Brick Break Game

1. Program description
2. Class Diagram
3. Variables

Text

Description automatically generated

Stating variables are needed when making the game. Inside the gameplay class, I stated some variables that are needed inside the game. To state each variable, data types also need to be typed. There are 3 boolean data types variables which is play, gameplayOn and frontPage. The play variable is to state whether the gameplay in each level is still running. If the gameplay has stopped it will be false and the user will need to choose another level or reset that level. GameplayOn variable is similar to the play variable, but it is used to stop the paddle from moving when the user loses. The totalworldBricks variable is used to declare how many bricks in every different level maps. Totalbricks variable are used to state the number of bricks which later will be used to finish the game once there are no bricks left in the level. The timer and delay variables are used for the ball movement, paddle movement and animation. Next will be the player position variable which is playerX and playerY. Both are the coordinates of the player position from x and y. WorldspeedX and worldspeedY are used to declare the speed of the ball inside the game. They can be changed through the settings. Variable for the ball is declared with ballposX, ballposY, ballXdir, ballYdir. ballposX and ballposY are used as the coordinate for each ball inside the game. There are 3 balls in the game. ballXdir and ballYdir are to state the direction of the ball in x and y direction. There are also 3 ball direction. The worldNum variable are used inside the game to pick which level map will be shown in each level. Since the game has 2 page and 9 levels. The 2 pages use page variable so that the user can move from 1 page to another.

Text

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There are some variables stated in the mapStats class. The int x are used to state the number index in each array to access the level. The brickWidth and height are to declare how long the width and height for each brick. The numBricks variable are used to state how many bricks are there in each level. To store the map, multidimentional array is used to store each level of the map in 1 array.

1. Scores and resetting when the player lose

Scores

Graphical user interface, text, application, chat or text message

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Text

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Here is how the score is coded. Worldnum 9 is an empty bricks map which is used for the front and setting page so the level will only appears when the user are inside one of the levels (worldnum 1-9). First set the color of the font to white, set font (setting up the name of font, bold and size). Next will be drawing the string to the screen

The x and y are the coordinates of the string which is 590 and 30 starting from zero in the left top corner. The score variable will be added every time a ball hits a brick starting from 0.

Resetting

A screenshot of a computer

Description automatically generated with medium confidence

As the user loses (all the balls fall out from the screen) the play variable will be false. To reset the game, we can press enter key to reset and generate the same map with tits bricks reset. With the resetGame() function it will reset all the paddle and ball stats. And the repaint() function is to redraw all of the component into the screen similar to updating it.

Text

Description automatically generated

This is the reset function.

This resetGame() is used to reset all the stats inside the game.IT resets the ball direction,ball position. Player position and also the score. It also returns the gameplayON to true. When gameplayON is false the paddle cannot be moved. So when it is back become true the user can move the paddle again.

When the player finish breaking all the Bricks.

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Description automatically generated

When the totalBricks is 0 (no bricks left inside the level), the player will be in the front page for the user to choose another level. It use the mapgenerator on index 9 which is the empty map with no bricks for the page.In Mapgenerator(10,10,9), 10 10 means that the size of the brick map is 10 bricks by 10 bricks. The worldnum will be 9. Gameplay and game will be false since the user is not playing the level.

1. Movement

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Description automatically generated

Paddle

A screenshot of a computer

Description automatically generated with medium confidenceA screenshot of a computer

Description automatically generated with medium confidence

To move the paddle, this program uses keyboard arrow keys that’s why we use the keyEvent.VK\_KEYS and getkeyCode() to get input of any keys inside the keyboard. The paddle can move in four directions which is up, down, left, and right.

The if page ==2 statement is to run when the player is inside one of each level so the paddle will not move when the player is in the main or setting page.

The VK\_RIGHT keys have 2 functions. First is to move the player from the main page to the setting and the second is to move the paddle to the right. VK\_LEFT is to move the paddle to the left. VK\_TOP to move the paddle up and VK\_DOWN to move the paddle down. Each movement has an if statement which is to prevent the paddle from moving out of the screen. The paddle can move between 10 and 600 in x direction and 475 and 500 in y direction. So, when it moves more than the position, it will not move again and hold in that position. The else statement is to show that if it is not more than the range then the paddle will move up, down, left and right depending on the key pressed by the user.

Ball

Text

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Description automatically generated

By using these variables, the ball will moves depending on the x and y direction and updates it into its position (ballposY += ballYdir for example). There are 3 ball that can be shown inside the level if there are 2 or more, the program will also add the ball position for the second and third by using the if statement.

A screenshot of a computer

Description automatically generated with medium confidence

Both ball and paddle will be always updated as the game runs by using the fillOval and fillRect with its position updated in x and y.

1. Drawing Objects into the screen

Graphical user interface, text, website

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Description automatically generated with medium confidence

To draw object into the screen, fill function is needed, fillOval and fillRect. setColor is used to set the color for each shapes. FillOval is to draw circle object into the screen and fillRect is to draw rectangle to the screen. Inside the bracket, there are x and y to state the position and its width and height. First, Background is created with its width and height as the size of the screen and the color is black. Next is drawing map into the screen by using the map.draw((Graphics2D)g). More details about drawing map will be explained in the map generator part. Drawing the border, there are three rectangle shapes created for the border. The position for each are in the top, left and right. Drawing the ball and paddle are similar, only in different shapes (rectangle for paddle, circle for ball). Both are inside the if function which makes them to be drawn only when the player is playing inside levels. There are 3 ball so it depends on the game. If it is set to 2 balls, there will be 2 ball drawn.

1. Main Driver

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This is the driver where the code runs, the name of the file is BrickBreak. First is to create the gameboard using jframe and create the gameplay class object which contains all the mechanism inside the game. setBounds is used to set the size of the jframe object (700x600). Next is to setTitle which is set the title of the app on the top corner left. I don’t set the game to resizable so it will be false. The game need to appear so setVisible will be true.setDefaultCloseOperation(JFrame.EXIT\_ON\_CLOSE) is for the user to closed the game when they press the x button on top right. And last is to add gameplay into the frame to put all the mechanism inside it. The Playsound(Gamesound) is to play the sound effect of the game so it will run throughout the game.

1. Map Generator

MapStats class

Graphical user interface, text

Description automatically generated

Inside the MapGenerator file there is also another class that store attributes for the MapGenerator which contains the integer x to identify which level are going to be picked, the width and height of brick, number of bricks and also a multidimensional array that contain the brick location

MapGenerator class

Text

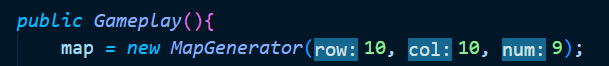
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The mapGenerator contains method that create the map so that it will be drawn into the screen. It extends the MapStats class to take its attributes. There is a constructor method inside the class which is to count the brickwidth and height. The number of columns and rows I used for the game is 10x10, so each brick width is 54 and height is 35. The draw function is to set the color and draw each rectangle into the screen which work as bricks in the level. I used nested loop to access the array. The array consists of 1 and 0 numbers. It means that every number 1 contain bricks and 0 is empty. Inside the loop there is also if statement to show that every 1 in the array, create a brick by setting its color to red and fill the rectangle with the location of j \* brickWidth + 80 and I \* brickHeight + 50. +80 and +50 is to locate the bricks in the middle not at the corner of the screen. And last the setBrickValue method is used to change the value inside the array depending on the location by using int row and int col. So, the main function of this method is to change the number 1 in the array to zero when a ball hit one of the bricks so it will disappear.

Graphical user interface, text, website

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Graphics2D is a class that extend Graphics class to provide more control to geometry, changing positions and it is mostly used for rendering 2d dimensional shapes, text, and images



Inside the gameplay class, a MapGenerator object is created depending on the page. As the front page it will be empty without bricks so the mapGenerator will take the index 9 from the array which contains empty brick.

A screenshot of a computer

Description automatically generated with medium confidence

For each levels the mapGenerator is also updated into the variable depending on the level. Level 1 uses index 0 of the array map and level 2 uses the index 1 until level 9.

1. Collision

Logo

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Collision is the main solution to this brick game. It is used to remove the bricks once the ball hit the brick and bounce the ball in the reverse direction. Not only that it also helps to bounce the ball back between the paddle and the wall.

Text

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Text

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To make this happens, Inside the gameplay file there is an override method which is a method inside the ActionListener interface. This method is called after the user perform and action. First there is an if statement, so it only works when the play is true which means only when the user is playing one level. The 3 if statement of rectangle is to show that once the ball intersects with the paddle it will bounce back in the opposite direction it hits (ballYdir = -ballYdir). The position for both keeps updating with the variable position for each object. Next is the nested loop which is to access each brick that are in the array. It also create the brick x and y position depending on the width and height and put the brickWidth and Height into a new variable. Next is creating the rectangle object for each ball and bricks, stating its position in x and y and its width and height. The next if statement is to run when the ball intersects with one of the brick. Map.setBrickValue(0,I,j). I and J is the column and rows so it is set to 10. The setBrickValue is a method inside the MapGenerator class. So, when the ball hits a brick it will set the value to 0 (the brick will disappear). The total bricks are also minus 1 because 1 brick disappears and the score adds 5. After hitting a brick the ball will bounce back into the opposite direction. So the if statement shows that the ball can come from the left and right. The intersects function is to show if the 2 items are intersecting with each other. BallposX+19 <= brickRect.x (ball is coming from the left of the brick) or ballposX + 1 >= brickRect.x + brickRect.width (ball coming from the right) will oppositely change direction on x. and if they don’t come from left and right, that means the ball will come from top or bottom so it will change direction on y. After changing direction, the loop will break because a brick can only be hit one time. There are 3 if statement intersection which is between first ball with bricks, second ball with bricks and third ball with bricks if there are more than one ball inside the level.

1. Music

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To create music for the game, 3 imports are needed to read files, open, and put it into clip object.



Graphical user interface, text

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Logo

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First is to import the game.wav file into the GameSound object. The Playsound function is to play the music. First with the Clip object, getClip is to play the sound again and getAudioInputStream is to get the input from which file do the user want to play. Start() is to start playing the clip and loop continuously until the program ends. The try and exception is to show that the function playSound requires a sound file, if there is no file it will do an exception. But I leave it empty because the name of the sound is already named and placed in the file so there will be no worry about error when running in the game. And last is using the method PlaySound to the GameSound that contain Game.Wav (the music file for the game).

1. Page managing

Text

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There are 3 pages inside the game. To change between pages, I use the page variables which stores number from 0-2 depending on which page. 0 as in the level page, 1 is the front page and 2 for the setting page.

1. Command keys