**Tile.java**

**Lines:** 14

boolean isVisited; // what is the purpose of this Why did you use it

while creating a group of same numbered tiles, it checks if a tile has been visited. So it will not be checked again in the loop

20

Group adj; // what is the purpose of this and what is that in java

Group is a class in the project that represents a group of same numbered tiles. Its name is adj. each tile belongs to a group so it stores a reference of the group it belongs to. It is used when we want to remove all the tiles of a specific group.

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// what is the purpose of this and what how does it work

static HashMap<Integer,String> *groupColors* = new HashMap<Integer,String>();

Hashmap is being used to store color of each tile group based on tile number. We identify color based on the tile number. So for example if we have tile numbered 2 it will have color red. So hashmap will have <2,”red”> so each time we have number 2 we will assign color red to it.

30/31

setMinSize(60,60); //its for Tile Size I get it but

this.setMaxSize(80, 60); //Why is there MaxSize //it doesn't effect the blocks

thought

this is used to ensure that the size of tile does not exceed min and max range. That is it remains between (60,60) and (80,60). As if a tile had value 9 and user clicks on it the value will become 10, it will change the width of the tile. We need to ensure it remain in a range.

35

isVisited=false; //? why did u used this how does it affect the Tile?

By default each tile is unvisited i.e isVisited=false. When we are making groups of same numbered tiles, we mark visited tile as true so we may not end up traversing same tile over and over.

36

inGroup=false; //does that means it isn’t Grouping with any other Tile

yes

49

// after reaching lv 12 from where it takes it color?

After reaching score 12. The colors are randomly generated in setColor() method.

56

* can you please Explain how does this code works// and why there is only 3 color here name = String.*format*( "#%02X%02X%02X",(int)( c[i].getRed() \* 255 ),(int)(

c[i].getGreen() \* 255 ),(int)( c[i].getBlue() \* 255 ) );

this line converts RGB color values to hexadecimal format. It is used to convert the color to string so it can be assigned to javafx style property of button

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//what does this put does and why its i+1

*groupColors*.put(i+1,name);

this line adds a color in variable “name” against a number i on board. It is used to add default colors for 1 to 12 in hashmap. So each time the same colors are allocated.

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//set color according to the number x // i thought populateColors did that line 43 public void setColor(){

Line 43 is just populating the hashmap with default colors and is called once when the game starts. Setcolor() is used each time the value of a tile changes so its color change. e.g. tile 2 had color red, on clicking it becomes 3 so setColor() is called to change its color according to the new value.

65

// can you give me a example how its working if (*groupColors*.containsKey(value)){ color = *groupColors*.get(value);

Suppose the hashmap is <1,”red”>, <2,”yellow”>, <3,”green>,…

And we have to setcolor of tile numbered 2 then we will check if the hashmap contains any record against number 2. In this case there is one so we get the value against number 2 i.e. “yellow’ so tile is colored yellow.

//if key exists already

//get color from the value

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//what do you mean with random for the group color and why is there 3 time Math.random c = Color.*color*(Math.*random*(), Math.*random*(), Math.*random*()); //pick a

random color for group how??

As in the above explanation we had colors associated with numbers. If we encounter a number that does not have any color associated with it. We generated a random color for it and put it in the hashmap. So if we have number 12 and it is not in the hashmap, we will generate 3 random values for RGB (red, green , blue) channels and create a color object.

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* this will add a block? public void addValue(){

value++; //why id we increment it? setText(""+value);

setColor();

this will increment the value of the tile. When a tile is clicked i.e. 2 then addValue will be called to make it 3 and then its setcolor will be called to assign the color for tile 3.

126

//what does it do?

public void changeValue(int u, int l){

Random rnd = new Random();

value = rnd.nextInt(u-l)+l; i dint get why u-l

setText(""+value);

setColor();

this is used to generate random value for the removed tiles.

u is upper bound, l is lower bound as in the document. The java nextint() function requires a range in which values will be generated so if we have l=3 and u=9 and we want a random value in this range. Then nextInt(9-3) will give us random value from 0 to 5 ,6 will not be included. We add lower bound in it to make the range from 3 to 8

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// what does it do?

public void setValue(int v){

value = v;

setText(""+value);

setColor();

this is used while shifiting tiles down. The removed tile gets the value of the tile above it. We pass the value of top tile to this function to change value of the removed tile.

Basically it sets the value of tile to a specific number.

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//what is the use of it if we are in Tile class and why do we have the same method in Group and Board

public void removeTile(){

isVisited=false; //how

inGroup=false;

this function in Tile class is not used anywhere. The one in Board class is used to remove a specific tile from board by removing it from its group and changing its value.

151}

//what does it do reset?

public void resetTile(){

setVisited(false);

setGroup(false);

setAdj(null);

this function resets all tiles so we can check for groups again.

}

**Group.java**

//is this class for printing out group of Tile?

This class is used to represent a group of same numbered tiles that are linked together. Is it helpful when we need to remove tiles in a group so we know which tiles to remove.

18

//is this adding a Tile to the group

public void addTile(Tile t){

tiles.add(t); }

yes

25

//what does it do

//i delete this method and the game was still working

public void getAdj(){ //is it printing those number "blocks"?

if (tiles.size()>0){

for (int i=0 ; i<tiles.size() ; i++)

System.***out***.print(" "+tiles.get(i).getValue()+"

r:"+tiles.get(i).getRow()+" c:"+tiles.get(i).getCol());

this was just used to check if it was making correct groups. Not used in code anywhere.

}

33/41

* why do we have 2 remove method what does each do? public void remove(Tile t){

t.setVisited(false); t.setGroup(false); t.setAdj(null);//what do you mean removes the tile from its group

tiles.remove(t);}

this remove method is used when we need to remove all tiles of the same group. The other method is used when we reach a new highscore and need to remove all tiles with least value. That is based on tile number.

55

* i dint get what does it do? public ArrayList getTiles(){

return tiles;

this returns the tiles that belong to same group

}

**Board.java**

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gameBoard = new Tile[row][col]; // this 2 dimension array which has no Constructor in Tile class with those parameters! so how does it works at all?

This 2d array represents the game board. This is an array of tile objects. The constructor of tile class is called for each index of the array in randInit method.

30

//what does this method do

//and after reaching 6 how did we get 7

public void randInit(){

Random rnd = new Random();

int number;

for (int i=0 ; i<rows ; i++)

for (int j=0 ; j<cols ; j++){

number=rnd.nextInt(6)+1;

gameBoard[i][j] = new Tile(number,i,j); //can you explain to me how its

working

this method assigns initial values to the game board from 1 to 6. First we generate a random value in the range then we call the constructor of tile with that value to create a new tile at a specific row ‘i’ and column ‘j’ in the board.

}

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//what does it do i dint it

public void initialize(){

int arr[][] =

{{4,1,1,1,3},{1,3,2,2,3},{1,1,2,1,1},{4,2,2,3,1},{2,1,4,4,6}}; //what is that

and what are those numbers for?

for (int i=0 ; i<rows ; i++)

for (int j=0 ; j<cols ; j++){

this method is used to assign predefined values to the board. The randInit gives random values whereas this function allocates the same values every time the game is played. This can work only for 5\*5 board. The values in array are tile numbers in each row and column.

64

}

//is this when i max is more than 6?

if (gameBoard[i][j].getValue()==score-1

gameBoard[i][j].setColor();

it changes the value of previous max tile. That is when max is 6 all 6 numbered tiles on board will be white. When 7 is reached we change the color of 7-1 (score-1) tiles i.e. 6 to its normal color. So we can color 7 white.

73

//What does this method do

* i remove it and the game still works public void display(){

for (int i=0 ; i<rows ; i++){ for (int j=0 ; j<cols ; j++){

System.***out***.print(gameBoard[i][j].getValue()+" ")

;// you put this space in between why? it doesn't effect the game

}

System.***out***.println();

}

just just used for testing purpose to print the board values on console.

}

83

* why do we need this method? public Tile[][] getTiles(){

return gameBoard;

this returns the gameboard to another class so it can be updated as in controller.

}

92

//what does this method do

public void setTiles(int[][] tiles){

for (int i=0 ; i<rows ; i++)

for (int j=0 ; j<cols ; j++){

gameBoard[i][j] = new Tile(tiles[i][j],i,j);

this is used to set the values of board according to the values read from the xml file when resuming.

}

}

101

// what is that?

public void setBounds(int u, int l){

upper = u;

lower = l;

sets the upper lower bound as in the document for random number generation.

109

//what does it do?

// i also remove it and its still working

public void display1(){ //displays groups for (int i=0 ; i<groups.size() ; i++){

groups.get(i).getAdj();

System.***out***.println();

Just used for testing purpose

118

* what are those Queue<Tile> what do u mean with BFS //does this method check if right left top bottom are matched?

This a technique used to check neighboring nodes and ensures that a node is not visited twice. Queue is builtin in java and BFS is a traversal technique used for graphs.

138

//What does it do? reset what

public void reset(){

groups.clear();

for (int i=0 ; i<rows ; i++){

for (int j=0 ; j<cols ; j++){

gameBoard[i][j].setGroup(false);

gameBoard[i][j].setVisited(false);

gameBoard[i][j].setAdj(null);

}

It resets all the tiles in the group.

}1

150

//What does it do?

public void checkGroups(){

reset(); //reset after each move for new groups what does it reset? Queue<Tile> traversal = new LinkedList<Tile>(); // can you please Explain what

does it do?

Every time a tile is clicked in the board, this function is called to check for changes in groups and create them.

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* in Group and tile we have the same method so why? public void removeTile(Tile t){

this remove method is used when we need to remove all tiles of the same group.

196

* why do we have two method like that and what does each do public void removeTile(int val){

The method is used when we reach a new highscore and need to remove all tiles with least value. That is based on tile number

222

// why is there shifDown for Tile and one for Group and how is it working

For group:

When we click on a tile all the other tiles of the same group need to be removed. The other tiles are shifted down. We get the column of each removed tile and assign it the value of the tile above it i.e. same column but row-1.

For tile:

It is used when we use bomb or when we reach a new highscore and need to remove all tiles with least value. It is used with tiles that are not in any group.

256

//why do we did that

public void findMinMax(){

this function finds the minimum and maximum value after each move so we can update our upper and lower bounds. So if max score is 9 no 1s,2s are generated.

}

289

// what is (upper-lower)+lower

private void random(Tile t){

Random rnd = new Random();

int v = rnd.nextInt(upper-lower)+lower;

//can you please Explain more

t.setValue(v);

How are greedyand protective working what logic I mean

Greedy:

It tends to generate a number that is the max of its neighboring tile. E.g. if a tile has 2,5,4 as its left, right and bottom tiles, then greedy will predict 5 to make the maximum score faster.

Protective:

It will generate a number that is neither of its neighboring tile. E.g. if a tile has 2,5,4 as its left, right and bottom tiles, then protective will predict number other than these to make the maximum score slower

**BoardViewController.java**

//what is this class for why did u implements it to Initializable

This is controller class for the fxml view file and it is by default that way. It handles all the controls relevant to the GUI.

30/31

//what are those called in java and how it works Tile[][] tiles;

Tile[][] prevState;

These are object arrays. They contain an object at each index rather than a simple value. The prevstate is used to store values for undo operation.

56

//what is the propose of using it here?

Tile.*populateColors*();

It is function call to popuplate the default colors for the board, when the program runs

//fill hash map of colors

59/60

//what do u mean

ub=6; //set upper bound

lb=1; //set lower bound

w=5; //width

as per the document in start the game will have values from 1 to 6 so lower bound =1, upper = 6 and range i.e. width=5

95

//what do mean with rows - cols//gridPane cuase its the same name as Fxml

gridPane.add(moves,0,rows+1);

gridPane.add(info,3,rows+1,3,1);

gridPane.add(bomb,cols+1,1);

gridPane.add(undo,cols+1,2);

it is adding the buttons and the labels on right and bottom of the gameboard, so if the gameboard has rows=5 and cols=5 then moves label will be in col 0 and row 6 and so on.

102

* of What if we are in **BoardViewController** there is no resume game buttom private void storePrevState(){

this is just storing for undo operation not for resume

}

110

// we are setting a Board for the to start right?

Yes this one is for new game

public void setBoard(int r, int c, String level, int h){ rows=r;

cols=c;

this.level = level;

b = new Board(rows,cols,level)

;

b.setBounds(ub,lb);//what does it do

Sets the range of numbers

gridPane.add(tiles[i][j],j,i);// where this goes

adds to the GUI

}

}

132

//why is there 2 setBoard what when this will work and when the first one will public void setBoard(int r, int c, String level, int mov, int score , int hscore, int

board[][]){

gridPane.add(tiles[i][j],j,i); // where this goes

this one is for resume game when we have moves and prevous board values too.

}

155

//what this method do can you please Explain a bit private void addGridEvent() {

if (event.getSource() instanceof Tile){ //what is that

this confirms that functions work when user click on a tile not anywhere else on the board.

if (t.inGroup()){ //what do u mean

this checks if a tile is in group so makes it clickable.

269

//with getTiles what for do we need it

public int[][] getTiles(){

}

OptionViewController.java

44

ObservableList<String> lev = //What is this?

this is used to populate the drop down for strategies.

54

public void startGame(ActionEvent e){ //how does it know that its okay button

it has been added as onclick method in the fxml of the okay button

66

//what is the different between both of setBoard Constructor //can i call it without xmlReader?

Xml reader is used to read/write game state to the xml file.

setBoard is used to start new game/ resume based on the button clickex.

It wont work without xmlreader.

ctrl.setBoard(row,col,level.getValue(),xmlReader.*getHighScore*()); //Call with default settings

Stage primaryStage = new Stage();

70-74

//what are those

These are used to set the size of GUI frame. Based on the rows and columns in the board.

primaryStage.setMinWidth(ctrl.cols\*60+80); primaryStage.setMinHeight(ctrl.rows\*60+60); primaryStage.setMaxWidth(ctrl.cols\*60+80);

primaryStage.setMaxHeight(ctrl.rows\*60+60);

111

if (r.matches("[4-9]")){//how does this matches works

that is built-in method of java that compares if a string is in the range

**StartController.java**

29

//what is that? URL and the other thing and why do we need it, if its empty public void initialize(URL url, ResourceBundle rb)

That is built-in default syntax for this method and cannot be changed. {

39

//can i start the BoardView from here without going into the OptionView

yes

FXMLLoader loader = new

FXMLLoader(getClass().getClassLoader().getResource("view/OptionView.fxml"));

67

//what is crtl?

BoardViewController ctrl = loader.getController();

Ctrl is the controller object for that fxml view

85

what is b

if (!ctrl.b.checkStatus()){

b is the gameboard in the controller