

Term Project: 15-Puzzle
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CSCI 141

What Happens When the User Clicks in the Window:

- 1) Once the game is launched, the program will generate a board and check if it has every number 1 through 15 and if it's solvable. If the program verifies that it satisfies these 2 conditions, then it will launch the window, paint the board and background, set the moves to 0, start playing music, and import the top 5 players in the leaderboard. If not, it will continue to generate possible boards that do satisfy these 2 conditions.
- 2) The player can click anywhere in the window, but if the clicks aren't within one of the movable pieces of the board or a music button, then they'll be ignored. Depending on where the player clicks within the board, the blocks will shift. If the block is adjacent to the blank cell, they'll switch. If the block is 2 or 3 cells away from the blank cell, they'll all shift and switch with the blank cell. This works horizontally and vertically.
- 3) After every click, the board will run through each cell and check to see if the board is in winning position (every number 1 through 15 in ascending order with the blank cell in the bottom righthand corner). If not, the game will continue. If it is in winning position, then all clicks within the board will be ignored and a congratulatory text will appear above the board in red.
 - a) In addition, if the player's moves are less than one or more of the top 5 players, a pop-up will appear and ask for the player's name. If the player enters a name that's more than 5 characters long or a name that's the same as one of the previous players, then an error message will appear and ask the player to re-enter a name. If the player keeps putting in an invalid name, then once the player enters a name not already on the leaderboard, but more than 5 characters, then the program will truncate their name to the first 5 characters.
- 4) Lastly, the program will generate another pop-up to ask if the player would like to play again or not. If the user presses yes, then the pop-up will go away and regenerate a board and update the leaderboard if necessary. If the user presses no, then the program will end.

Dazzle Features:

- 1) Color Scheme
My first dazzle feature is the color scheme of the board, leaderboard, and background. I used `drawRect` to draw the background and William & Mary's official colors to decorate my game. I changed most of the color of the text to be either green or gold as well.
- 2) Music and Sound Effects
My second dazzle feature is background music. I have 2 options for the player to pick from and a third option in case the music is distracting. The first and default option is the Mii music. The second option is an instrumental of BTS's song Go Go. These 3 music features each have their own button at the bottom of the board and the user can toggle between each one by clicking the button. In addition to the music, when the user clicks on a block to move, the program will elicit a clicking sound effect. There's also a fun winning sound effect when the player completes the game.

3) Pop-Up Windows

My last dazzle feature is an additional pop-up window at the end of the game. It simply asks the player if he/she would like to replay. If the user presses yes, then the pop-up will go away and regenerate a board and update the leaderboard if necessary. If the user presses no, then the program will end.

Sources:

- 1) In addition to the following resources, I used my notes and labs from this class to help me complete this project.
- 2) PyQt5 Documentation
<https://doc.qt.io/qtforpython/>
- 3) PyQt5 Tutorial on MessageBoxes & Pop-Up Boxes
<https://techwithtim.net/tutorials/pyqt5-tutorial/messageboxes/>
- 4) William & Mary's Official Colors
<https://brand.wm.edu/index.php/university-colors/>
- 5) SimpleAudio Documentation
<https://simpleaudio.readthedocs.io/en/latest/simpleaudio.html#simpleaudio.WaveObject>
- 6) FreeAudio - Level Win Sound Effect
<https://freesound.org/people/Tuudurt/sounds/258142/>
- 7) FreeAudio - Click Sound Effect
<https://freesound.org/people/lebaston100/sounds/192275/>
- 8) Mii Music (10-hour Loop)
<https://www.youtube.com/watch?v=TwI92KYddW4>
- 9) BTS Go Go Instrumental
<https://www.youtube.com/watch?v=pryQ4RKIvIM>