SIMON: Game of Memory Skill

Instruction Manual

Written by Mohsin Muzammil

Welcome to SIMON

SIMON is a memory game. The game lights up a sequence of colours, and your goal is to match the generated sequence of lights. If you match the sequence correctly, then you progress to the next round. The rounds progressively get harder by generating longer sequences to match. Once you fail to match a sequence, the game ends. Let's see how far you can get!

Prerequisite Software

To play SIMON, you will first need to download a simulator called Ripes. Download and install the latest version of Ripes for your operating system by visiting the following link:
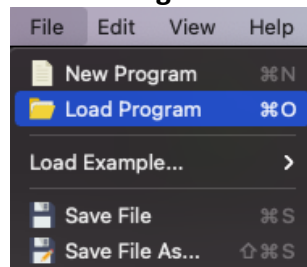
https://github.com/mortbopet/Ripes/releases/tag/v2.2.4
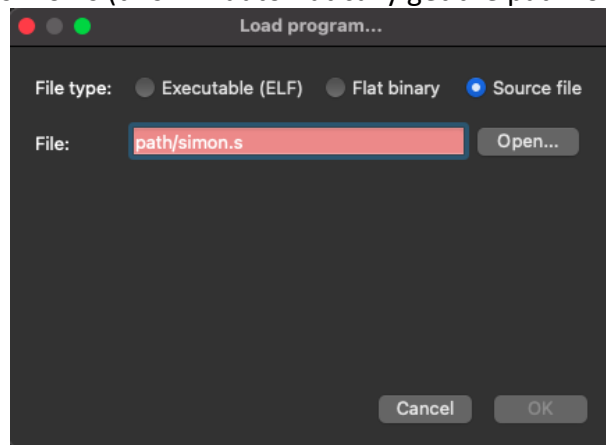
Opening SIMON in Ripes

After Ripes has been installed, open the application.
To open SIMON in Ripes,

1) In the app menu, click **File** > **Load Program**

2) Select the **File type** to be **Source file**. Then either provide a path to simon.s or click **open** and select simon.s (this will automatically get the path for you). Finally, click **OK**.

To confirm that SIMON has been successfully loaded into Ripes, select the **Editor** tab in the menu located on the left. Here you should see the source code for the game.
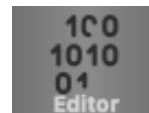
Game Setup

Now that SIMON is open in Ripes, you will need an LED Matrix and a D-pad to start playing. Select the **I/O** tab in the menu located on the left to configure input and output devices.

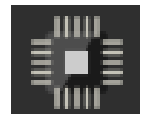## Creating an LED Matrix and a D-Pad

You will see a panel named **Devices** on the left. Double click on **LED Matrix** to create an LED Matrix. Now on the right there will be a panel named **LED MATRIX 0** which contains a table of parameters such as **Height**, **Width**, and **LED Size**. Set both the **Height** and **Width** to 3. Set the **LED Size** to 50 (or any other value that helps you distinguish between the LEDs). Next, double click on **D-Pad** from the **Devices** panel on the left to create a D-Pad device. No further settings are required for the D-Pad device.

Now that you have both an LED Matrix and a D-pad, click on the following icon located in both of their windows. This will detach the LED Matrix and the D-Pad from their windows, allowing you to freely move them through tabs. You should have something similar to the following:
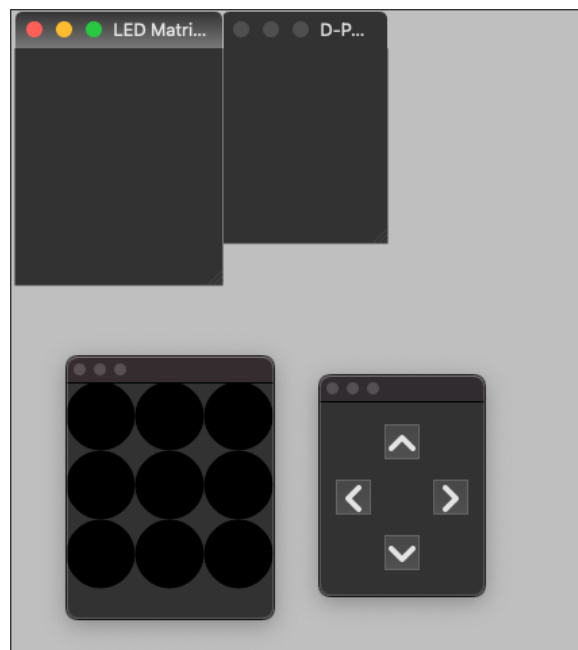
Selecting a Processor

Next, you will need to select a processor. At the top in Ripes, there is a toolbar, click the processor icon. A new window named **Select Processor** will pop up. Expand the **RISC-V** tab, then further expand the **32-bit** tab and select **Single-cycle processor**. Finally, click **OK** to apply changes.

Note: Every time Ripes is opened to play SIMON, you may have to recreate an LED-Matrix and a D-Pad.

Adjusting Game Layout

Finally, select the **Processor** tab in the menu located on the left. This is where you will play SIMON. The tab may seem overwhelming, but the only thing you need to focus on is the white console window at the bottom.
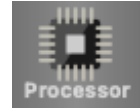
Since we detached the LED Matrix and D-Pad, they should remain visible in this tab. Drag them around to a comfortable spot where the console is clearly visible. You should have something similar to the following:
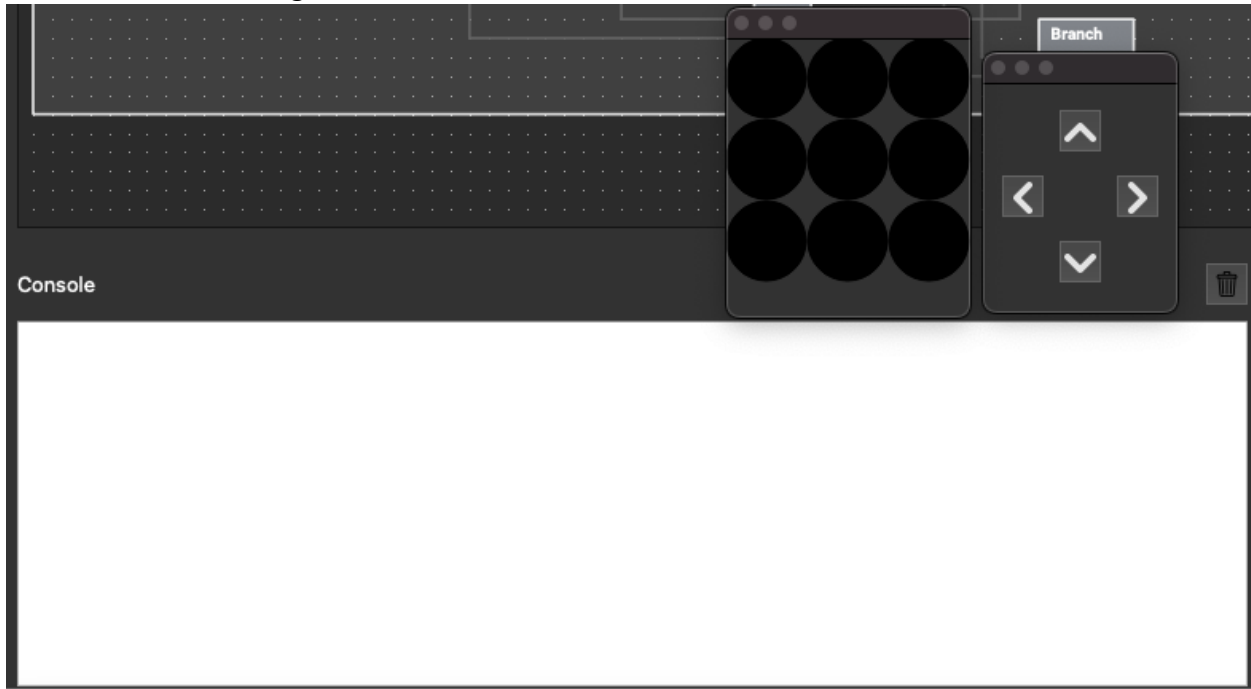
When you play the game, text will be displayed in the console. So, before the start of a new game, you may wish to clear the old text in the console. This can be done by clicking the trash icon.

Game Controls

To start a new game of SIMON, first click on the **Reset** icon (two arrows forming a circle) and then click on the **Play Game** icon (double arrowheads), both of which are located in the toolbar.

How to Play a Game of SIMON

Start a game of SIMON by clicking the **Reset** icon followed by the **Play Game** icon in the toolbar (you may also want to clear the console).

The game will begin by displaying the current round number in the console.

<p align="center"><code>Current Round 1</code></p>

Then the game will display a sequence of lights that you will have to match. The length of this sequence of lights starts at four and increases by one each round. So, as the rounds progress, the game gets harder by generating longer sequences to match. When the sequence to match is fully displayed, the console will indicate to you that it is your turn to display the sequence.

<p align="center"><code>Now your turn!</code></p>

There are four different coloured lights with fixed locations:
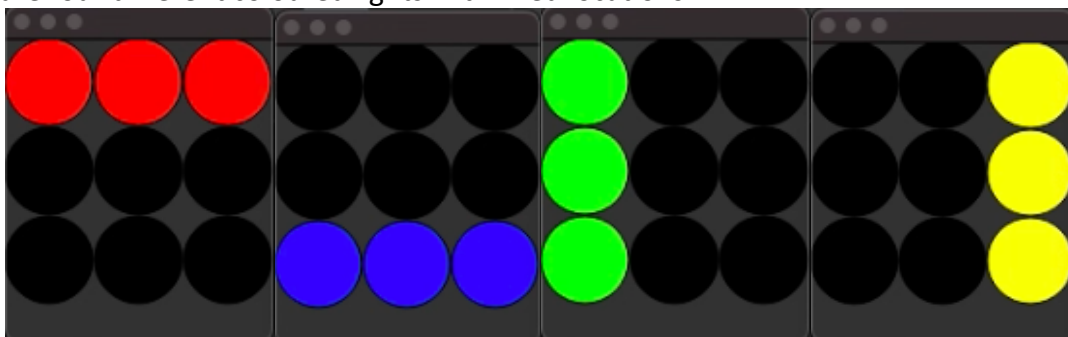
You will use the D-Pad to play the displayed sequence. Clicking the **UP** arrow on the D-Pad corresponds to the colour **RED**, clicking the **DOWN** arrow on the D-Pad corresponds to the colour **BLUE**, clicking the **LEFT** arrow on the D-Pad corresponds to the colour **GREEN**, and clicking the **RIGHT** arrow on the D-Pad corresponds to the colour **YELLOW**.

When you click an arrow on the D-Pad to select a colour, the LED Matrix will light up the colour you selected.

Matching Light Sequence Correctly

If you match the sequence of lights correctly, you will be indicated by the console.

<p align="center"><code>Correct!, try the next one.</code></p>

The LED Matrix will also indicate that you matched the sequence correctly by rapidly flashing all **GREEN** lights twice.
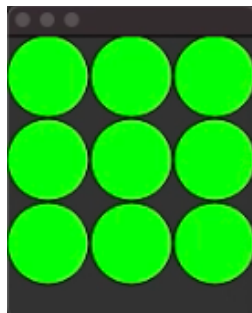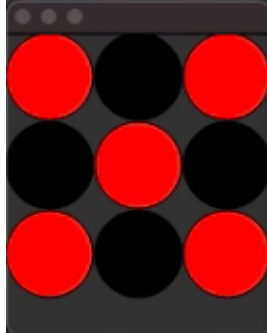

Correctly matching the sequence of lights will progress you to the next round with a longer sequence.

Matching Light Sequence Incorrectly

If you fail to match the sequence of lights correctly, you will be indicated by the console.

<div align="center">

`Incorrect! Game Over.`

</div>

The LED Matrix will also indicate that you matched the sequence incorrectly by rapidly flashing a **RED** X twice.

Incorrectly matching the sequence of lights will end the game. You will be asked to play again or exit, via the console.

<div align="center">

`To play again, click UP. To quit, click DOWN.`

</div>

If you wish to play again, click **UP** on the D-Pad. The game will restart from round 1. If you wish to stop, click **DOWN** on the D-Pad and the game will exit.

If you want to play SIMON after exiting, start a new game by clicking the **Reset** icon followed by the **Play Game** icon in the toolbar (you may also want to clear the console).