Sokoban Game User Documentation

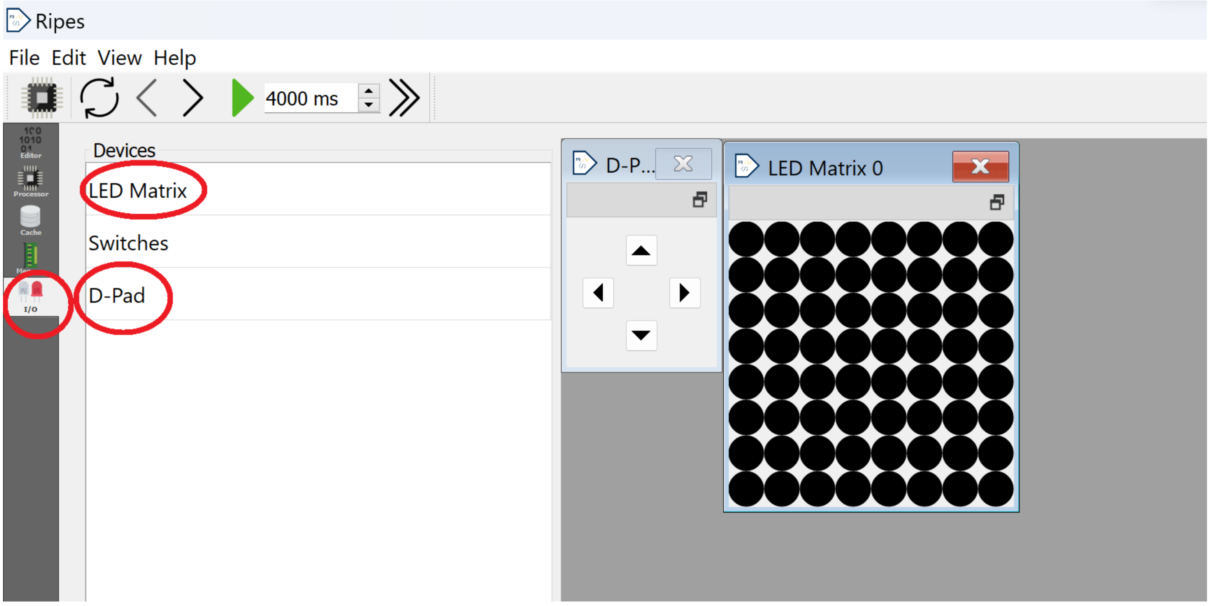
Table of Contents

Introduction

Sokoban, a term originating from Japan and translating to ‘warehouse keeper’, is a classic puzzle video game. The primary objective of the game is to navigate through a warehouse filled with a box, and strategically push it onto a designated target. This user manual will guide you through the installation, setup, gameplay, and troubleshooting of Sokoban.

Setup

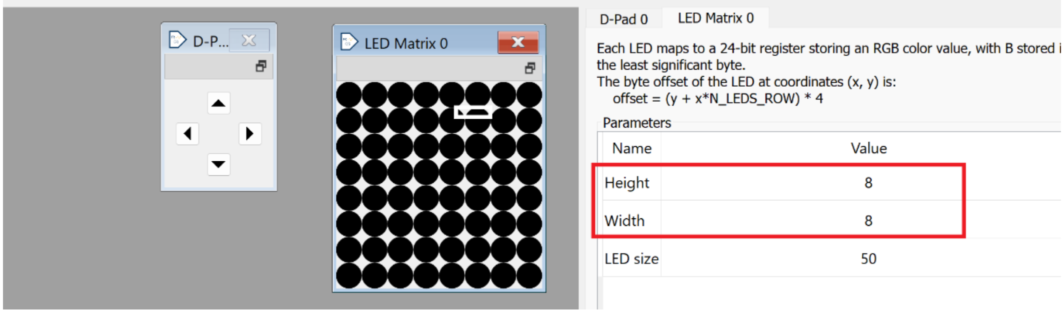
- First, in order to play the game, you need to have the latest Ripes software installed on your device. Then, load the Sokoban game code onto your Ripes platform using the file option on the menu bar and Load Program option.
- After doing this we set up the UI of the game, to do so click on the I/O section in sidebar and then select the LED Matrix and D-Pad in under the Devices section.



Next, you need to configure the following devices in the Ripes I/O section:

  - LED Matrix: This is where the game board will be displayed. Set the height and width to 8, and the LED size to 32.

- D-Pad: This is used to control the movement of the character in the game. No setup is required.

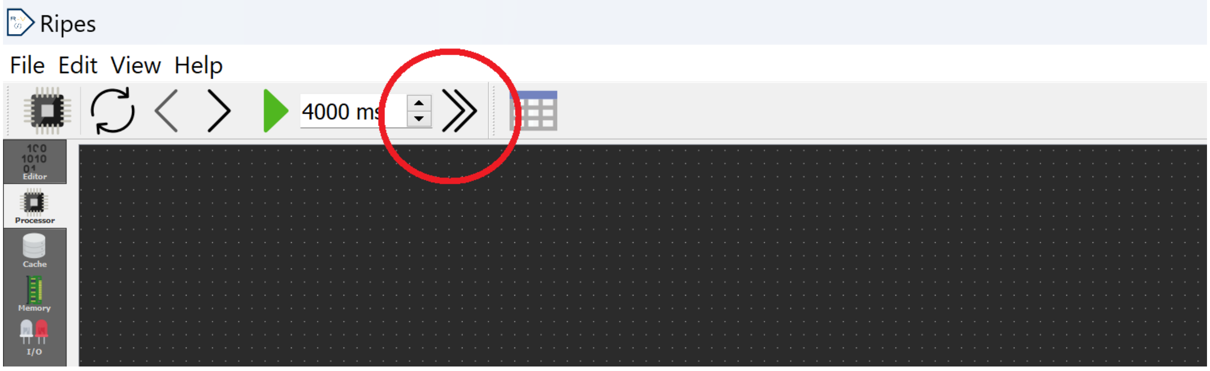


Each LED maps to a 24-bit register storing an RGB color value, with B stored i the least significant byte.
The byte offset of the LED at coordinates (x, y) is:
offset = (y + x*N_LEDS_ROW) * 4

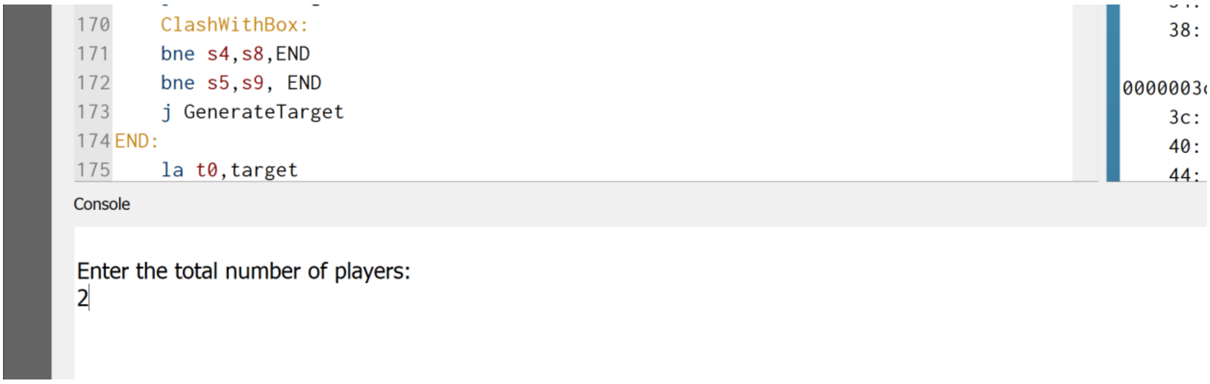
Parameters

Name	Value
Height	8
Width	8
LED size	50

- Once you are done you will select the fast execute button in Navigation Bar at the top as shown in the picture below.



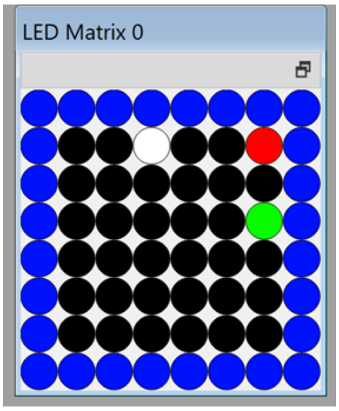
- Finally, before starting the game, you will be asked how many players are going to play the game in the console provided by Ripes as shown in the picture below. Here you enter the number of players playing the game in the console.



```
    ClashWithBox:
    bne s4,s8,END
    bne s5,s9, END
    j GenerateTarget
END:
    la t0,target
```

```
Enter the total number of players:
2
```

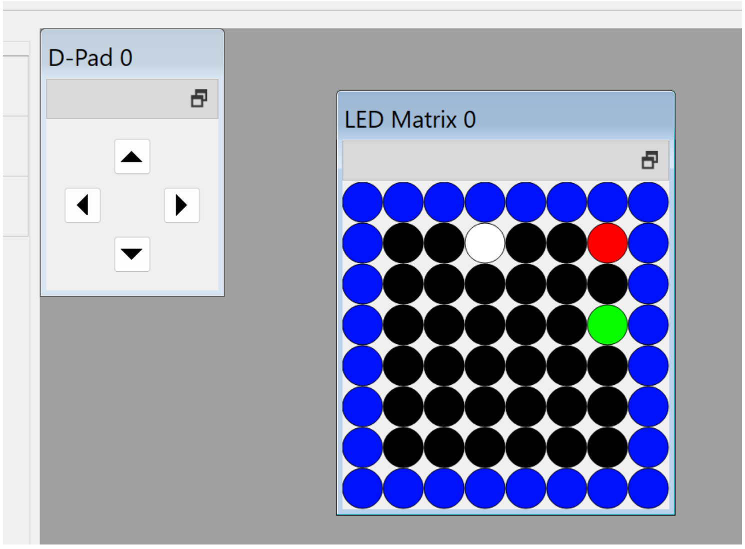
- The game will then generate a random map with the player, box, and target positions as shown. You can now see the game board on the LED Matrix and start playing.



Components

In each run of the game, the game will have the following on the board:

- A Player (White LED)
- A Box (Green LED)
- A Target (Red LED)
- The Walls (Blue LED)
- A D-Pad



Gameplay

Game Setup: The game is set up for the number of players participating. Each player in the multiplayer setup has the same setup of the box, target, and player locations on the LED grid.

Movement: Players can move in four directions: up, down, left, or right. However, movement is restricted to empty squares. Players cannot pass through walls or boxes. To move the player, press the desired button on the D-Pad.

Box Manipulation: To move a box, the player must be adjacent to it and push it onto the LED beyond. It's important to note that boxes cannot be pulled, and they cannot be pushed onto LEDs that are occupied by walls.

Goal: The goal is to push the box (depicted as a green LED) onto the target (a red LED) in the fewest moves possible. The blue LEDs are walls which block your movement.

Success: The game is finished when the box is on the target. The game counts your moves and displays them on the console. The aim is to solve the puzzle with the fewest moves possible.

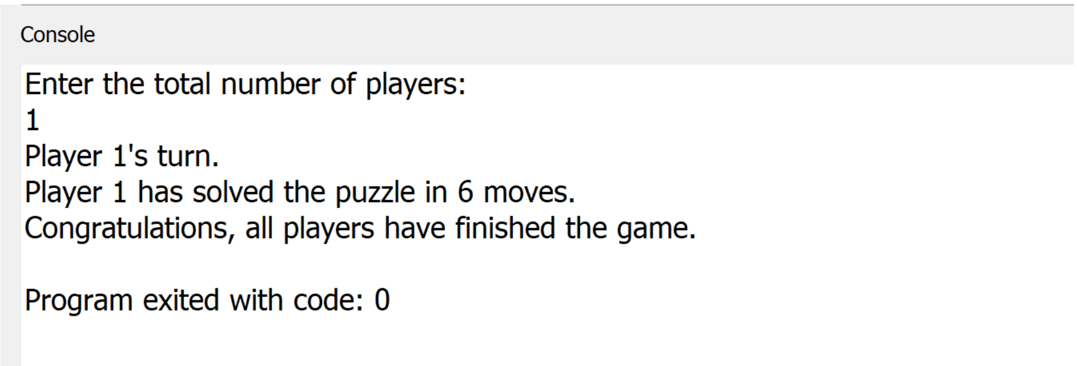
Reset: If a player gets stuck and wants to restart the game, they can do so by pushing the box against a corner. The game will reset the map and the move score.

Multiplayer Mode: This game is designed to be played with multiple players. At the beginning of the game, in the console enter the number of players participating. After that each player takes turns to solve the same puzzle. The player who solves the puzzle with the fewest moves wins the game. The game keeps track of the scores and displays them on the console after each run of the game.

Note: Remember, the box can only be pushed, not pulled. If you push the box against a wall or another box, you cannot move it anymore.

Ending the Game

The game is considered to end when all the players have placed the box successfully at their respective target. After this the program will automatically stop. It will print all the latest scores of all players and a congratulatory message. Lastly when the program stops the console prints the prompt, "Program exited with code: 0". When this happens you can either close the Ripes application to exit the game or load a new game by again clicking on the "Fast Execution button" which will set up a new board to play. Lastly you can review the scores and in multiplayer mode congratulate the winner.



```
Enter the total number of players:
1
Player 1's turn.
Player 1 has solved the puzzle in 6 moves.
Congratulations, all players have finished the game.

Program exited with code: 0
```

Strategy

Sokoban puzzles require strategic planning. If you find yourself stuck at a particular stage, take a moment to plan your moves. Consider the positions of the box and the target and devise a strategy that allows you to move the box without blocking your path or the targets. Plan your moves carefully before making them. Think about the consequences of each move and how it will affect the position of the box and the walls. Experiment with different strategies and approaches. Learn from your mistakes and try to find the optimal solution for each puzzle. Be patient and precise. Do not rush through the puzzles, as you might make unnecessary or irreversible moves. Take your time and enjoy the challenge.

Troubleshooting

If you encounter any problems while playing Sokoban , you can try the following solutions:

- Issue: The wall LEDs or the game difficulty are not correct.
    - Solution: This can happen due to a glitch in Ripes. To fix it, restart the Ripes application and run the game again.
- Issue: The game does not respond to the input devices.
    - Solution: This can happen due to a connection issue. To fix it, check the wiring and the configuration of the devices in the Ripes I/O section.

Note

Remember, the essence of Sokoban puzzles lies in efficiency. The goal is not just to move the box to the target, but to do so in the least amount of moves possible. Happy gaming!