Project

By

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PROJECT TITLE

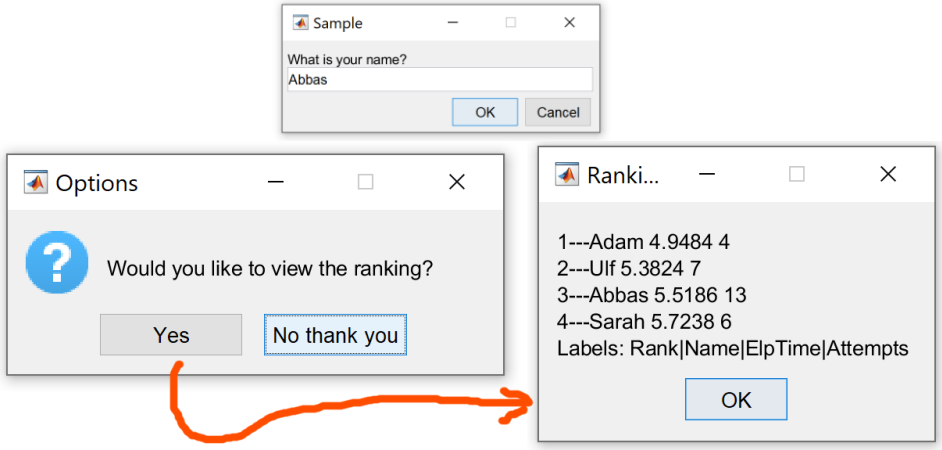
Image manipulation for spotting the difference and maze game path finding

PROJECT DESCRIPTION

This year we will do a project on image processing-based gaming. This project is due on Tuesday, August 24th, 2021.

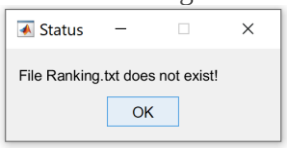
GUI Walk Through

A) Ranking Viewer Module



This must be drawn from a text file in which you store the "`Name elapsedTimeInSeconds numberOfAttempts`" separated by space. Three cases exist:

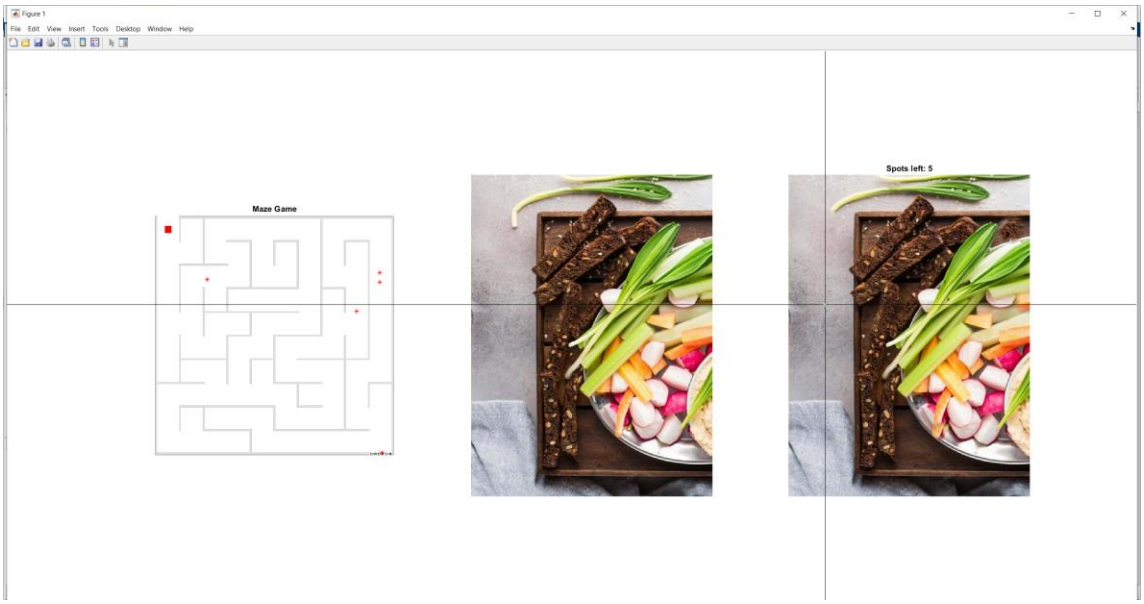
- In the first run, the text file does not exist, so clicking on "Yes" must invoke a message box:



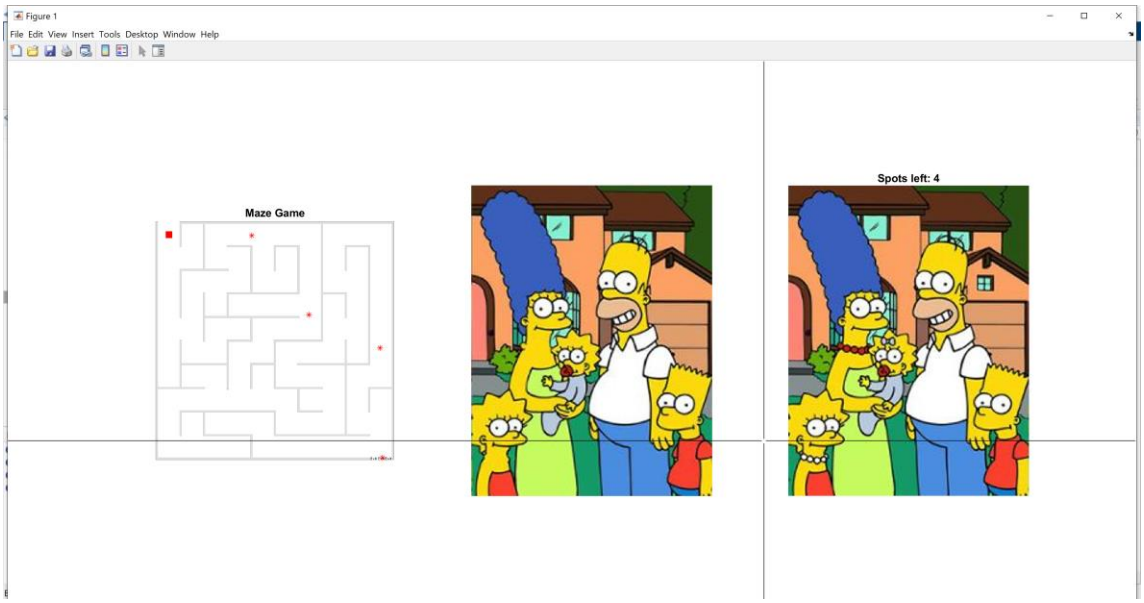
- When the first player finishes a game, his/her name and other info are entered into the text file after creating it.
- Any subsequent players, their names and info will be entered into the text after sorting the entries (ascending order) based on their elapsed time as shown above.

B) Game Launcher Module

number of locations along the maze are randomly chosen, where # denotes the number of the differences between the images minus one. In this case there are 5 spots (4 random locations + last 1 at the exit).



In here, the number of random points # is 4 (3 random locations + last 1 at the exit).



Note: the last point (whether in the first example -5 points- or the second example -4 points- always the last point's coordinates are **fixed** at the exit.

A DETAILED WALK THROUGH THE PROJECT

To eradicate any confusion and to make it clear what exactly your program must perform, I made the project MATLAB pcode (".p") file available for you to have a feel on what is needed and to experiment on it. The pcode is a content-obscured, executable file. Example of calling the pcode is shown below:

```
>> MazeGame('ImageC.png', 'ImageD.png');
```

WHAT YOU NEED TO SUBMIT

- The MATLAB ".m" file(s)
- Two "spot the difference" images you used to exemplify the process (you cannot use the images I supplied you with as they already have the difference map embedded)
- A short report of 1 page detailing what methods/steps you used

USEFUL FUNCTIONS AND HINTS

Here, I supply you with some MATLAB functionalities which you need (or might need), check MATLAB documentation on how to use them:

- For the elapsed time measurement use:
  - `myTime = tic` % at the start of the program to start the timer
  - `elapsedTime = toc(myTime);` % at the end of the program
- `inputdlg questdlg msgbox cell2mat strcmpi randperm sort strcat sprintf`
- `exist` % checks if file exists
- `fopen` % opens a txt file for "w" writing, "r" reading, "a+" appending & create file if does not exist, etc, (type `doc fopen` for more options)
- `fgetl` % fetch text line by line
- `split` % splits a fetched text string by certain delimiter (space for example)
- `fwrite fclose`
- To get the *Crosshair Cursor* use `ginput` which returns the Y- and X-coordinates (round them) where the player has clicked
- **Hint 1:** You do not need to create GUI application. The main module can be executed simply by using `subplot` (oneRow, threeColumns)
- **Hint 2:** The red box's initial coordinates are x = 43, y = 68 and it is square
- **Hint 3:** Use the `find` function to retrieve the path ordered coordinates from the path mask I supplied you with.
- **Hint 4:** Embed the differences map into the red channel's LSB of both input images, to help detecting if the player has clicked on the spot.

- **Hint 5:**

```
figure('units','normalized','outerposition',[0 0 1 1])
% maximizes the figure display to fill up the screen
```

TIME FRAME