

starter.s Sokoban User Documentation

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1. About

Sokoban is a game that consists of a player, one or multiple boxes, and one or multiple targets. The objective of the game is to move the boxes to the location of the targets. The player wins the game if all of the boxes are placed at the locations of the targets. Therefore, this documentation will provide the users with throughout guidelines on how to play Sokoban with starter.s file in Ripes software.

2. Requirements

- Minimum player = 1 player
- Playing time = approximately 5 minutes
- Age requirements = 6+ years old

3. Main Components

3.1 Character

- The Character is the object that the player can move using the D-pad.
- The Character is represented with Yellow LED in the game.

3.2 Box

- The Box is an object that the Player needs to push to the target in order to win the game.
- The Box is represented with Red LED in the game.

3.3 Target



- The Target is the location where the box needs to be placed at in order to win the game.
- The Target is represented with Blue LED in the game.

3.4 Wall

- The Wall is the object that blocks the Character and the Box from entering.
- The Walls are only present at the edges of the game field.
- The Wall is represented with Grey LED in the game.

4. Setup

- Download the starter.s file and Ripes, if haven't done so.

- The game can be started by firstly loading the starter.s file on Ripes. To do that, on the top-left corner, click on the File menu. Then, click on load program. Choose the starter.s to be loaded in Ripes, and click OK.
- On the top-left corner, click on  button. A Select Processor panel will appear that enables the user to change the processor setting.
- Select the option 32-bit and Single-cycle processor before running the game. Click OK after selected the options.
- Select the I/O tab and double-click on the "D-Pad" option if there is not one. Then, double-click on the "LED Matrix" option if there is not one.
- A panel "LED Matrix 0" should appear on the right, containing parameters such as "Height", "Width", and "Size". "Height" represents the number of LEDs available in the vertical axis of the LED Matrix. "Width" represents the number of LEDs available in the horizontal axis of the LED Matrix. "Size" represents the size of the LEDs. These parameters can be adjusted as wished.
- Near the top left of the D-pad and the Matrix panel, click on the button that has two overlapping squares, or . The panels will be shown at all times on different tabs.
- Select the Editor Tab and make sure the console tab is visible.
- On the top bar, click on the ">>" button to start the game. The finished setup should look similar to Figure 1.

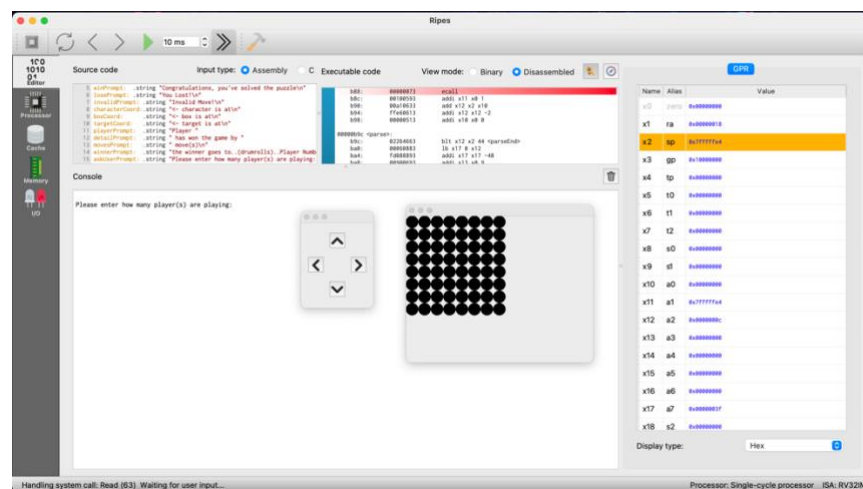


Figure 1. Finished setup of starter.s in Ripes.

- The game is ready to be played.

5. How to Play

- The game starts with a prompt that asks the number of players that will be playing the game. The user has to enter a positive integer into the console and press enter.
- The game then starts with the first player to play the round.
- The character can be moved by clicking on one of the buttons in the D-pad.
- The box can only be moved if the character's location is next to the box, horizontally and vertically, but not diagonally, as well as character is moving towards the location of the box.

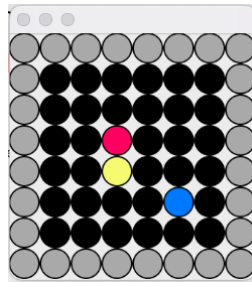


Figure 2. A Matrix with the Character location next to the Box

- A move will be invalid if the character is next to a wall, which is denoted in the color of grey, and the player tries to move to the direction towards the walls.

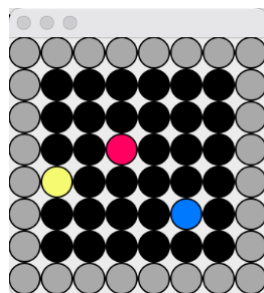


Figure 3. A Matrix with the Character located next to a wall

- A move will be invalid if a wall, a box, and a character are aligned, horizontally and vertically, with the box located between the wall and the character.

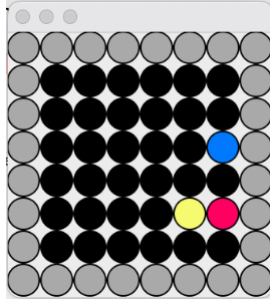


Figure 4. A Matrix with the Character, the Box, and the Wall aligned horizontally, with the box located between the wall and the character

- Any invalid move that is done will be notified to the player with “Invalid move!” in the console tab.

```
Please enter how many player(s) are playing: 3
Player 1's turn
Invalid Move!
```

Figure 5. Notification of “Invalid Move!” in the console tab given to Player 1

- If the player wins or unable to win the round, the player will be notified in the console tab with a prompt and the cumulative standing of every player that has played the round. The game will then move on to the next player to play the round, until all players have played a round.

```
Please enter how many player(s) are playing: 3
Player 1's turn
Congratulations, you've solved the puzzle
Player 1 has won the game by 5 move(s)
Player 2's turn
```

Figure 6. Notification that Player 1 has won the game on the fifth line and the game has moved on to player 2.

- If play in multi-player mode, after the previous player has finished the round, the game will notify the next player’s turn with a prompt in the console tab, as shown in Figure 6.

- If all players have played a round, the game will provide the user with cumulative standing of all players and announce the winner of the game. If no player wins the game, the game will announce that no one wins.

```
Overall..
Player 1 failed to complete the game
Player 2 failed to complete the game
Player 3 has won the game by 9 move(s)
the winner goes to..(drumrolls)..Player Number 3 with 9 move(s)

Program exited with code: 0
```

Figure 7. Notification of the cumulative standing and the winner of the game after all players played a round.

- The end of the game should look similar to Figure. 8

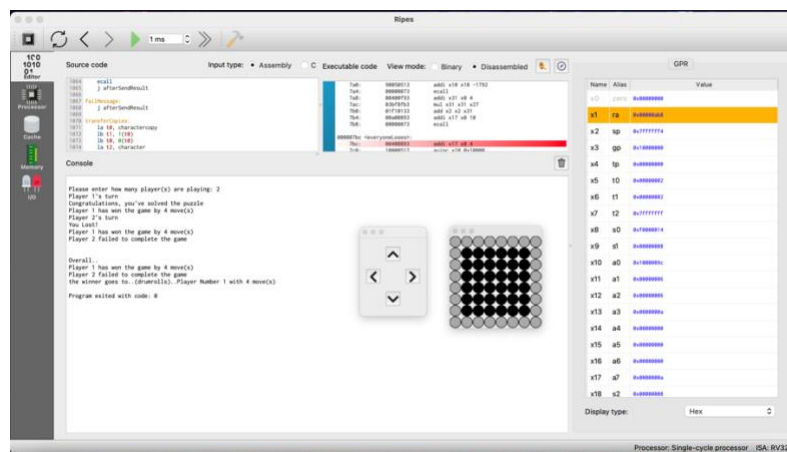


Figure 8. An example of a finished game.

6. Winning the Game

In order to win the round, the character has to push the box to the location of the target. A player may fail to do so if the box reached an edge that isn't resided by the target. A player may also fail if the box reached to the corner that isn't resided by the target. Furthermore, to win against other players that is in the game, the player has to win the round with the lowest number of moves. If there are two winners of the game, the player with the earliest round will win the game.

7. Ending/Restarting the Game

- To end the game, the current player has to move the character to the top-left of the field and click on left button of the D-pad. The game will provide a prompt that indicates the game has been ended in the console tab.

```
Please enter how many player(s) are playing: 2
Player 1's turn
The game has been ended. Thank you for playing.
Program exited with code: 0
```

Figure 9. Prompt that indicates the game has been ended.

- To restart the game, the current player has to move the character to the top-left of the field and click on the top button of the D-pad. The game will provide a prompt that indicates the player has restarted the game in the console tab.

```
Please enter how many player(s) are playing: 2
Player 1's turn
The round has been restarted
```

Figure 10. Prompt that indicates the round has been restarted.