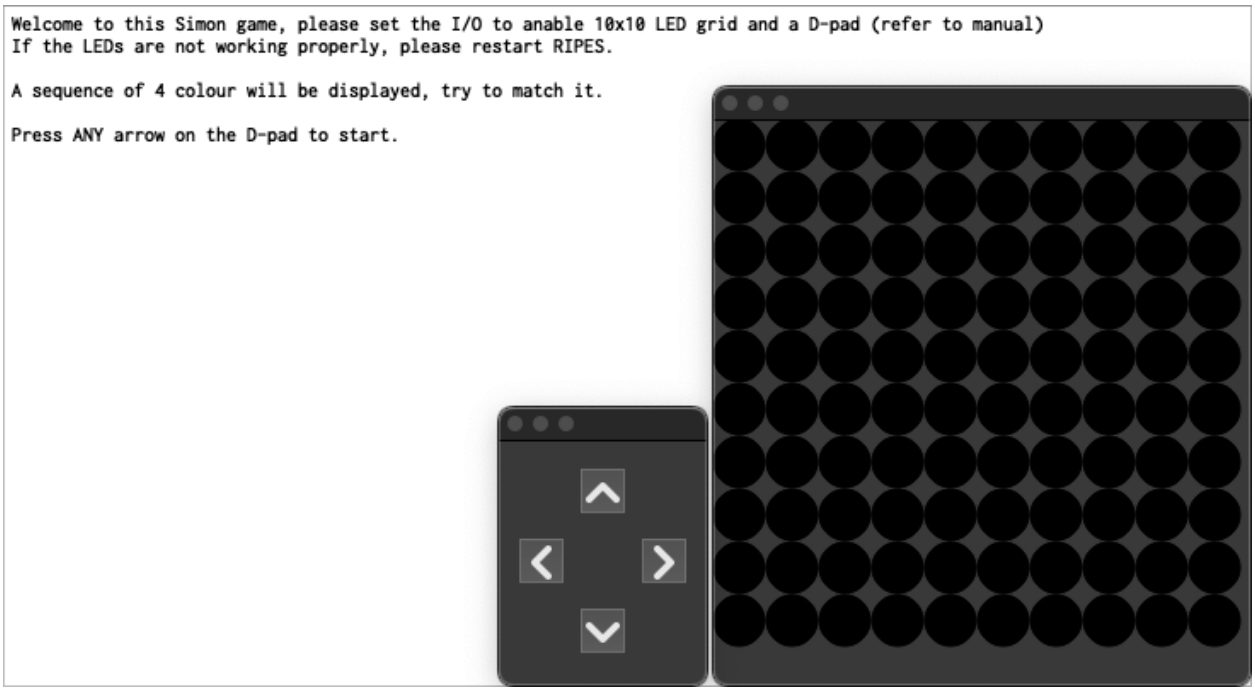

Figure 2. The editor tab showing the running game with the LED Matrix and D-Pad in view. The game is ready to be played.

A3: How to Play the Game:

- After clicking the fast execution  , press any arrow on the D-pad to begin the first round.
- A sequence of 4 colors will be displayed on the LED grid.
- Once the sequence has been fully displayed, the game will prompt you to start providing input. The LED grid will be off, and the console will ask you for the first step in the sequence.
- Use the D-pad to match the sequence.
- The LEFT arrow on the D-pad corresponds to the Yellow Left pattern on the LED grid (Figure 3a).
- The RIGHT arrow on the D-pad corresponds to the Blue Right pattern on the LED grid (Figure 3b).
- The UP arrow on the D-pad corresponds to the Red Top pattern on the LED grid (Figure 3c).
- The DOWN arrow on the D-pad corresponds to the Green Bottom pattern on the LED grid (Figure 3d).
- To confirm that the game registered the D-pad input, a message will display on the console asking for the next step of the sequence of colors.
- Once you have completed the sequence, the game will indicate whether you were successful or not.
- Success will be signaled with the entire LED grid flashing green twice.
- Failure will be signaled with the entire LED grid flashing red three times.
- Despite the result of this round, there are 3 options at the end of the round.
- Option 1 (UP arrow on D-pad): increase the sequence count by an increment of 1, thus the next round will be 5 steps.
- Option 2 (DOWN arrow on D-pad): keep the current sequence count play another round.
- Option 3 (LEFT/RIGHT arrow on D-pad): either left or right arrows will quit the game and output an exit code.
- If option 3 was chosen, the game can be relaunched by clicking  on the top of the window, then fast executing the code  .

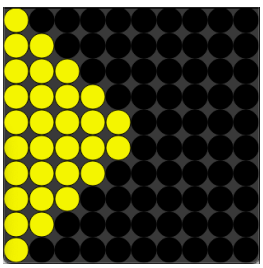

Figure 3a. Yellow left pattern corresponding to left arrow D-pad

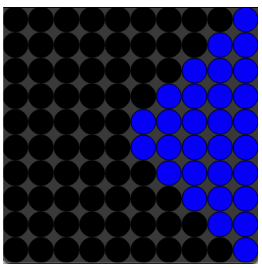

Figure 3b. Blue right pattern corresponding to right arrow D-pad

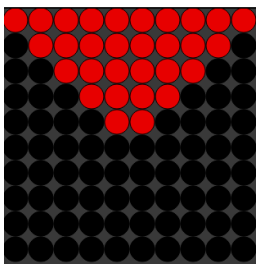

Figure 3c. Red top pattern corresponding to up arrow D-pad

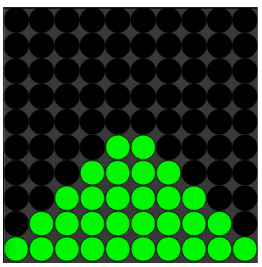

Figure 3a. Green bottom pattern corresponding to down arrow D-pad

A4: Enhancements:

- Category A (Memory enhancement): This version of the game considers the choice of the user to increase the difficulty of the game. At the end of each round the user can press the UP arrow on the D-pad to increase the count of the sequence by 1 for the next round. Example: the current sequence count will be displayed at the end of the round; this round it was 4 steps in the sequence. Pressing the UP arrow means that next round will have 5 steps in the sequence that the user must match with.

- Category B (Code enhancement): This version of the game improves the LED interface to make it more intuitive to the user. The original suggester interface had a 2x2 LED (Figure 4a) grid and each corner corresponds to a D-pad input. The D-pad interface has vertical and horizontal arrows only, but the LEDs in a 2x2 grid are diagonal, thus the mapping of the input was counter intuitive. To solve this issue, a Simon game sketch (Figure 4b) can be rotated 45º, then expanded to fit a square grid (Figure 4c), which can be translated to a digital interface using 10x10 LED grid (Figure 4d). This new interface is more intuitive and makes the interaction with the user more organic as each D-pad Arrow points to its respective region.

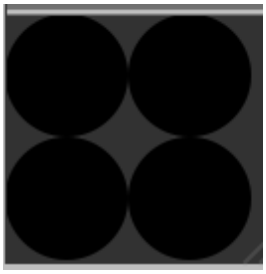

Figure 4a. The initial counter-intuitive interface

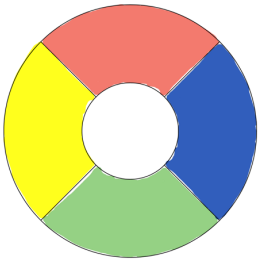

Figure 4b. Original Simon game rotated 45º

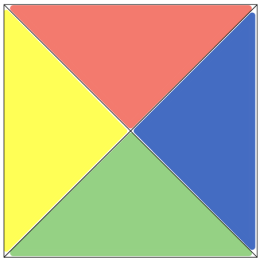

Figure 4c. Expanding the original design to fit a digital format

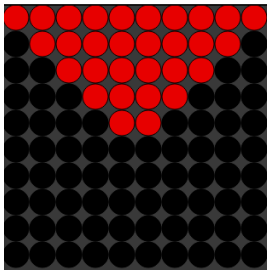

Figure 4d. The final interface showing the red portion as an example

FAQ:

Q: How will the game indicate that a sequence has been fully displayed and a player should start providing input?

A: The LED stop showing any patterns, and the console output (white rectangle on the editor tab of RIPES) prints “What’s the first step?” to indicate that the pattern was fully shown and awaiting the user input.

Q: How will the game indicate that a d-pad key has been pressed?

A: The console output prints “Next?” after every successful press to indicate that the user’s choice is correct but haven’t matched the rest of the sequence. If the user chooses a wrong choice, the game will immediately show that the answer is wrong and flash the screen red three times.

Q: Which d-pad key corresponds with which LED?

A: Please refer to section “A3: How to play the game” for a detailed mapping of the D-pad arrows.

Q: How will the game indicate that the player successfully matched the sequence?

A: If the user matches the correct sequence, the LED grid will flash green twice and the console output will print “CORRECT!”

Q: Can players select a difficulty? How?

A: The user can choose to increase the difficulty of the game at the end of each round. Pressing UP on the D-pad will increase the count of steps to the sequence by 1 for the next round to increase difficulty, OR pressing DOWN on the D-pad will keep the same count of steps to the sequence for the next round.

Hope you enjoy playing the Simon Game! If you encounter any problems, please consult the instructions above or contact the author for assistance.