Course Project Documentation

CS101 Project

UNBLOCK ME

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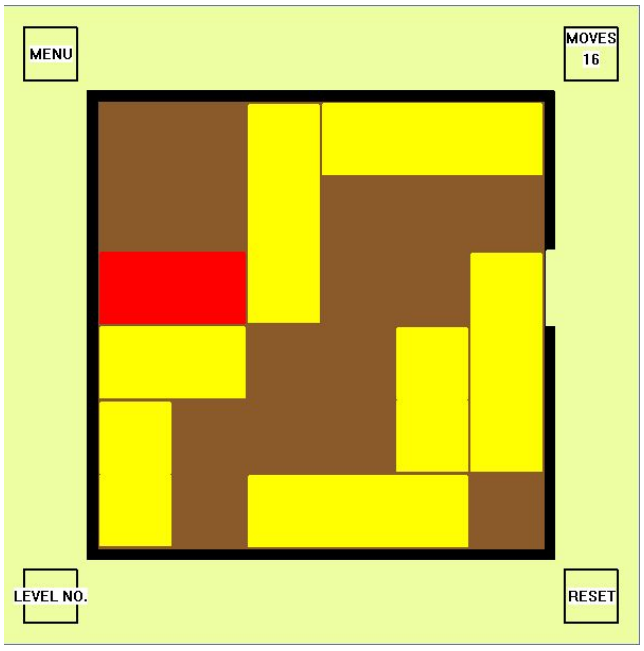
1. Introduction :

Unblock me is a fun game which provides user with entertaining and addictive puzzles. The picture below shows a screenshot of our game. The goal is to help the red block escape through the opening in the grid (on the right hand side). In order to win the game, user have to move other (yellow) blocks out of the way appropriately. All the blocks can be moved only parallel to the length.

As players keeps on playing, the difficulty level of the puzzles keep on increasing.



2. Problem Statement:

Giving the user a solvable UNBLOCK ME puzzle which may not a unique solution, and updating the high score that the user has made in the number of moves and the number of seconds taken to finish the level.

To implement high score of the time taken and the number of moves of each level.

Upon an appropriate prompt from the user, giving the instruction to play the game.

3. Requirements :

A) Hardware Requirements :

Working PC, with input device Mouse, no extra hardware is needed.

B) Software Requirements :

1. Code Blocks : An IDE to develop and modify the code, which is written in C++.
2. GNU Compiler : A C++ Compiler.
3. Simplecpp Library : A Graphical library developed by IIT Bombay.

4. Implementation:

We virtually divided the Box into 6x6 grid. And we defined two 6x6 arrays, one integer array and one character array. Each section of the grid is represented by one element of integer array and one element from character array.

Basically integer array represents the size/type of the block and character array represents the orientation of the block.

ex.

here, 2 stand for the all the yellow blocks of 3 unit length (1 for all yellow blocks of 2 unit length and 3 for Red Block)
And, L,H,R stand for Left section, Horizontal Middle section, Right section resp. (V for vertical middle section of the block).

If user wants to move the block in some direction (the direction parallel to block length is allowed only), he has to click on that section of the block. i.e. ex. if user wants to move the upper block to Right he must click on the Right section of the block out of the 3 sections shown.

When program takes click input it check for the validity of the input, if it is valid the arrays are updated and another function builds the

level graphics according to the updated array. If input by user is not valid, “Invalid Move” message flashes on the screen.

About Highscore :

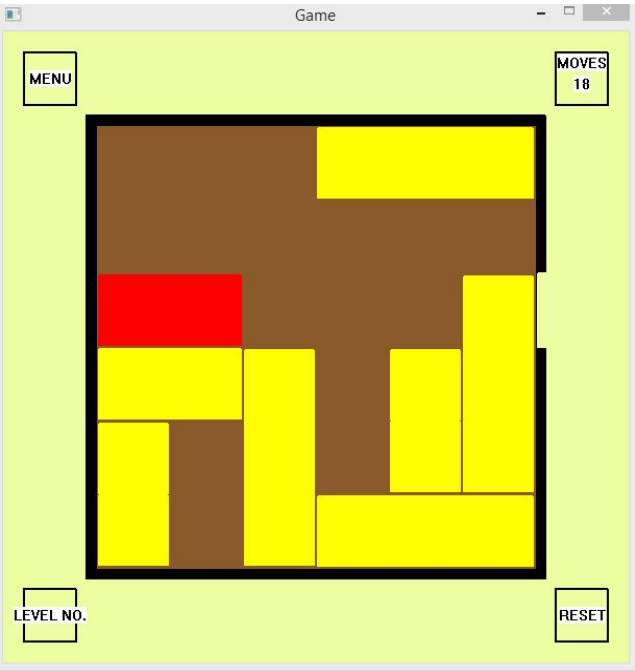
Whenever player solves the level in lesser number of moves and lesser time than all the previous players of the same level, the program stores the number of moves and the time taken to solve the level in text files. Another function prints those values on the Highscore page.

Using files ensures that previous data of the highscore is retained even after the game is closed.

5.Testing strategy and Data:

5.1 Moving the blocks:-

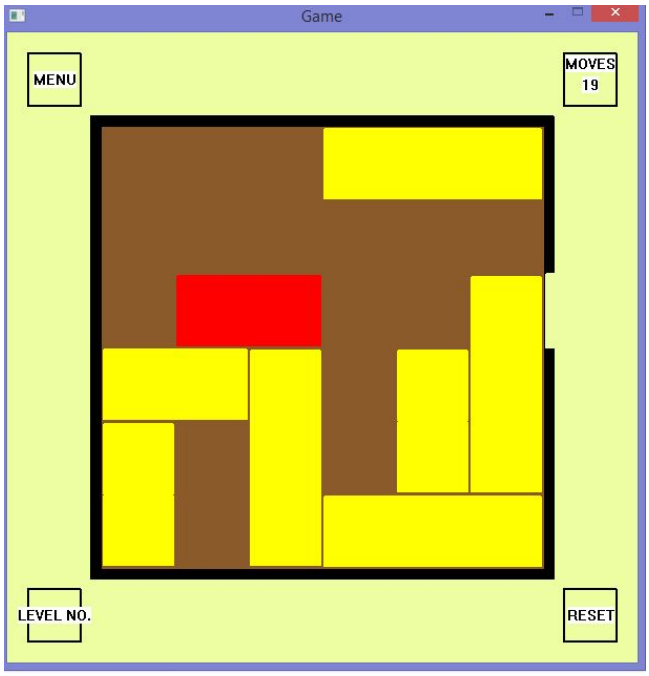
When user clicks on the block on appropriate position block is supposed to move.eg-




```
0  0  0  2l 2h 2r
0  0  0  0  0  0
3l 3r 0  0  0  2t
1l 1r 2t 0  1t 2v
1t 0  2v 0  1b 2b
1b 0  2b 2l 2h 2r
```

(console output of array corresponding to adjacent image)

once user clicks on the right side of the red block the block to move it -




```
0  0  0  2l 2h 2r
0  0  0  0  0  0
0  3l 3r 0  0  2t
1l 1r 2t 0  1t 2v
1t 0  2v 0  1b 2b
1b 0  2b 2l 2h 2r
```

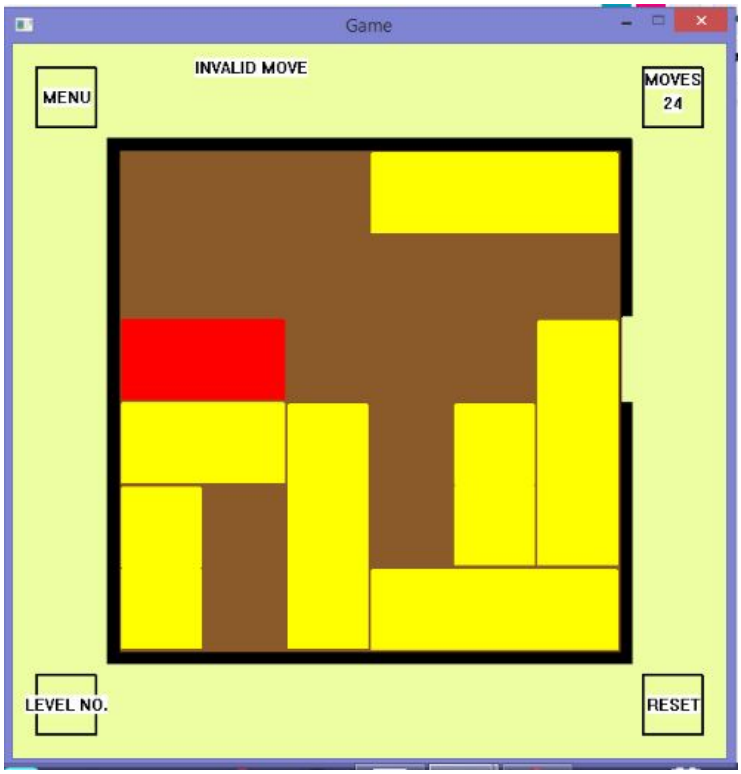
(console output of array corresponding to adjacent image)

5.2. Applying suitable restrictions on the movements of the block:-

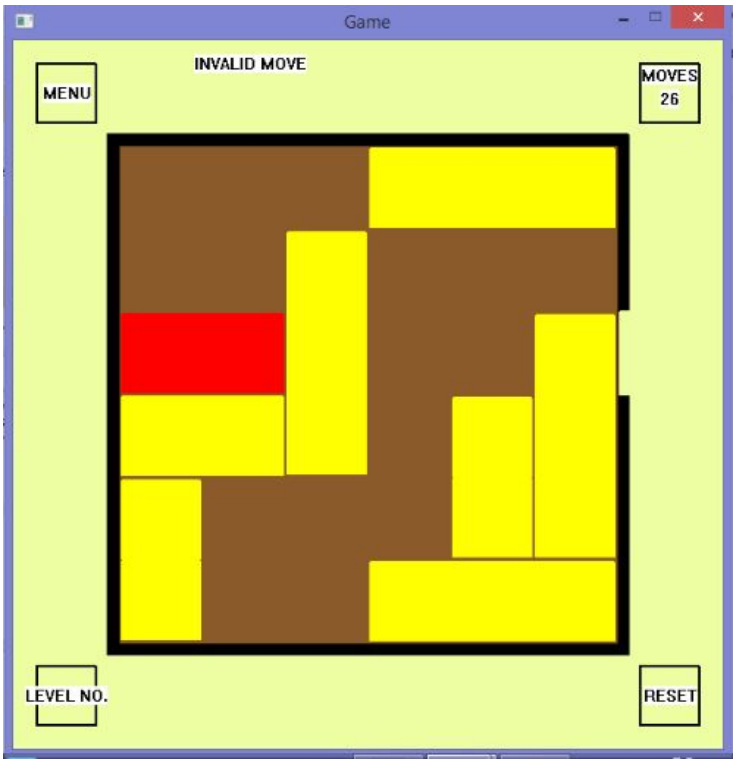
5.2.1 It should be kept in mind that blocks should not overlap each other while moving.
5.2.2 They should not escape through the boundaries of grid.

If the move played by the user tries to override the above two conditions(5.2.1 & 5.2.2) it should be considered invalid and should leave the arrangement of the blocks as it is with no change in no. of moves played by the user.

On clicking the red block on the left side

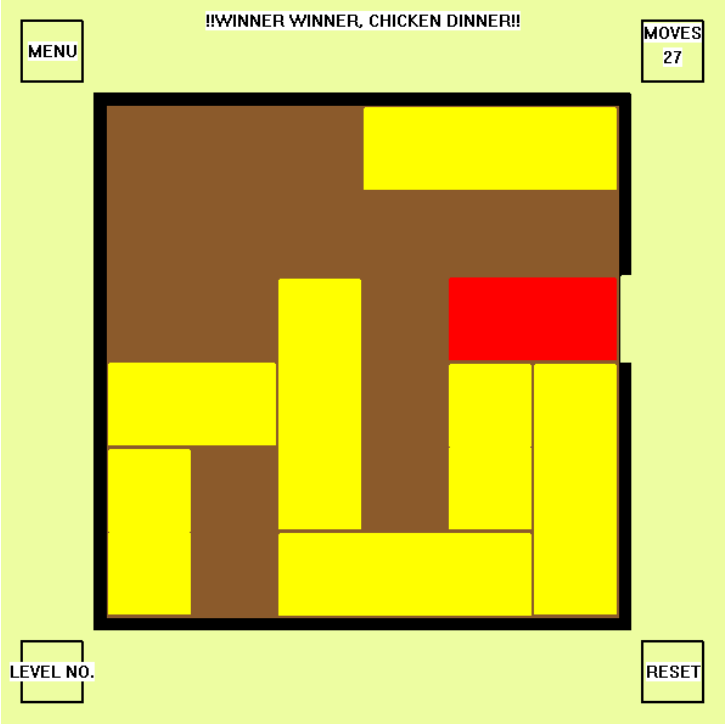


If red block is clicked on the right side (with a yellow block constraining it’s movement)

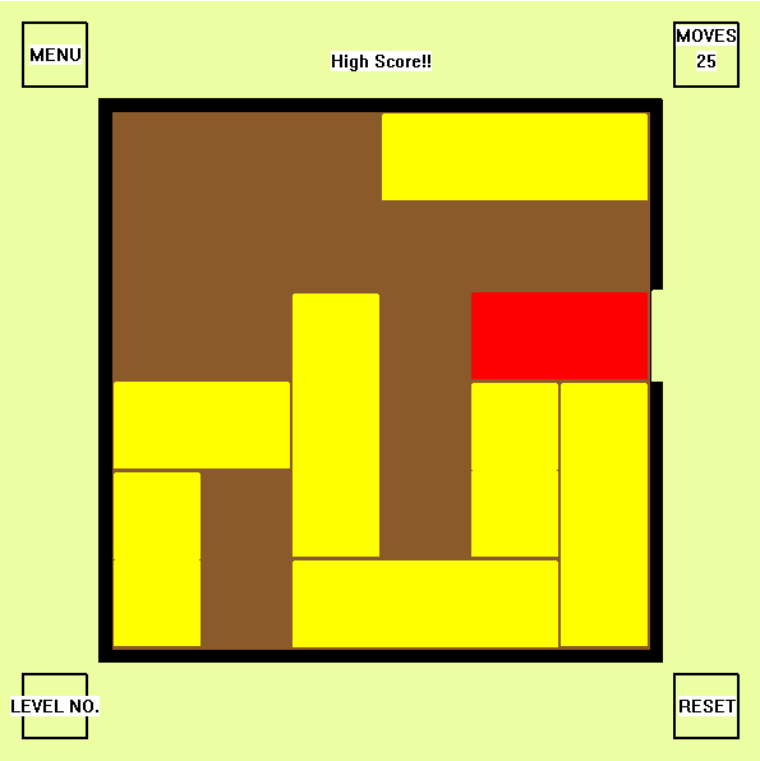


5.3Displaying appropriate message if user completes the stage :-

On completing the stage, following message will be shown to the use. Then the screen will display the next level.



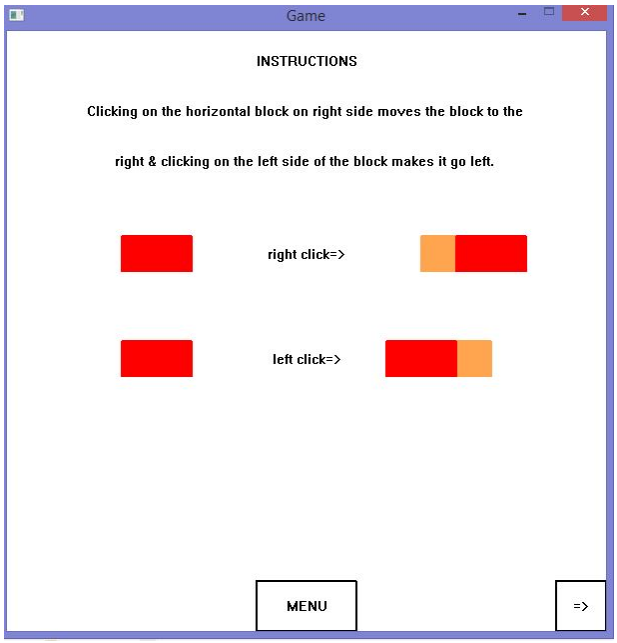
If the current user is able to finish the stage with lesser number of moves than all the users who played the game before him/her high score should be recorded (which will be equal to the number. of moves it took to finish the stage) and “high score!” message must be displayed.

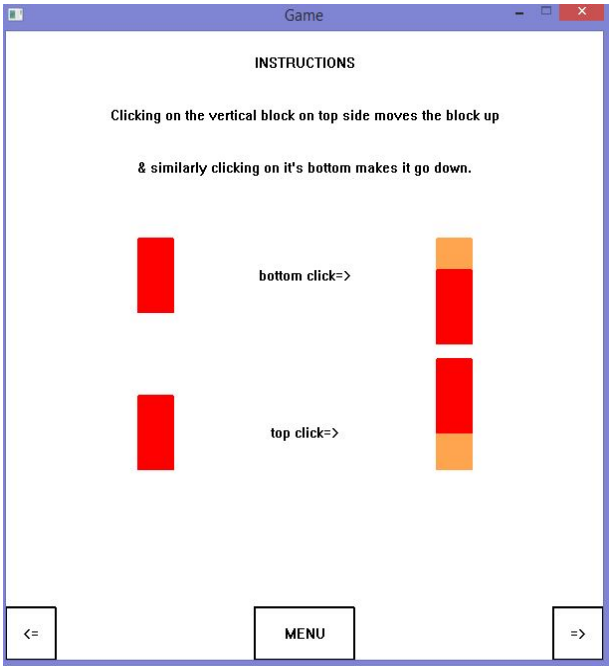


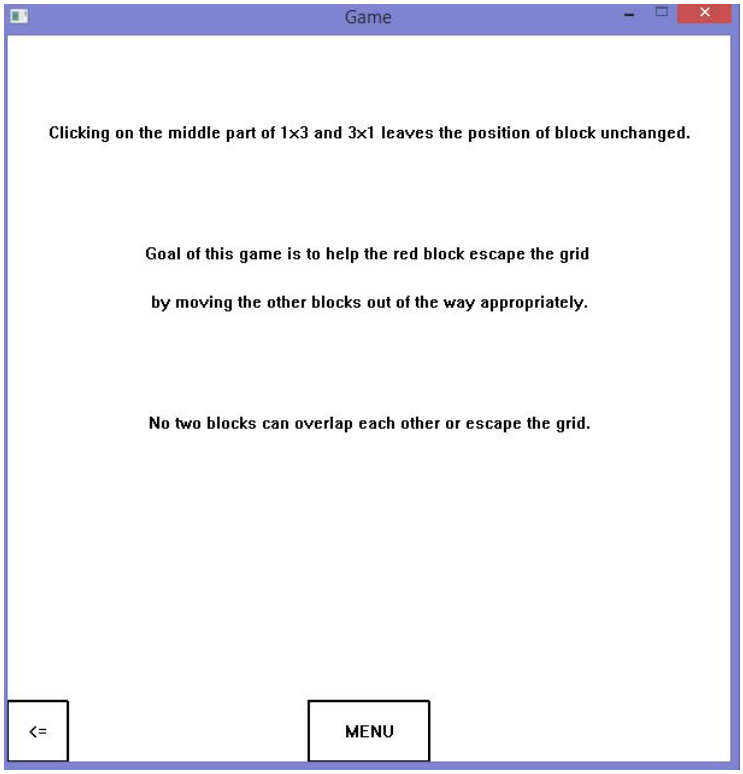
High score page :

This page displays the high score in each level. The status will show incomplete if the corresponding level has not been finished yet.

HOW TO PLAY


Game
INSTRUCTIONS
Clicking on the horizontal block on right side moves the block to the
right & clicking on the left side of the block makes it go left.
right click=>
left click=>
MENU
=>


Game
INSTRUCTIONS
Clicking on the vertical block on top side moves the block up
& similarly clicking on it's bottom makes it go down.
bottom click=>
top click=>
<=
MENU
=>


Game
Clicking on the middle part of 1x3 and 3x1 leaves the position of block unchanged.
Goal of this game is to help the red block escape the grid
by moving the other blocks out of the way appropriately.
No two blocks can overlap each other or escape the grid.
<=
MENU

The user can click on the menu rectangle for going back to the menu page. The menu rectangle is present on every How To Play page.

6.Future Works :

1. Currently we have developed each level manually, but random level generation, which is a solvable level, is possible. One can work on the that.

2. Auto-Unblock Me Solver which checks the solvability of a given arrangement of blocks and solves the level with the minimum number of moves. As this is far more difficult than solving other puzzles because we can’t apply Brute Force in this case, This will be an extraordinary project for geniuses.

7. Conclusions:

Simplecpp graphical library can be used to design games like Unblock Me. Graphical functions are very simple and easy to use to design the various puzzle levels.

Enjoy the Game !

8. References :

Book:

“An introduction to programming through c++” by Abhiram Ranade

Websites :

1. www.stackoverflow.com/
2. www.cse.iitb.ac.in/~cs101/
3. www.