COEN 276

Fall 2014

Web Programming I

Tetris

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1. Summary

Tetris is probably the most popular puzzle video game ever originally designed and progammed in 1984 by Alexey Pajitnov in Moscow. Javascript Tetris is a tetris clone written in Javascript, CSS, HTML. It only requires a browser to run. Tested on: IE, Mozilla, Safari. In the standard version of the game, "Tetriminos" are game pieces shaped like tetrominoes, geometric shapes composed of four square blocks each. A random sequence of Tetriminos fall down the playing field (a rectangular vertical shaft, called the "well" or "matrix"). The objective of the game is to manipulate these Tetriminos, by moving each one sideways and rotating it by 90 degree units, with the aim of creating a horizontal line of ten blocks without gaps. When such a line is created, it disappears, and any block above the deleted line will fall. When a certain number of lines are cleared, the game enters a new level. As the game progresses, each level causes the Tetriminos to fall faster, and the game ends when the stack of Tetriminos reaches the top of the playing field and no new Tetriminos are able to enter. Some games also end after a finite number of levels or lines.

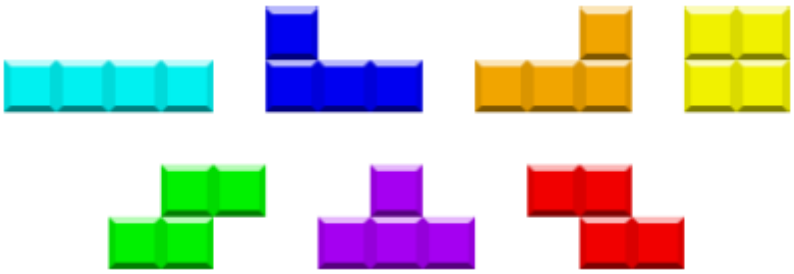


Figure 1: The seven tetrominoes used in tetris (top row, left to right: I, J, L, O; bottom row: S, T, Z).

All of the Tetriminos are capable of single and double clears. *I*, *J*, and *L* are able to clear triples. Only the *I* Tetrimino has the capacity to clear four lines simultaneously, and this is referred to as a "tetris". (This may vary depending on the rotation and compensation rules of each specific *Tetris* implementation. For instance, in the Super Rotation System used in most recent implementations, certain situations allow *T*, *S*, and *Z* to 'snap' into tight spots and clear triples.)

2. Design

Front End Client Side: HTML5, CSS3, Javascript

Server Side: PHP, AJAX

Database: PDO, MySQL

The Game interface contains the following

1) Home Screen comprising different elements.
2) Main window with the tetrisgrid where the actual tetris game logic is implemented displaying 7 different tetris blocks falling randomly based on gravity, time interval set.
3) Upcoming or tetrisnext where the upcoming blocks will be displayed based on time interval set. Random blocks which will be the incoming tetrisblock will be displayed in the tetrisnext so that user can predict in advance of the upcoming tetris block and decide to move the blocks accordingly.
4) Control buttons are provided to Start, Pause and End the game, Help and High Scores to display the information.
5) Start Button - Onclick - >Starts the Game.

    - On Game Start – Level is One, Singles, Doubles, Triples, Tetris will be zero.
    - Name field and Score will be empty.

6) Pause Button - Onclick - > Pauses the Game already started. Esc – Esc to be pressed to resume from Pause.
7) End Button - Onclick - > Ends the Game.
8) Help Button – Onclick -> Opens up a window with Tetris game instructions as how to play, how to rotate, key movement controls.
9) TetrisKeys division below the Help Button Shows the KeyMovements.

    - Rotate – Press Up Arrow Key
    - Move – Left –Press Left Key
    - Move – Right –Press Right Key
    - Move - Down – Press Down Key
    - Drop the lines while playing to move them fast – Spacebar

10) TetrisScores Division – shows the Level and lines cleared.

    - Score –Single line clearing- for each complete line of tetris blocks filling – score of 10 is allocated
    - Doubles - When double lines are cleared at a time
    - Tripes – When three tetrisblocks of three lines are cleared at a time

- Tetris – When Four lines are cleared at a time.
- Level – Initially starts with Level 1 on Game Start. Level keeps increasing after reaching certain score. Say Level 1 changes to Level 2 when the score reaches 100.

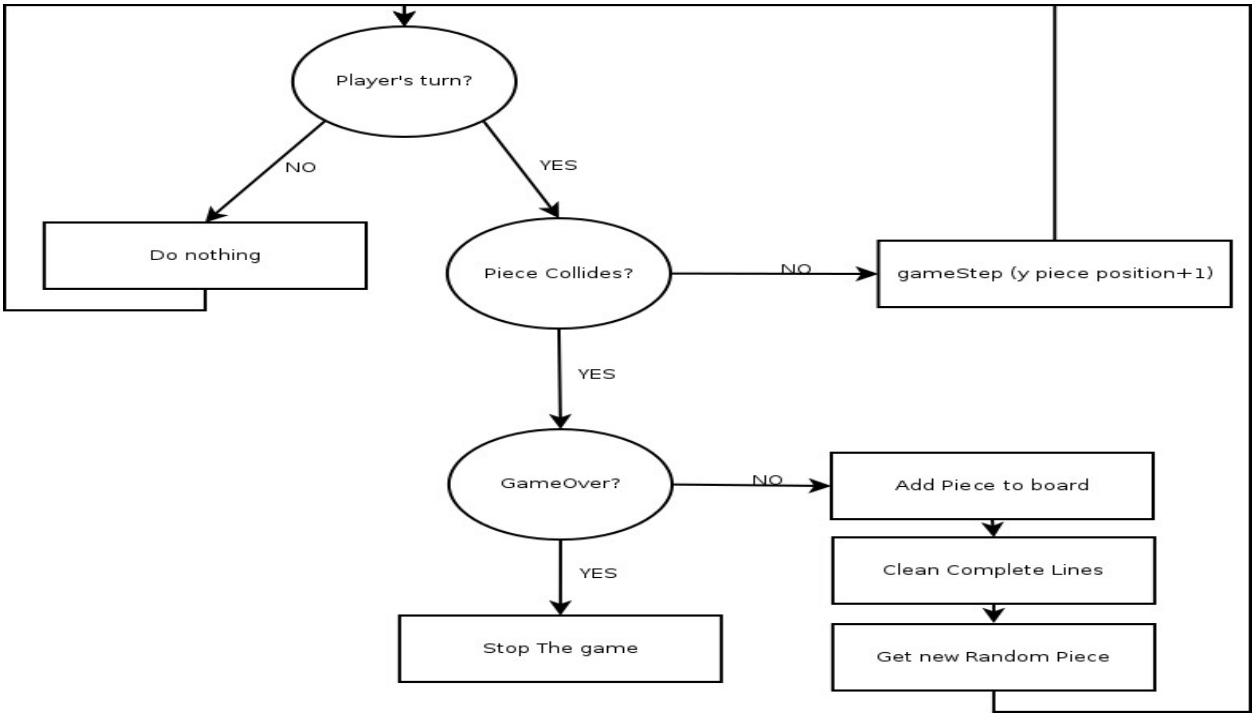
11) Game Over – Game gets Over by filling the grid completely with tetrisblocks or when the user pressed the End button. Once the tetris mainWindow gets filled with the tetris blocks in a way that blocks can't be further moved, game gets over and then pops up a prompt to enter the name.
12) Name field – After game Over, pop up box with prompt to enter the Player Name comes into picture. This field is not mandatory and Player or user can enter the name or leave the field blank.

- This name will get posted to the MySQL database and thus make an entry with the Name and Score in the database 'tetris' with table "scores" in 'pname' and 'pscore' along with unique ID generated in the database table.So you can see as below in database table

pid	pname	pscore
1	Silpa	300
2	Noname	150

13) Animation – When the lines get cleared from the tetris board, it animates.
14) Sound – Basic sound controls has been provided. When the window loads the tetris sound gets autoplayed. When the tetris block is falling a drop sound is added. When the game overs, gameover sound is added.

- script file - Sound.js

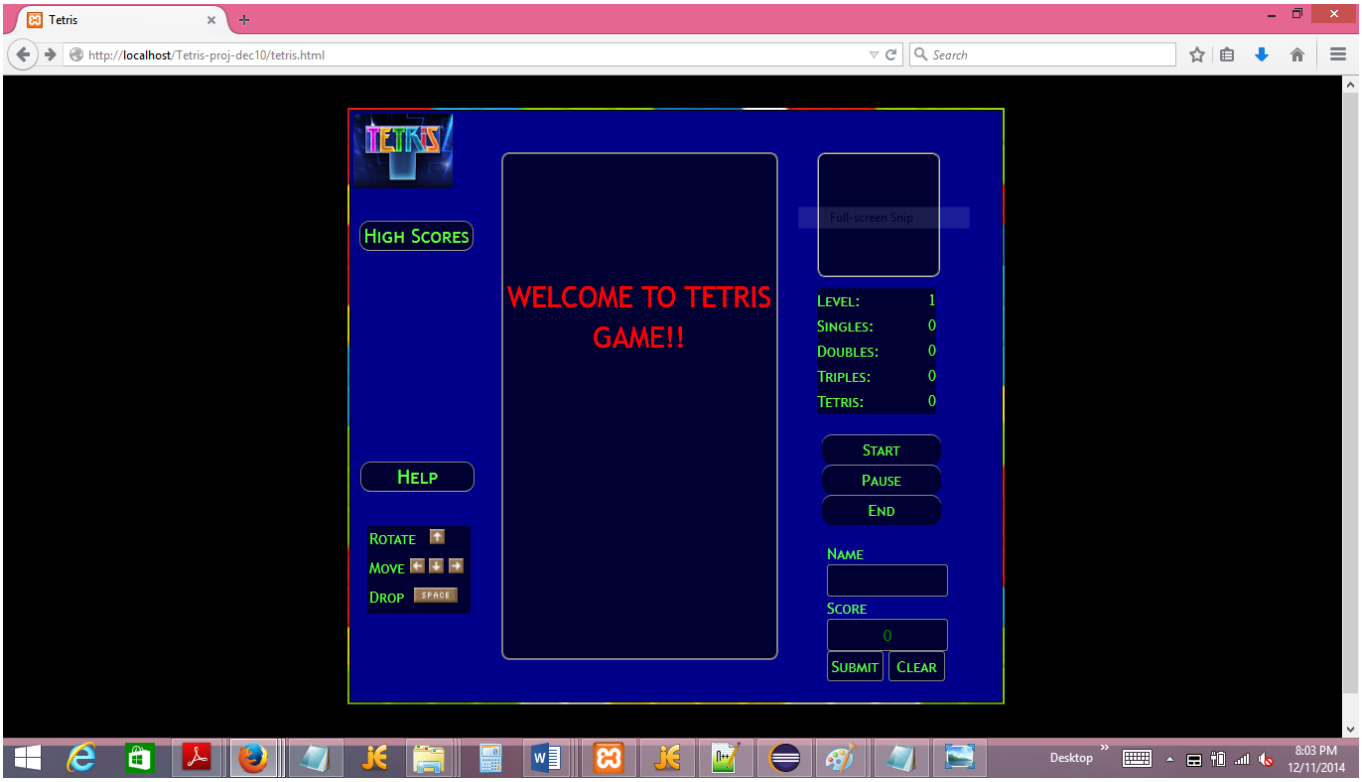


The squares means actions and the circles means decisions.

This is implemented with a timer with an associated task (GameLoop) executing it until the game is over.

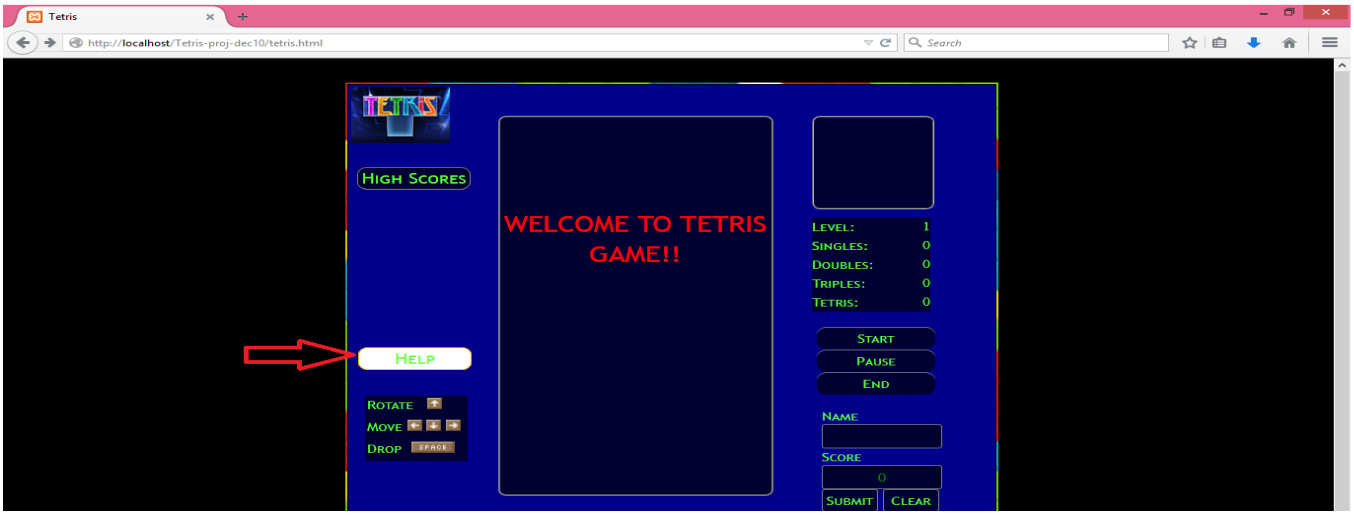
3. Interface and Screen Shots of the Game

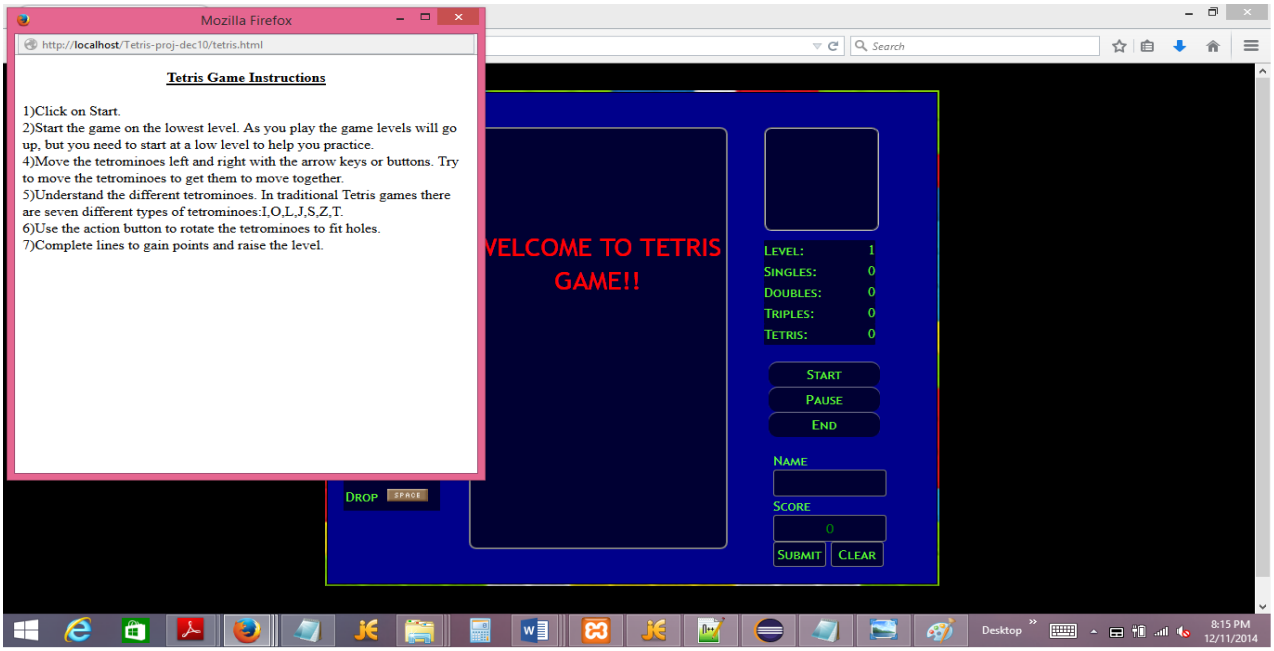
Home Screen: http://localhost/Tetris-proj-dec10th/tetris.html


Tetris
http://localhost/Tetris-proj-dec10/tetris.html
Search
HIGH SCORES
WELCOME TO TETRIS GAME!!
LEVEL: 1
SINGLES: 0
DOUBLES: 0
TRIPLES: 0
TETRIS: 0
START
PAUSE
END
HELP
ROTATE
MOVE
DROP
SPACE
NAME
SCORE
0
SUBMIT
CLEAR
Desktop
8:03 PM
12/11/2014

HIGH SCORES
Displays user high scores and name
WELCOME TO TETRIS GAME!!
Upcoming TetrisBlock
LEVEL: 1
SINGLES: 0
DOUBLES: 0
TRIPLES: 0
TETRIS: 0
Levels and lines cleared
Help info button
HELP
START
Start Button
PAUSE
Pause Button
END
End Button
ROTATE
MOVE
DROP
SPACE
Key Movements
NAME
User input field to enter Name
SCORE
0
Score obtained
SUBMIT
CLEAR
submit and clear information
Tetris grid Main window

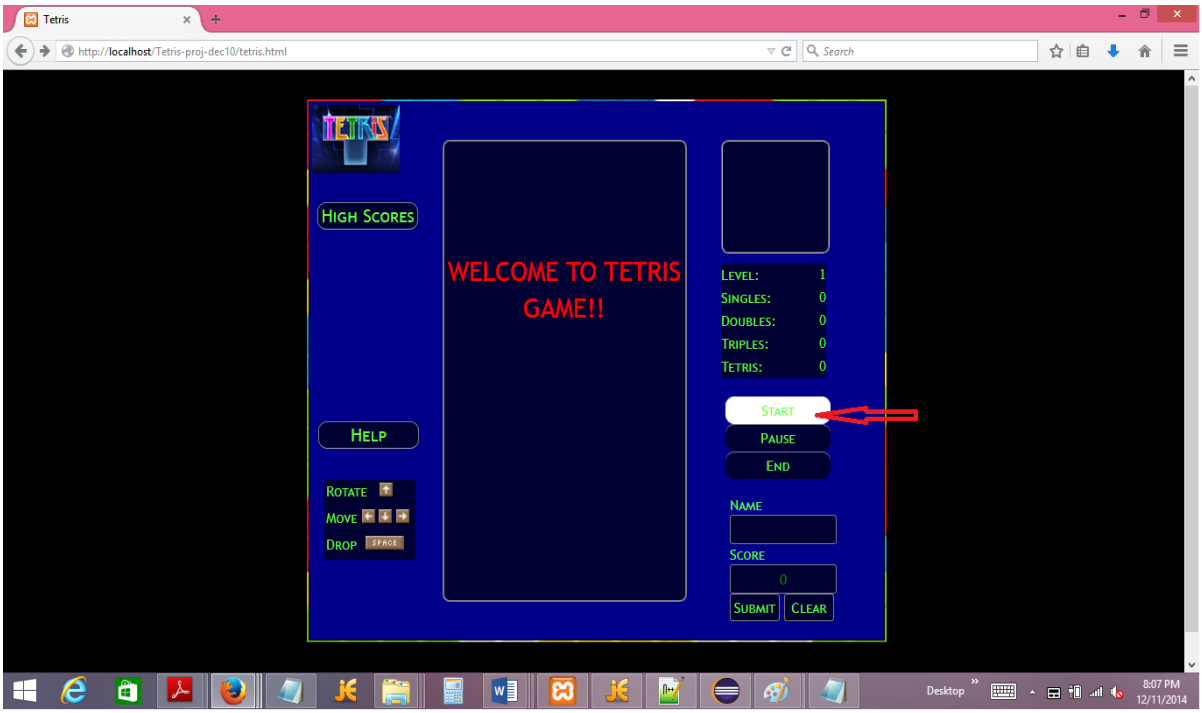
User can see the Help Information Pressing Help Button

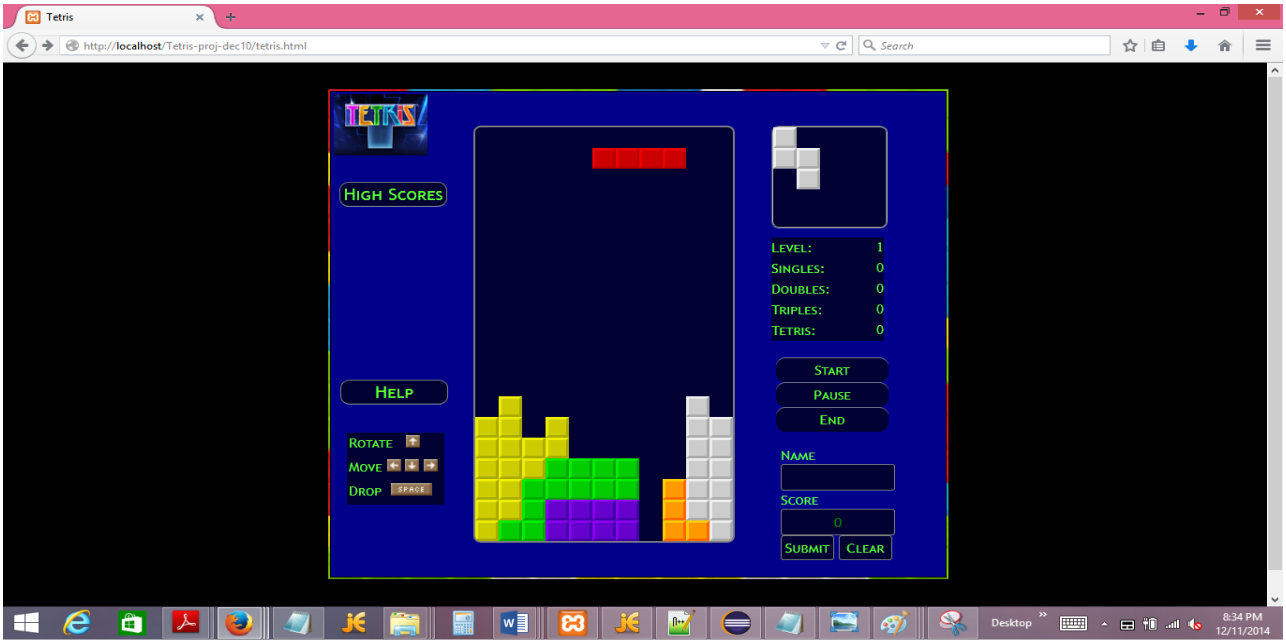




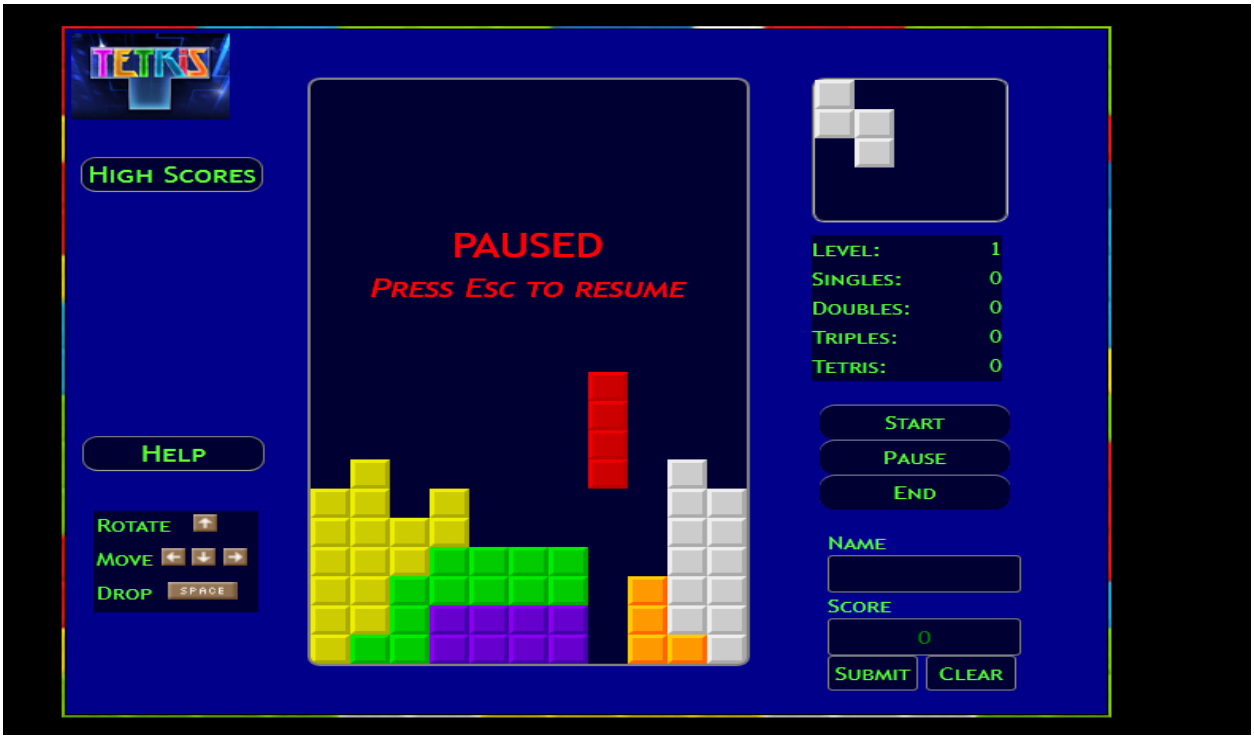
New Window Opens up with the needed help Information

User Starts the game by Pressing Start button

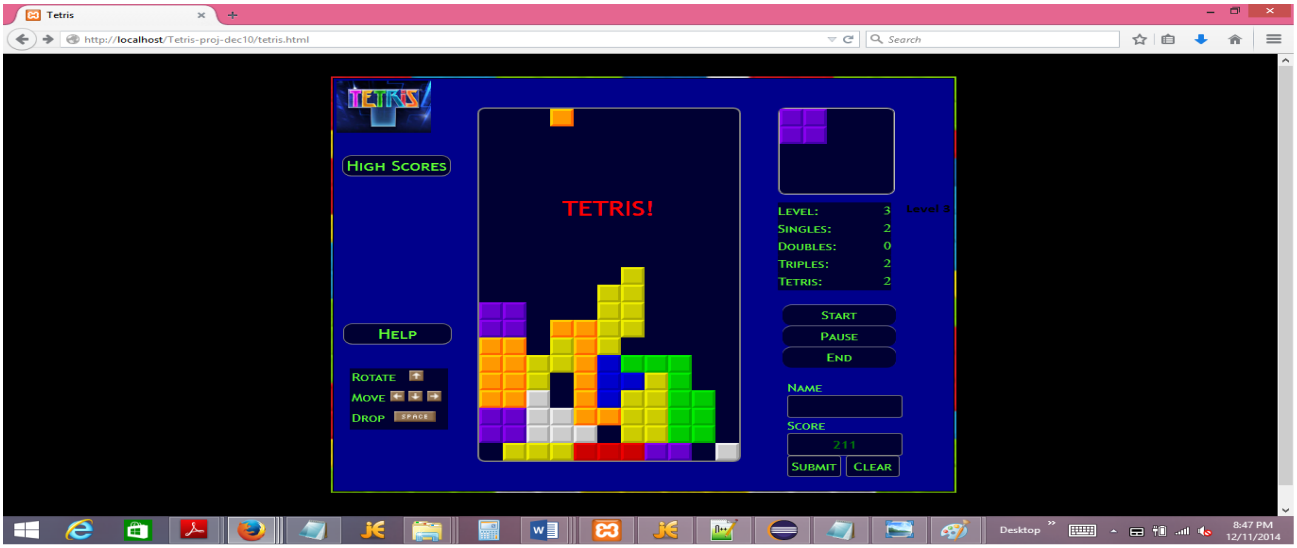


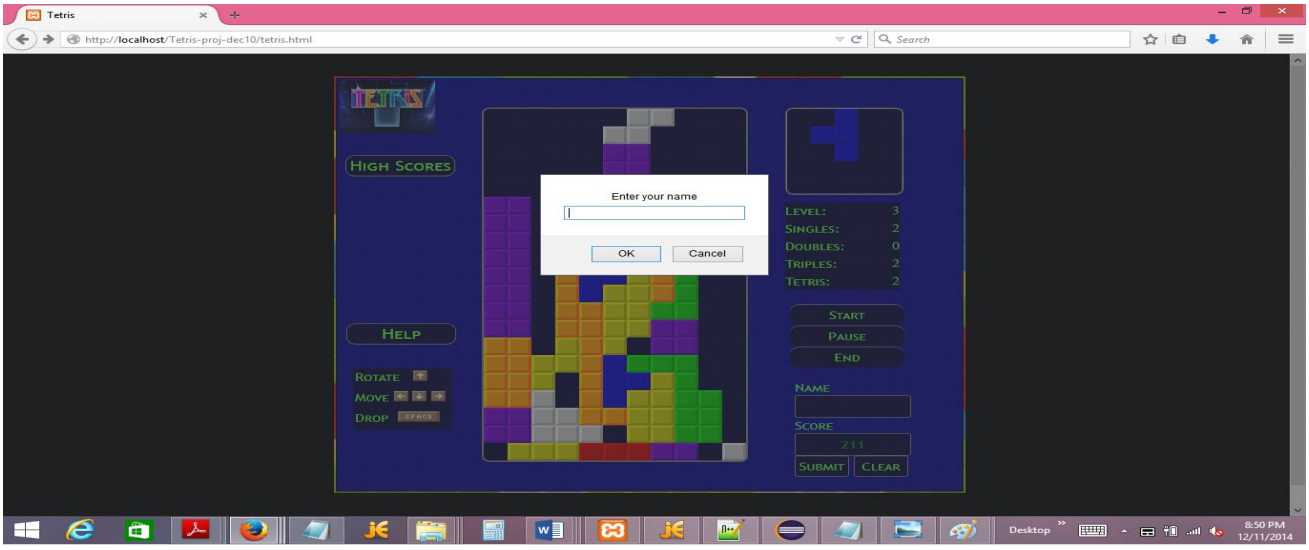


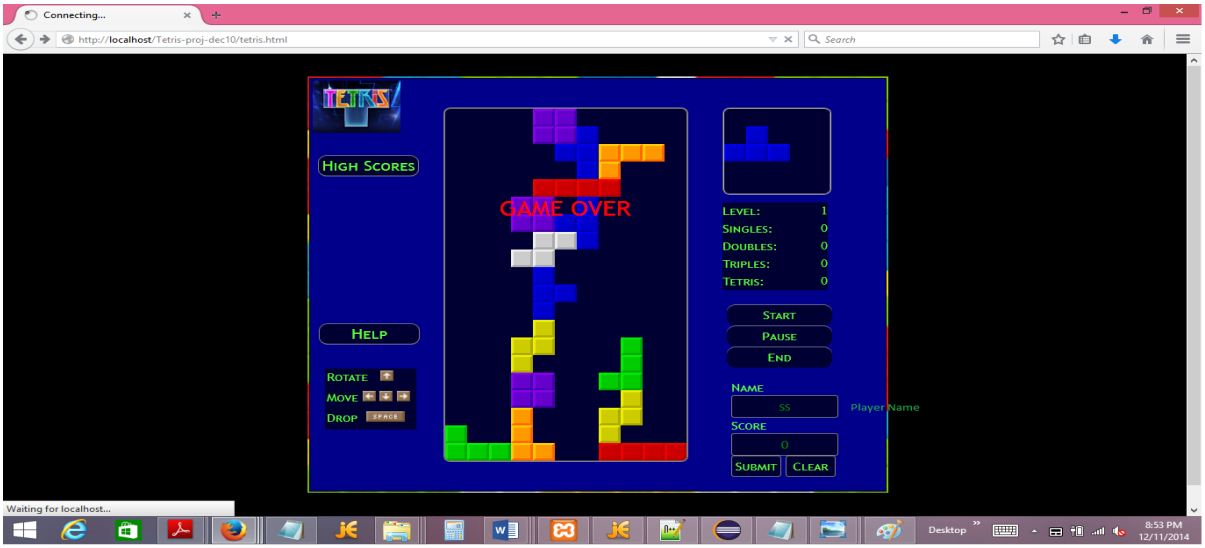
Tetris blocks with falling blocks

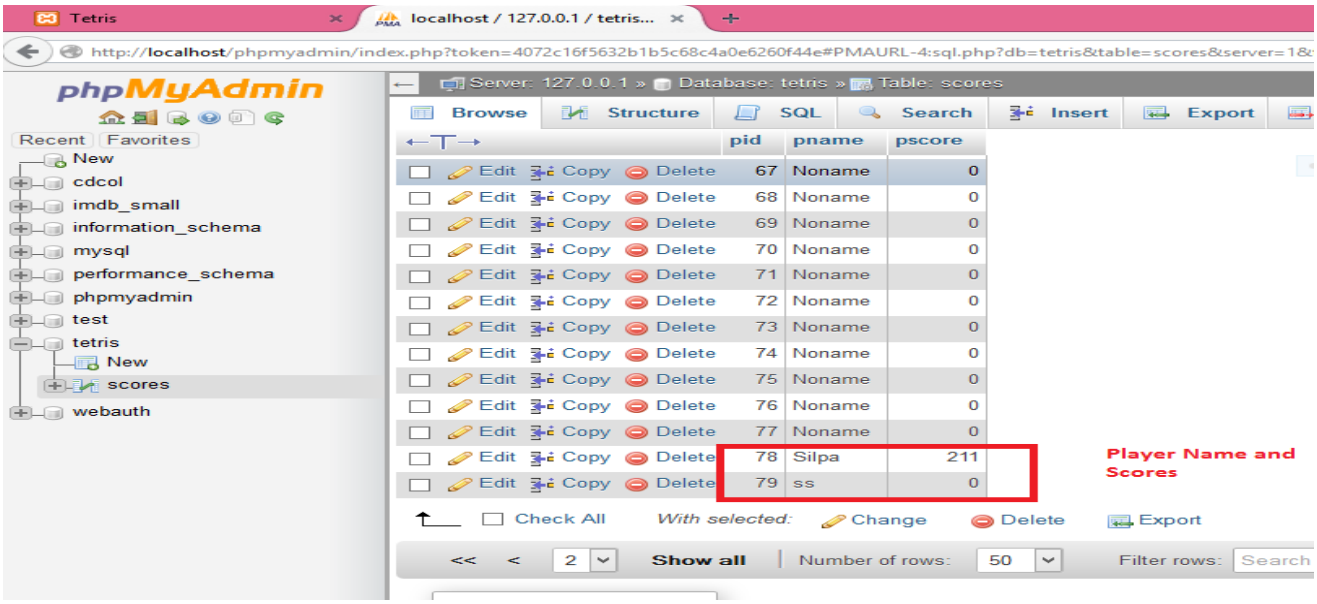


Mainwindow of tetris grid sowing the animation of cleared lines and gives Triple! As three lines clearedat time. Score gets displayed


Tetris
http://localhost/Tetris-proj-dec10/tetris.html
TETRIS
HIGH SCORES
TETRIS!
LEVEL: 3
SINGLES: 2
DOUBLES: 0
TRIPLES: 2
TETRIS: 2
START
PAUSE
END
HELP
ROTATE
MOVE
DROP
NAME
SCORE
211
SUBMIT
CLEAR
Desktop
8:47 PM
12/11/2014


Tetris
http://localhost/Tetris-proj-dec10/tetris.html
TETRIS
HIGH SCORES
Enter your name
OK
Cancel
LEVEL: 3
SINGLES: 2
DOUBLES: 0
TRIPLES: 2
TETRIS: 2
START
PAUSE
END
HELP
ROTATE
MOVE
DROP
NAME
SCORE
211
SUBMIT
CLEAR
Desktop
8:50 PM
12/11/2014





4. Implementation

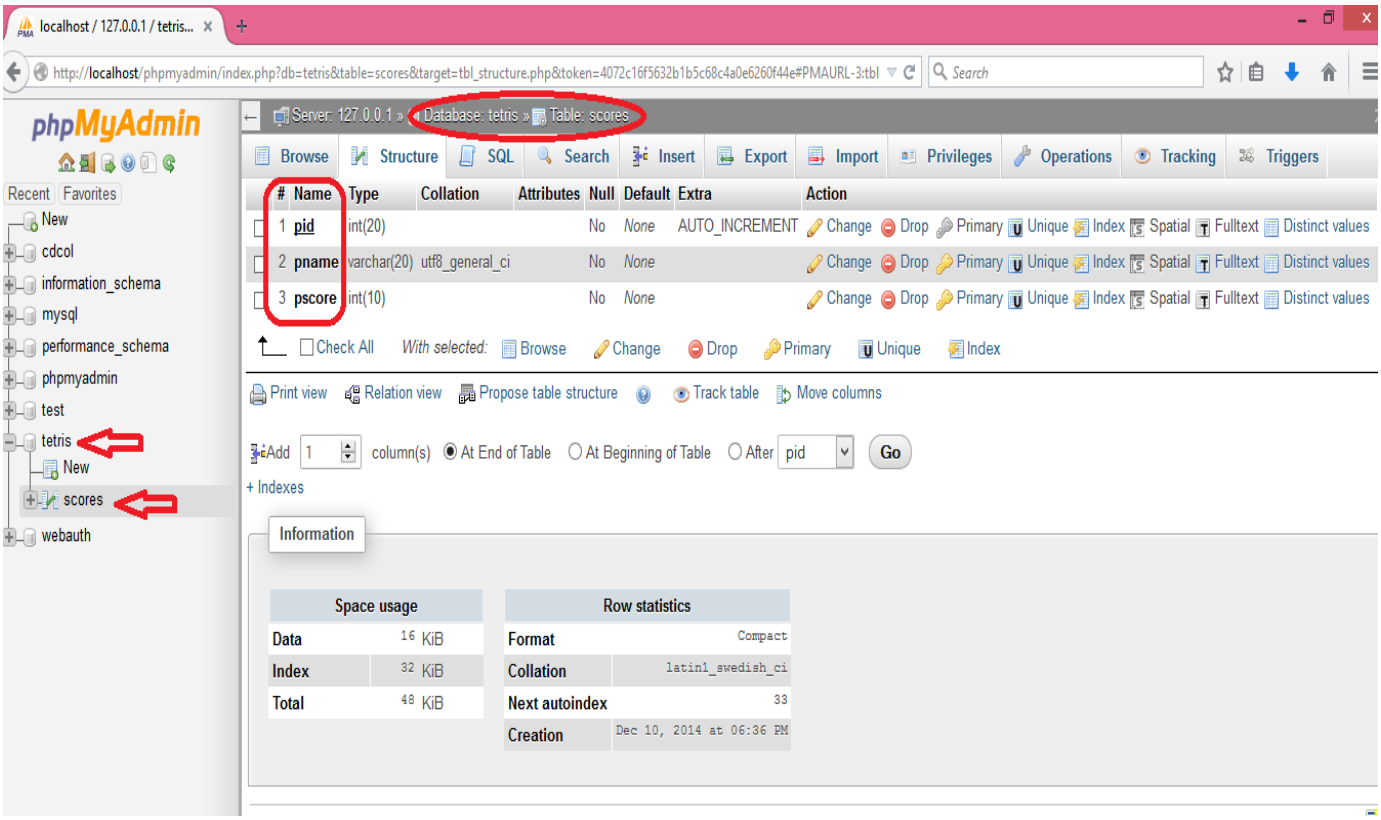
Front End Client Side: HTML5, CSS3, Javascript

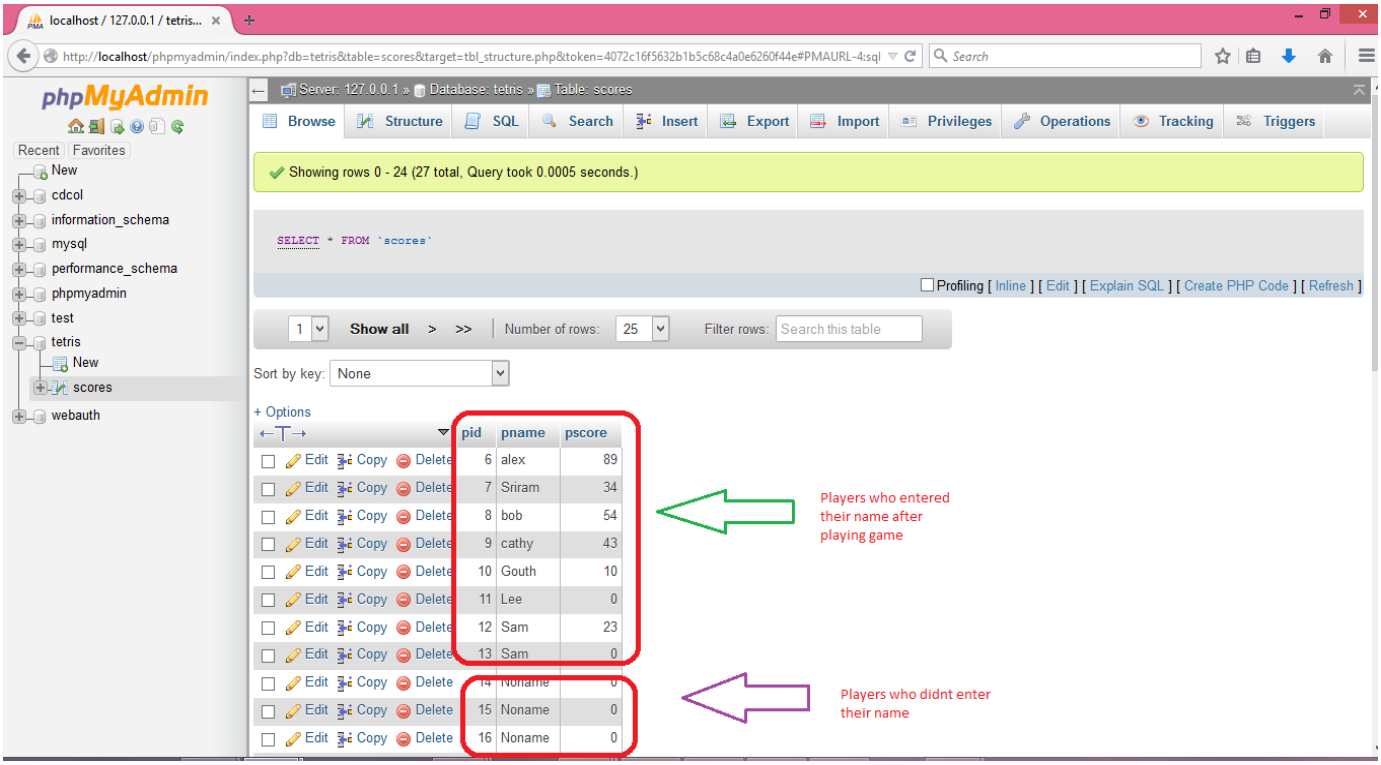
Server Side: PHP, AJAX

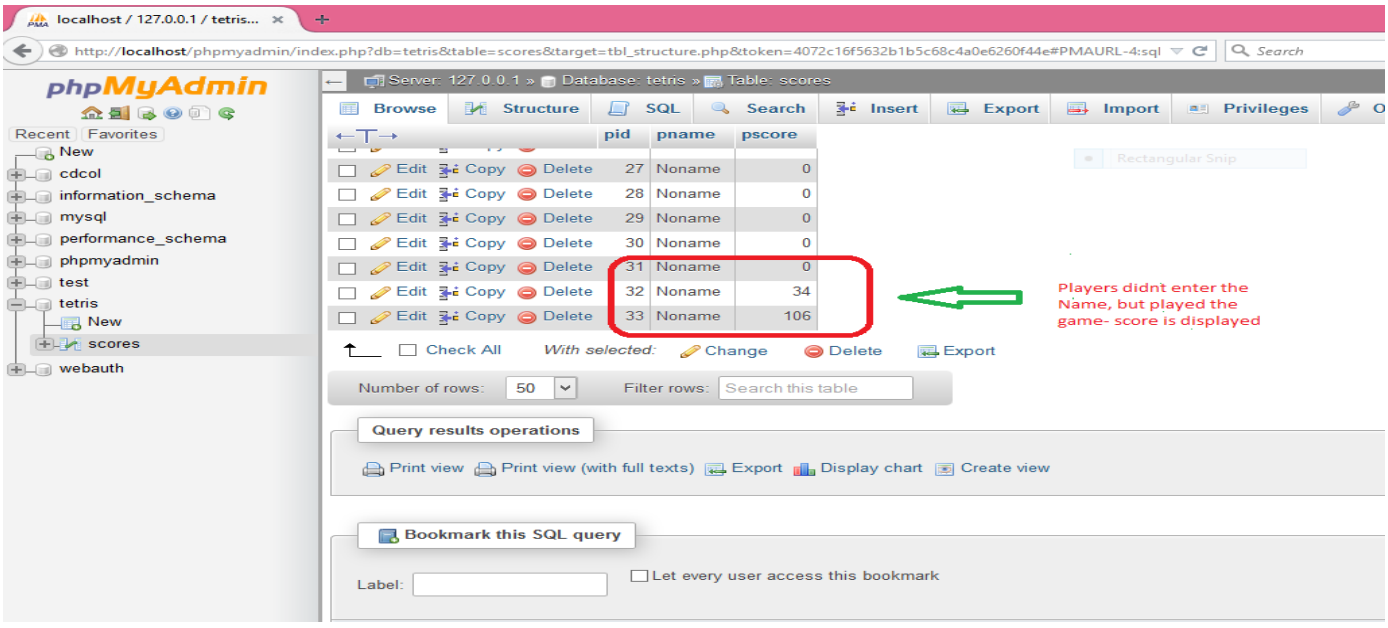
Database: PDO, MySQL

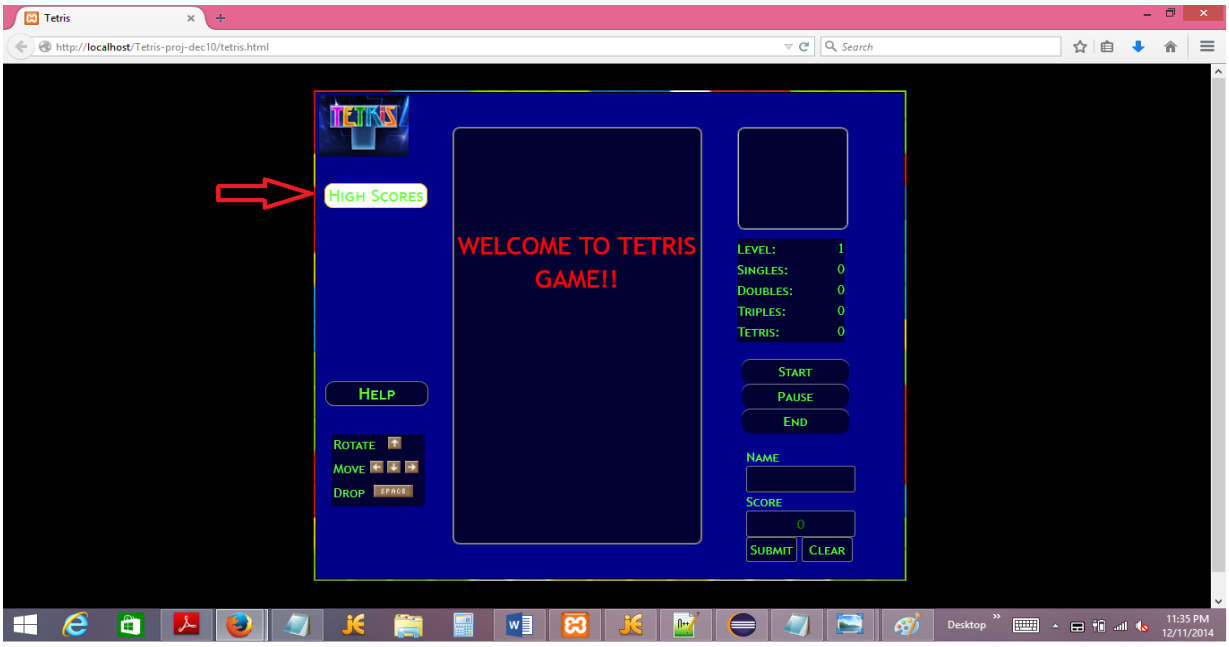
Display elements in HTML, Make use of and manipulate the elements using Javascript client side programming. Client on update of fields – POST using PHP file into MySQL database. So user information gets created in the database.

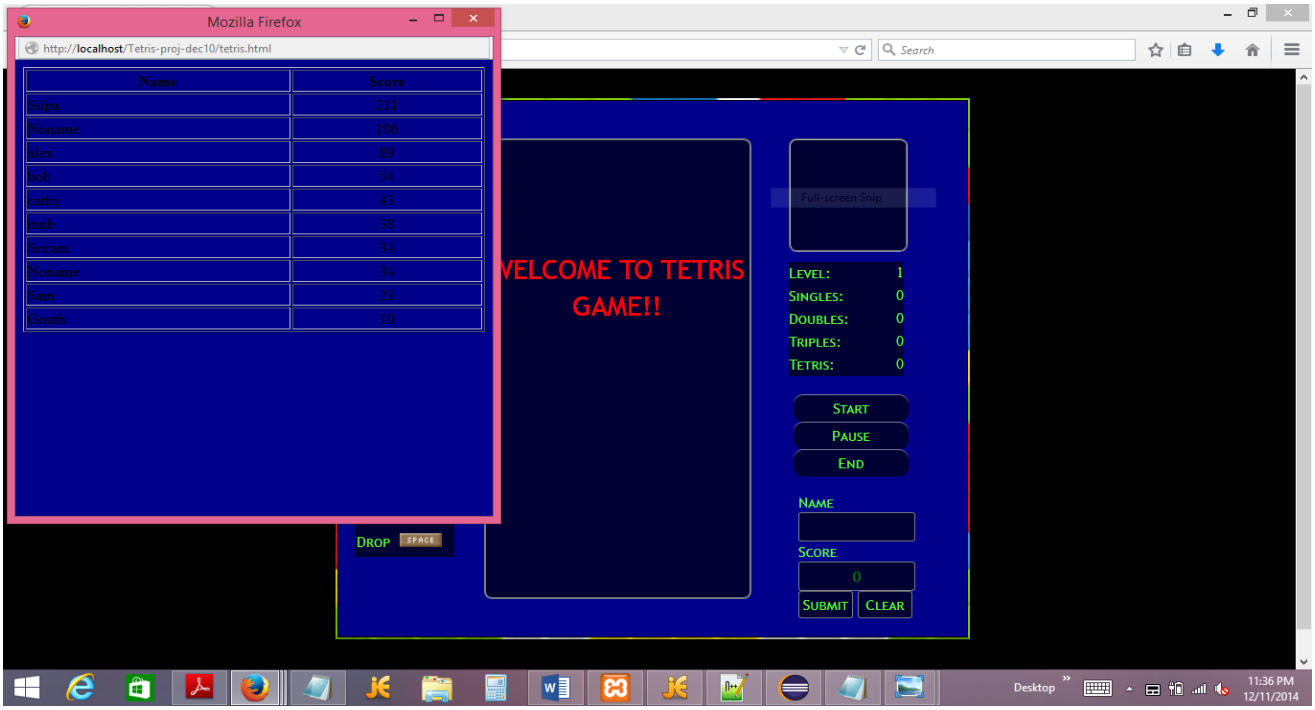
Database




phpMyAdmin
Server: 127.0.0.1 » Database: tetris » Table: scores
Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers
Showing rows 0 - 24 (27 total, Query took 0.0005 seconds.)
SELECT * FROM `scores`
pid pname pscore
6 alex 89
7 Sriram 34
8 bob 54
9 cathy 43
10 Gouth 10
11 Lee 0
12 Sam 23
13 Sam 0
15 Noname 0
16 Noname 0
Players who entered their name after playing game
Players who didnt enter their name


phpMyAdmin
Server: 127.0.0.1 » Database: tetris » Table: scores
Browse Structure SQL Search Insert Export Import Privileges
pid pname pscore
27 Noname 0
28 Noname 0
29 Noname 0
30 Noname 0
31 Noname 0
32 Noname 34
33 Noname 106
Players didnt enter the Name, but played the game- score is displayed
Query results operations
Print view Print view (with full texts) Export Display chart Create view
Bookmark this SQL query


Tetris
http://localhost/Tetris-proj-dec10/tetris.html
Search
TETRIS
HIGH SCORES
WELCOME TO TETRIS GAME!!
LEVEL: 1
SINGLES: 0
DOUBLES: 0
TRIPLES: 0
TETRIS: 0
START
PAUSE
END
HELP
ROTATE
MOVE
DROP
SPACE
NAME
SCORE
0
SUBMIT
CLEAR
Desktop
11:35 PM
12/11/2014


Mozilla Firefox
http://localhost/Tetris-proj-dec10/tetris.html
Name
Score
Silpa 211
Noname 106
Alex 89
Bob 54
Cathy 43
Lanb 38
Sriram 34
Noname 34
Sam 23
Gouth 10
WELCOME TO TETRIS GAME!!
LEVEL: 1
SINGLES: 0
DOUBLES: 0
TRIPLES: 0
TETRIS: 0
START
PAUSE
END
NAME
SCORE
0
SUBMIT
CLEAR
DROP
SPACE
Desktop
11:36 PM
12/11/2014

5) Limitations

1) Player Name cannot be saved in the middle of the game.