Design Document for Tetris

GUI version

TetrisController
Tetris is the controller for the Tetris game.
It takes input from the user and make changes to the board accordingly.

- Instance variables

JLabel
  - label – shows the user information about scores and instructions

JFrame
  - frame – window that holds the Tetris Board

int
  - boardWidth – the width of the board
  - boardHeight – the height of the board

Board
  - board – a standard Tetris board

Tetris
  - game – the Tetris game that we are playing

boolean
  - gameOver – checks if the game is over

- Instance methods

  - Tetris – constructor

void
  - main – sets up the game
  - keyTyped – checks which key is pressed and call the according methods to do the necessary behavior
  - updateBoard – updates the board according to user input

Board
Board represents a standard Tetris board.
It stores information about the current state of the game.
It has functions that can be called by the controller.

- Instance variables

boolean

        - start – check if the game starts
        - fallen – check if a certain piece had fallen into place

int
        - row – the rows of a standard Tetris board
        - col – the columns of a standard Tetris board
        - score – the score of the user
        - linesCleared – the number of lines that the user had cleared
        - moveSpace – the amount of space to move the pieces
        - borderLeft – the left border of the board where the pieces should not be able to move across
        - borderRight – the right border of the board where the pieces should not be able to move across
        - borderBottom – the bottom border of the board where the pieces should not be able to move across
        - borderTop – the top border of the board where if the pieces piled up across, the user loses
        - time – remember the time since the piece had fallen from the top to let the piece fall down slowly

piece[]
        - board – the array that stores the pieces

- Instance methods

        - Board – set up fields

void
        - clearBoard – clear the board if the game is lost
        - start – start the game
        - pieceFallen – stop the piece if it had fallen into place
        - newPiece – start a new piece falling from the top
        - clearLine – clear a line of blocks if filled
        - fallDown – move the blocks down
        - tetris – clear four lines at once

boolean
        - tryMove – check if the piece can be moved
        - lineFilled – check if a line is filled with blocks
        - gameLost – check if the pieces went over the top border of the board

int
        - getScore – get the current score of the user
        - updateScore – update the score of the user
        - updateTetris – update the tetris cleared by the user

Piece

Piece creates the 7 unique pieces of a Tetris standard game.

- Instance variables

piece
  - I – the I shaped piece of a standard Tetris game
  - J – the J shaped piece of a standard Tetris game
  - L – the L shaped piece of a standard Tetris game
  - O – the O shaped piece of a standard Tetris game
  - S – the S shaped piece of a standard Tetris game
  - T – the T shaped piece of a standard Tetris game
  - Z – the Z shaped piece of a standard Tetris game
  - block – one building block of a standard Tetris piece
  - currentPiece – the current piece that is falling down the board
  - nextPiece – the next piece that will be falling down the board

color
  - nextPieceColor – the color of the next piece

int
  - blockSize – the size of each building block of a standard Tetris piece

int array[][]
  - coord – the coordinates of a tetris piece

int array[][][]
  - coordsTable – the table of the coordinates of a tetris piece

- Instance methods

  - Piece – constructor

int
  - getX – get an x coordinate of a block
  - getY – get an y coordinate of a block

piece
  - getPiece – get a piece

void
  - setX – set an x coordinate of a block
  - setY – set an y coordinate of a block

  - setPiece – set a piece

  - left – move the piece left
  - right – move the piece right

    ○ down - move the piece down

        ○ rotateLeft - rotate a piece to the left
        ○ rotateRight - rotate a piece to the right
        ○ setColor - set the color of the next piece
        ○ drawBlock(Graphics g, int x, int y, Pieces piece) - draw the blocks of the piece

text-only version

TextTetrisController
Tetris is the controller for the text-only Tetris game.
It takes input from the user and make changes to the board accordingly.

● Instance variables

Tetris
        ○ game - the Tetris game that we are playing

boolean
        ○ gameOver - checks if the game is over

● Instance methods

        ○ Tetris - constructor

void
        ○ main - sets up the game

        ○ keyTyped - call the according methods to do the necessary behavior when a command is received
        l for move left, r for move right, d for down
        z for rotate counter-clockwise, x for rotate clockwise

Board
Board represents a standard Tetris board.
It stores information about the current state of the game.
It has functions that can be called by the controller.

● Instance variables

boolean
        ○ start - check if the game starts
        ○ fallen - check if a certain piece had fallen into place

int
        ○ score - the score of the user

- linesCleared – the number of lines that the user had cleared

- borderLeft – the left border of the board where the pieces should not be able to move across
- borderRight – the right border of the board where the pieces should not be able to move across
- borderBottom – the bottom border of the board where the pieces should not be able to move across
- borderTop – the top border of the board where if the pieces piled up across, the user loses

piece[]
- board – the array that stores the pieces

● Instance methods

void
- clearBoard – clear the board if the game is lost
- start – start the game
- pieceFallen – stop the piece if it had fallen into place
- newPiece – start a new piece falling from the top
- clearLine – clear a line of blocks if filled
- fallDown – move the piece down
- tetris – clear four lines at once

boolean
- tryMove – check if the piece can be moved
- lineFilled – check if a line is filled with blocks
- gameLost – check if the pieces went over the top border of the board

int
- getScore – get the current score of the user
- updateScore – update the score of the user
- updateTetris – update the tetris cleared by the user

Piece
Piece creates the 7 unique pieces of a Tetris standard game.

● Instance variables

piece
- I – the I shaped piece of a standard Tetris game
- J – the J shaped piece of a standard Tetris game
- L – the L shaped piece of a standard Tetris game
- O – the O shaped piece of a standard Tetris game
- S – the S shaped piece of a standard Tetris game
- T – the T shaped piece of a standard Tetris game
- Z – the Z shaped piece of a standard Tetris game

        ○ block – one building block of a standard Tetris piece
        ○ currentPiece – the current piece that is falling down the board
        ○ nextPiece – the next piece that will be falling down the board

int array[][]
        ○ coord – the coordinates of a tetris piece

int array[][][]
        ○ coordsTable – the table of the coordinates of a tetris piece

● Instance methods

        ○ Piece – constructor

void
        ○ getX – get an x coordinate of a block
        ○ getY – get an y coordinate of a block
        ○ setX – set an x coordinate of a block
        ○ setY – set an y coordinate of a block
        ○ getPiece – get a piece
        ○ setPiece – set a piece
        ○ left – move the piece left
        ○ right – move the piece right
    ○ down – move the piece down
        ○ rotateLeft – rotate a piece to the left
        ○ rotateRight – rotate a piece to the right
        ○ drawBlock(Graphics g, int x, int y, Pieces piece) – draw the blocks of the piece