



Final EE364 Project Puzzle Game

Students name

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1- Problem Statement:

In the advanced programming course EE364, designing a GUI game using JavaFx was required. The chosen game project was "puzzle game", and its main objectives were to pass time and have fun, as it has numerous health benefits, from helping players in developing their cognitive skills, through improving their memory and problem-solving ability. However, the game is for all different ages from kids until adults (above 7 years). In order to complete the game, the user has to arrange puzzle pieces properly in minimum time to break the highest score. There are 5 levels of difficulty, the complexity increases with increasing the level. Each level contains a different image and a different number of pieces. Finally, the username and the score will be saved as well as the highest score will be counted.

2- Distribution of WorkLoad

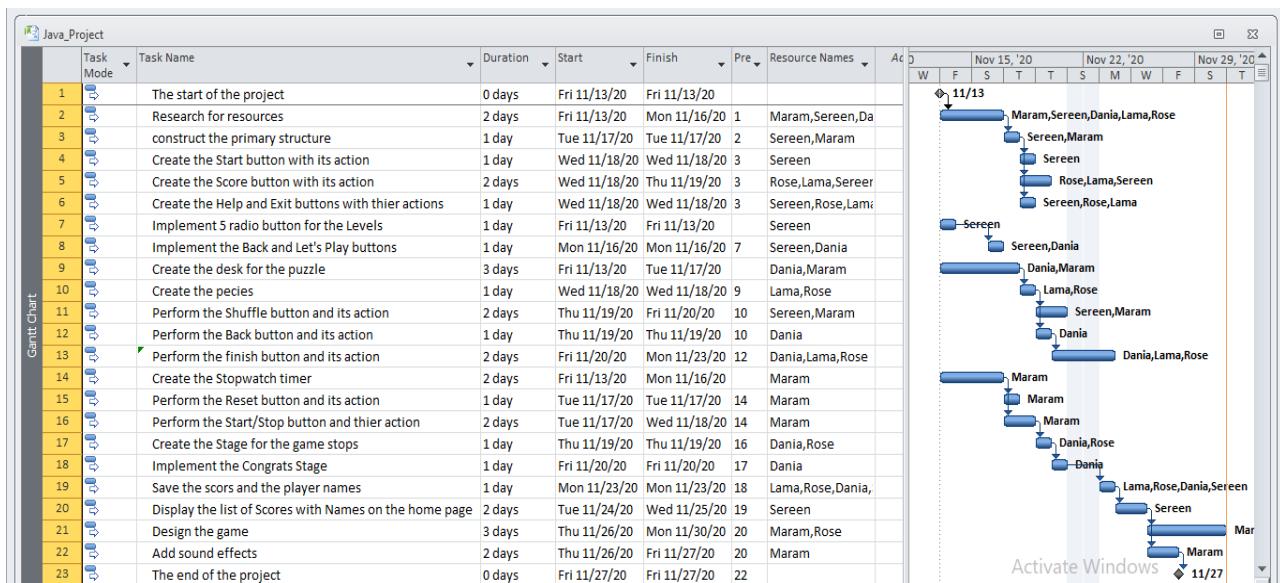


Figure 1: Work load distribution schedule.

3- GUI Code:

```

import java.io.BufferedReader;
import java.io.BufferedWriter;
import java.io.File;
import java.io.FileInputStream;
import java.io.FileNotFoundException;
import java.io.FileWriter;
import java.io.IOException;
import java.io.InputStreamReader;
import java.io.Writer;
import java.net.URISyntaxException;
import java.time.LocalDateTime;
import java.time.format.DateTimeFormatter;

```

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```
import java.util.ArrayList;
import java.util.List;
import java.util.Scanner;
import java.util.Timer;
import java.util.concurrent.Executors;
import java.util.concurrent.ScheduledExecutorService;
import java.util.concurrent.TimeUnit;
import java.util.concurrent.atomic.AtomicInteger;
import com.sun.webkit.ContextMenu;
import javafx.animation.KeyFrame;
import javafx.animation.KeyValue;
import javafx.animation.Timeline;
import javafx.application.Application;
import javafx.application.Platform;
import javafx.beans.property.Property;
import javafx.beans.value.ObservableValue;
import javafx.collections.FXCollections;

import static javafx.application.Application.launch;
import javafx.event.ActionEvent;
import javafx.event.Event;
import javafx.event.EventHandler;
import javafx.geometry.Insets;
import javafx.geometry.Point2D;
import javafx.geometry.Pos;
import javafx.scene.Group;
import javafx.scene.Parent;
import javafx.scene.Scene;
import javafx.scene.control.Button;
import javafx.scene.control.ContentDisplay;
import javafx.scene.control.Label;
import javafx.scene.control.ListView;
import javafx.scene.control.TextField;
import javafx.scene.effect.DropShadow;
import javafx.scene.image.Image;
import javafx.scene.image.ImageView;
import javafx.scene.input.MouseEvent;
import javafx.scene.layout.Background;
import javafx.scene.layout.BackgroundImage;
import javafx.scene.layout.BackgroundRepeat;
import javafx.scene.layout.BackgroundSize;
import javafx.scene.layout.BorderPane;
import javafx.scene.layout.FlowPane;
import javafx.scene.layout.GridPane;
import javafx.scene.layout.HBox;
import javafx.scene.layout.Pane;
import javafx.scene.layout.Region;
import javafx.scene.layout.StackPane;
import javafx.scene.layout.VBox;
import javafx.scene.media.Media;
import javafx.scene.media.MediaPlayer;
import javafx.scene.paint.Color;
```

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```
import javafx.scene.shape.Circle;
import javafx.scene.shape.Ellipse;
import javafx.scene.shape.LineTo;
import javafx.scene.shape.MoveTo;
import javafx.scene.shape.Path;
import javafx.scene.shape.Rectangle;
import javafx.scene.shape.Shape;
import javafx.scene.text.Font;
import javafx.scene.text.FontPosture;
import javafx.scene.text.FontWeight;
import javafx.scene.text.Text;
import javafx.scene.text.TextAlignment;
import javafx.stage.Stage;
import javafx.util.Duration;
import java.time.LocalTime;
import java.time.format.DateTimeFormatter;
import java.util.ArrayList;
import java.util.List;
import java.util.Timer;
import java.util.concurrent.Executors;
import java.util.concurrent.ScheduledExecutorService;
import java.util.concurrent.TimeUnit;
import java.util.concurrent.atomic.AtomicInteger;
import com.sun.webkit.ContextMenu;
import javafx.animation.KeyFrame;
import javafx.animation.KeyValue;
import javafx.animation.Timeline;
import javafx.application.Application;
import javafx.application.Platform;
import static javafx.application.Application.launch;
import javafx.event.ActionEvent;
import javafx.event.Event;
import javafx.event.EventHandler;
import javafx.geometry.Insets;
import javafx.geometry.Point2D;
import javafx.scene.Group;
import javafx.scene.Parent;
import javafx.scene.Scene;
import javafx.scene.control.Button;
import javafx.scene.control.ContentDisplay;
import javafx.scene.control.Label;
import javafx.scene.control.RadioButton;
import javafx.scene.control.ScrollBar;
import javafx.scene.control.ScrollPane;
import javafx.scene.control.SelectionMode;
import javafx.scene.control.TextArea;
import javafx.scene.control.TextField;
import javafx.scene.control.ToggleGroup;
import javafx.scene.effect.DropShadow;
import javafx.scene.image.Image;
import javafx.scene.image.ImageView;
import javafx.scene.input.MouseEvent;
import javafx.scene.layout.Background;
```

```

import javafx.scene.layout.BackgroundFill;
import javafx.scene.layout.BorderPane;
import javafx.scene.layout.GridPane;
import javafx.scene.layout.HBox;
import javafx.scene.layout.Pane;
import javafx.scene.layout.StackPane;
import javafx.scene.layout.VBox;
import javafx.scene.paint.Color;
import javafx.scene.shape.Circle;
import javafx.scene.shape.Ellipse;
import javafx.scene.shape.LineTo;
import javafx.scene.shape.MoveTo;
import javafx.scene.shape.Path;
import javafx.scene.shape.Rectangle;
import javafx.scene.shape.Shape;
import javafx.scene.text.Font;
import javafx.scene.text.FontPosture;
import javafx.scene.text.FontWeight;
import javafx.scene.text.Text;

public class codefile extends Application {
    private int mins = 0, secs = 0, millis = 0;
    private boolean sos = true;
    private Text text;
    private Button sButton, rButton;
    Timeline timelinee;
    private final int i = 60;
    private final DateTimeFormatter HH_MM_SS =
    DateTimeFormatter.ofPattern("HH:mm:ss");
    private final Label l1 = new Label("Time: " + "00:00:00");
    private final Insets insets = new Insets(3, 5, 3, 5);
    private final Button shuffleButton = new
    Button("Shuffle");
    private final Button Finish = new Button("Finish");
    private final List<Piece> pieces = new ArrayList<Piece>();
    //for game paices
    private final Button Bas = new Button("Back");
    private final Button button1 = new Button("Finish");
    private String HighScores = "Time: 00:00:000" + " ";
    private List<String> HighScore = new ArrayList<String>();
    // for saving Score
    private Font ScoreFont;
    String high;
    private String SaveDataPath;
    private String Level1file = "SaveData";

    private final String path =
    "/Users/sireenbahdad/Desktop/eclipse-
    workspace/ProjectPuzzel/bin/s1.mp3";
    private final String path2 =
    "/Users/sireenbahdad/Desktop/eclipse-
    workspace/ProjectPuzzel/bin/s3.mp3";

```

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```

private final String path3 = "/Users/sireenbahdad/Desktop/eclipse-
workspace/ProjectPuzzel/bin/s3.mp3";
private final String path4 = "/Users/sireenbahdad/Desktop/eclipse-
workspace/ProjectPuzzel/bin/s3.mp3";
private final String path5 = "/Users/sireenbahdad/Desktop/eclipse-
workspace/ProjectPuzzel/bin/s3.mp3";
private final String path6 = "/Users/sireenbahdad/Desktop/eclipse-
workspace/ProjectPuzzel/bin/s3.mp3";
private final String path7 = "/Users/sireenbahdad/Desktop/eclipse-
workspace/ProjectPuzzel/bin/s3.mp3";
private final String path8 = "/Users/sireenbahdad/Desktop/eclipse-
workspace/ProjectPuzzel/bin/s3.mp3";
private final String path9 = "/Users/sireenbahdad/Desktop/eclipse-
workspace/ProjectPuzzel/bin/s3.mp3";
private final String path10 = "/Users/sireenbahdad/Desktop/eclipse-
workspace/ProjectPuzzel/bin/s3.mp3";
private final String path11 = "/Users/sireenbahdad/Desktop/eclipse-
workspace/ProjectPuzzel/bin/s3.mp3";
private final String path12 = "/Users/sireenbahdad/Desktop/eclipse-
workspace/ProjectPuzzel/bin/s3.mp3";
private final String path13 = "/Users/sireenbahdad/Desktop/eclipse-
workspace/ProjectPuzzel/bin/s3.mp3";
private final String path14 = "/Users/sireenbahdad/Desktop/eclipse-
workspace/ProjectPuzzel/bin/s3.mp3";
private final String path15 = "/Users/sireenbahdad/Desktop/eclipse-
workspace/ProjectPuzzel/bin/s3.mp3";

// Instantiating Media class
private final Media media = new Media(new
File(path).toURI().toString());
// Instantiating MediaPlayer class
private MediaPlayer mediaPlayer = new MediaPlayer(media);
private final Media media2 = new Media(new
File(path2).toURI().toString());
private MediaPlayer mediaPlayer2 = new
MediaPlayer(media2);
private final Media media3 = new Media(new
File(path3).toURI().toString());
private MediaPlayer mediaPlayer3 = new
MediaPlayer(media3);

```

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```

        private final Media media4 = new Media(new
File(path4).toURI().toString());
        private MediaPlayer mediaPlayer4 = new
MediaPlayer(media4);
        private final Media media5 = new Media(new
File(path5).toURI().toString());
        private MediaPlayer mediaPlayer5 = new
MediaPlayer(media5);
        private final Media media7 = new Media(new
File(path7).toURI().toString());
        private MediaPlayer mediaPlayer7 = new
MediaPlayer(media7);
        private final Media media8 = new Media(new
File(path8).toURI().toString());
        private MediaPlayer mediaPlayer8 = new
MediaPlayer(media8);
        private final Media media9 = new Media(new
File(path9).toURI().toString());
        private MediaPlayer mediaPlayer9 = new
MediaPlayer(media9);
        private final Media media10 = new Media(new
File(path10).toURI().toString());
        private MediaPlayer mediaPlayer10 = new
MediaPlayer(media10);
        private final Media media11 = new Media(new
File(path11).toURI().toString());
        private MediaPlayer mediaPlayer11 = new
MediaPlayer(media11);
        private final Media media12 = new Media(new
File(path12).toURI().toString());
        private MediaPlayer mediaPlayer12 = new
MediaPlayer(media12);
        private final Media media13 = new Media(new
File(path13).toURI().toString());
        private MediaPlayer mediaPlayer13 = new
MediaPlayer(media13);
        private final Media media14 = new Media(new
File(path14).toURI().toString());
        private MediaPlayer mediaPlayer14 = new
MediaPlayer(media14);
        private final Media media15 = new Media(new
File(path15).toURI().toString());
        private MediaPlayer mediaPlayer15 = new
MediaPlayer(media15);
        private Timeline timeline;
public codefile() { // for saving data path
    try {
        SaveDataPath=codefile.class.getProtectionDomain().getCodeSource()
            .getLocation().toURI().getPath();
    } catch (Exception e) {
        e.printStackTrace();
    }
}
    
```



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```
    }

}

private void creatfile() { // creat score file

    try {
        File file = new File(SaveDataPath, Level1file);
        FileWriter output = new FileWriter(file,true);
        BufferedWriter f = new BufferedWriter(output);
        f.write("00:00:000");
        f.close();
    } catch (IOException e) {
        // TODO Auto-generated catch block
        e.printStackTrace();
    }
}

private void setHighScore() { // to write the score
    try {
        File ff = new File(SaveDataPath, Level1file);
        FileWriter output = new FileWriter(ff,true);
        BufferedWriter f = new BufferedWriter(output);
        int i = HighScore.size();
        f.write(HighScore.get(i-1));
        //f.newLine();

        f.close();
    }

    catch (Exception e) {
        e.printStackTrace();
    }
}

private String getFileText() { // for show the score from
file
    File ff = new File(SaveDataPath, Level1file);
    String listofscore = "";
    try {
        if(!(ff.exists() || ff.length() == 0 ) {

            System.out.print(" ");
        }
        else {
            Scanner s = new Scanner(ff);

            while (s.hasNext()) {
                listofscore
listofscore.concat(String.format("%s\n", s.next()));
            }
        }
    }
}
```



```

        } catch (FileNotFoundException e) {
            // TODO Auto-generated catch block
            e.printStackTrace();

        }

        return listofscore;
    }

    private String getHighScore() { // to find the highest
score
        File ff = new File(SaveDataPath, Level1file);
        try {

            if(!(ff.exists()) && ff.length() == 0 ) {

                System.out.print("there's      no      score,
please be the First player");
            }

        }

        else {

            Scanner s = new Scanner(ff);
            high=s.nextLine();
            int
hn7=Integer.parseInt(Character.toString(high.charAt(7)));
            int
hn8=Integer.parseInt(Character.toString(high.charAt(8)));
            int
hn10=Integer.parseInt(Character.toString(high.charAt(10)));
            int
hn11=Integer.parseInt(Character.toString(high.charAt(11)));
            int
hn13=Integer.parseInt(Character.toString(high.charAt(13)));
            while (s.hasNext()) {
                String e=s.nextLine();
                int
dn7=Integer.parseInt(Character.toString(e.charAt(7)));
                int
dn8=Integer.parseInt(Character.toString(e.charAt(8)));
                int
dn10=Integer.parseInt(Character.toString(e.charAt(10)));
                int
dn11=Integer.parseInt(Character.toString(e.charAt(11)));
                int
dn13=Integer.parseInt(Character.toString(e.charAt(13)));
                if(dn7<hn7) {
                    high=e;
                    break;
                }
            }
        }
    }
}

```



```

        }
        else if((dn7==hn7)&&(dn8<hn8)) {
            high=e;
            break;
        }
        else if((dn7==hn7)&&(dn8==hn8)&&(dn10<hn10)) {
            high=e;
            break;
        }
        else
    if((dn7==hn7)&&(dn8==hn8)&&(dn10==hn10)&&(dn11<hn11)) {
        high=e;
        break;
    }
    else
if((dn7==hn7)&&(dn8==hn8)&&(dn10==hn10)&&(dn11==hn11)&&(dn13<hn13)) {
    high=e;
    break;
}
s.close();
}

catch (FileNotFoundException e) {
    // TODO Auto-generated catch block
    e.printStackTrace();
}
return high;
}

public static void main(String[] args) {
    launch(args);
}

public void start(Stage primaryStage, Image image) {
    //////
    BorderPane pb = new BorderPane();
    text = new Text("Time: " + "00:00:00");
    text.setStyle("-fx-font-size: 2em;");
    text.setAlignment(TextAlignment.JUSTIFY);

    timelinee = new Timeline(new
KeyFrame(Duration.millis(1), new EventHandler<ActionEvent>() {
        @Override
        public void handle(ActionEvent event) {
            change(text);
        }
    }));
}

```



```

Group root = new Group();

root.getStylesheets().add(getClass().getClassLoader().getResourc
e("buttondesign.css.css").toExternalForm());
primaryStage.setScene(new Scene(root));
primaryStage.setTitle("Puzzle Game");

// load puzzle image
int num0fColumns = (int) (image.getWidth() / 
Piece.SIZE);
int num0fRows = (int) (image.getHeight() / 
Piece.SIZE);

// create desk
final Desk desk = new Desk(num0fColumns, num0fRows);
// create puzzle pieces
final List<Piece> pieces = new ArrayList<Piece>();
for (int col = 0; col < num0fColumns; col++) {
    for (int row = 0; row < num0fRows; row++) {
        int x = col * Piece.SIZE;
        int y = row * Piece.SIZE;
        final Piece piece = new Piece(image, x, y,
desk.getWidth(), desk.getHeight());
        pieces.add(piece);
    }
}
desk.getChildren().addAll(pieces);
// create button box

shuffleButton.setOnAction(new
EventHandler<ActionEvent>() {
    @Override
    public void handle(ActionEvent actionEvent) {
        if (timeline != null)
            timeline.stop();
        timeline = new Timeline();
        for (final Piece piece : pieces) {
            piece.setActive();
            double shuffleX = Math.random() *
(desk.getWidth() - Piece.SIZE + 48f) - 24f - piece.getCorrectX();
            double shuffleY = Math.random() *
(desk.getHeight() - Piece.SIZE + 30f) - 15f - piece.getCorrectY();

            timeline.getKeyFrames()
                .add(new
KeyFrame(Duration.seconds(1),
KeyValue(piece.translateXProperty(), shuffleX),
new
KeyValue(piece.translateYProperty(), shuffleY)));
        }
    }
});

```



```

        timeline.playFromStart();
        timelinee.play();

    })

});

timelinee.setCycleCount(Timeline.INDEFINITE);
timelinee.setAutoReverse(false);
sButton = new Button("Stop");
sButton.setPadding(insets);
shuffleButton.setOnMouseMoved(e->{
    mediaPlayer11.seek(Duration.ZERO);
    mediaPlayer11.play();
});

sButton.setOnMouseMoved(e->{
    mediaPlayer12.seek(Duration.ZERO);
    mediaPlayer12.play();
});

sButton.setOnMouseClicked(e -> {
    HBox pane3 = new HBox(20);
    HBox pane2 = new HBox(20);
    BorderPane H = new BorderPane();
    H.setStyle("-fx-background:beige");
    Button Ba = new Button("Back");
    Ba.setId("yellow1");
    timelinee.pause();
    sButton.setText("Stop");
    Label D = new Label("You Can't finish, Please
complete first");
    D.setFont(Font.font("Comic Sans MS",
FontWeight.MEDIUM, FontPosture.REGULAR, 18));
    H.setPadding(new Insets(30, 40, 40, 40));
    H.setTop(D);
    H.setBottom(Ba);
    Scene d = new Scene(H, 500, 200);

    d.getStylesheets().add(getClass().getClassLoader().getResource
("buttondesin.css.css").toExternalForm()); // for CSS button style

    // For the waiting stage
    if(!(text.getText().equals("Time:      "
+ "00:00:00"))){

        D.setText("You Stopped The Game ");
        primaryStage.close();
        Stage bt = new Stage();
        bt.setScene(d);
        primaryStage.close();
    }
});

```

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```

        bt.show();

        Ba.setOnMouseMoved(el->{
            mediaPlayer13.seek(Duration.ZERO);
            mediaPlayer13.play();
        });

        Ba.setOnMouseClicked(em -> { // back button to
level stage
            bt.close();
            timelinee.play();
            sButton.setText("stop");
            bt.close();
            primaryStage.show();
       });}
    });

Bas.setOnMouseClicked(e -> { // back button to level
stage
    timelinee.stop();
    //timelinee.pause();
    if(!(text.getText().equals("Time:      " +
"00:00:00"))){
paces
        for (final Piece piece : pieces) { // solve the
KeyFrame(Duration.seconds(1),
        new
KeyValue(piece.translateXProperty(),           0),
KeyValue(piece.translateYProperty(), 0));
        }
        timeline.playFromStart();
        mins = 0;
        secs = 0;
        millis = 0;
        text.setText("Time:  " + "00:00:00");
        }
        primaryStage.close();
        st.show();
    });
}

Finish.setOnMouseClicked(e -> { // when finishing the
game
    timelinee.pause();

    boolean b = true;

    for (int i = 0; i < numRows; i++) {
        if (pieces.get(i).checkd() == true) {

```



```

        }

        else {
            b = false;
        }
    }

HBox pane3 = new HBox(20);
pane3.setAlignment(Pos.CENTER);
HBox pane2 = new HBox(20);
pane2.setAlignment(Pos.CENTER);
BorderPane H = new BorderPane();
Button Ba = new Button("Back");
Ba.setId("yellow1");

Text EnterYourName = new Text("Enter Your
Name");
EnterYourName.setFont(Font.font("Comic Sans
MS", FontWeight.MEDIUM, FontPosture.REGULAR, 18));
TextField Name = new TextField("YourName");
Text Con = new Text("Congrats");
Con.setFont(Font.font("Comic Sans MS",
FontWeight.MEDIUM, FontPosture.REGULAR, 20));
Button seeScore = new Button("See all scores");
// return to levels
seeScore.setId("yellow1");
Button Save = new Button("Save your Score"); // save score
Save.setId("yellow1");

Label D = new Label("You Can't finish, Please
complete first");
D.setAlignment(Pos.CENTER);
D.setFont(Font.font("Comic Sans MS",
FontWeight.MEDIUM, FontPosture.REGULAR, 18));
H.setPadding(new Insets(30, 40, 40, 40));
H.setStyle("-fx-background:beige");

if (b && !(text.getText().equals("Time: " +
"00:00:00"))){// check if the game solved

    mediaPlayer.setAutoPlay(true);
    Stage a = new Stage();
    H.setTop(Con);
    H.setAlignment(Con, Pos.TOP_CENTER);

    pane3.getChildren().addAll(EnterYourName, Name);
    pane2.getChildren().addAll(seeScore,
Save);
    H.setCenter(pane3);
    H.setBottom(pane2);
    H.setAlignment(pane3, Pos.CENTER_LEFT);
}

```

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```

H.setAlignment(pane2, Pos.CENTER);

seeScore.setOnMouseClicked(em -> { // back button to level stage
    timelinee.stop();
    text.setText("Time: " + "00:00:00");
    a.setTitle("Puzzle Game");
    a.close();
    st.show();
});

Save.setOnMouseClicked(em -> { // Save your Score

    HighScore.add("+"+text.getText()+"+"+Name.getText()+"\n");

    setHighScore(); // save the score
    Stage confirmationmessage = new Stage(); // to confarm the saving score

    BorderPane messageforsaving = new BorderPane();
    Text messafe = new Text("Your Score is Saved");
    messafe.setFont(Font.font("Comic Sans MS", FontWeight.MEDIUM, FontPosture.REGULAR, 18));
    Button colsingets = new Button("OK"); // bach to Congrats stage
    colsingets.setId("yellow1");

    messageforsaving.setAlignment(colsingets, Pos.CENTER);
    messageforsaving.setCenter(messafe);
    messageforsaving.setStyle("-fx-background:beige");

    messageforsaving.setBottom(colsingets);
    Scene weww = new Scene(messageforsaving, 500, 200);

    weww.getStylesheets().add(getClass().getClassLoader().getResou
rce("buttondesin.css.css").toExternalForm()); // Css button style
    confirmationmessage.setScene(www);
    a.close();
    confirmationmessage.show();
    colsingets.setOnAction(eqqqq -> {

        confirmationmessage.close();
    });
});

```

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```

        a.show();
    });

});

primaryStage.close();
Scene d = new Scene(H, 500, 200);

d.getStylesheets().add(getClass().getClassLoader().getResource
("buttondesin.css.css").toExternalForm());
a.setScene(d);
a.setTitle("Congrats");
a.show();
}

else if (b && text.getText().equals("Time: " +
"00:00:000")) { // if the game deos not start

mediaPlayer.setAutoPlay(false);
D.setText("You Did Not Start Yet!");
D.setFont(Font.font("Comic Sans MS",
FontWeight.MEDIUM, FontPosture.REGULAR, 18));
H.setTop(D);
H.setBottom(Ba);

Scene d1 = new Scene(H, 500, 200);

d1.getStylesheets().add(getClass().getClassLoader().getResource
("buttondesin.css.css").toExternalForm());

primaryStage.close();
Stage bt = new Stage();
bt.setScene(d1);
primaryStage.close();
bt.show();
Ba.setOnMouseClicked(em -> { // back
button to level stage
    bt.close();
    Ba.setId("yellow1");
    primaryStage.show();
});
}

else {
H.setTop(D);
H.setBottom(Ba);
Scene d = new Scene(H, 500, 200);

d.getStylesheets().add(getClass().getClassLoader().getResource(
"buttondesin.css.css").toExternalForm());
primaryStage.close();
Stage bt = new Stage();
bt.setScene(d);
bt.show();
}

```



```

        Ba.setOnMouseClicked(em -> { // back
button to level stage
            bt.close();
            primaryStage.show();
            sButton.setText("start");
            timelinee.play();
        });

    });

rButton = new Button("Reset");
rButton.setPadding(insets);

// Reset Button acts as Shuffle button + makes the
time 00:00:00
rButton.setOnAction(new EventHandler<ActionEvent>()
{
    @Override
    public void handle(ActionEvent actionEvent) {
        if ( !text.getText().equals("Time: " +
"00:00:000")) {
            mins = 0;
            secs = 0;
            millis = 0;
            timeline.pause();
            if (sos == false) {
                timelinee.pause();
                sos = true;
                sButton.setText("Stop");
            }
            text.setText("Time: " + "00:00:000");

            if (timeline != null)
                timeline.stop();
            timeline = new Timeline();
            if (timeline != null)
                timeline.stop();
            timeline = new Timeline();
            for (final Piece piece : pieces) {
                piece.setActive();
                double shuffleX = Math.random() *
(desk.getWidth() - Piece.SIZE + 48f) - 24f - piece.getCorrectX();
                double shuffleY = Math.random() *
(desk.getHeight() - Piece.SIZE + 30f) - 15f - piece.getCorrectY();
                timeline.getKeyFrames()
                    .add(new
KeyFrame(Duration.seconds(1),
KeyValue(piece.translateXProperty(), shuffleX),
new

```



```

new
KeyValue(piece.translateYProperty(), shuffleY));
        }
        timeline.playFromStart();
        timelinee.play();
    }
}
});

shuffleButton.setPadding(insets);
Bas.setPadding(insets);
HBox buttonBox = new HBox(8);
rButton.setId("yellow1");
rButton.setOnMouseMoved(el->{
    mediaPlayer15.seek(Duration.ZERO);
    mediaPlayer15.play();
});

sButton.setId("yellow1");
Bas.setId("yellow1");
Finish.setId("yellow1");
shuffleButton.setId("yellow1");
buttonBox.getChildren().addAll(shuffleButton,
sButton, rButton, Bas, Finish);
buttonBox.setAlignment(Pos.BOTTOM_CENTER);
Finish.setOnMouseMoved(el->{
    mediaPlayer14.seek(Duration.ZERO);
    mediaPlayer14.play();
});
buttonBox.setPadding(insets);
GridPane buttonBox1 = new GridPane();
buttonBox1.add(text, 5, 0);
buttonBox1.setPadding(insets);

pb.setBottom(buttonBox);
pb.setLeft(buttonBox1);
BorderPane vb = new BorderPane();
vb.setTop(text);
text.setFont(Font.font("Comic Sans MS",
FontWeight.MEDIUM, FontPosture.REGULAR, 15));
BorderPane.setAlignment(text, Pos.TOP_CENTER);
vb.setCenter(desk);
vb.setBottom(buttonBox);
root.getChildren().addAll(vb);
}

//Node that represents the playing area/ desktop where
the puzzle pices sit

public static class Desk extends Pane {
    Desk(int numOfColumns, int numOfRows) {

```



```

        setStyle("-fx-background-color: #cccccc; " + "-
fx-border-color: #464646; "
                + "-fx-effect: innershadow( two-
pass-box , rgba(0,0,0,0.8) , 15, 0.0 , 0 , 4 );");
        double DESK_WIDTH = Piece.SIZE * numColumns;
        double DESK_HEIGHT = Piece.SIZE * numRows;
        setPrefSize(DESK_WIDTH, DESK_HEIGHT);
        setMaxSize(DESK_WIDTH, DESK_HEIGHT);
        autosize();
    }

    @Override
    protected void layoutChildren() {
    }
}

// Node that represents a puzzle piece
public static class Piece extends Parent {
    public static final int SIZE = 100;
    public final double correctX;
    public final double correctY;
    public double startDragX;
    public double startDragY;
    public Shape pieceStroke;
    public Shape pieceClip;
    public ImageView imageView = new ImageView();
    public Point2D dragAnchor;

    public Piece(Image image, final double correctX,
final double correctY, final double deskWidth,
final double deskHeight) {
        this.correctX = correctX;
        this.correctY = correctY;

        // configure clip
        pieceClip = createPiece();
        pieceClip.setFill(Color.WHITE);
        pieceClip.setStroke(null);
        // add a stroke
        pieceStroke = createPiece();
        pieceStroke.setFill(null);
        pieceStroke.setStroke(Color.BLACK);
        // create image view
        imageView.setImage(image);
        imageView.setClip(pieceClip);
        setFocusTraversable(true);
        getChildren().addAll(imageView, pieceStroke);
        // turn on caching so the jigsaw piece is fasr
        to draw when dragging
        setCache(true);
        // start in inactive state
        setInactive();
        // add listeners to support dragging
    }
}

```

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```

        setOnMousePressed(new
EventHandler<MouseEvent>() {// when user drag the puzzle pieces
    public void handle(MouseEvent me) {
        toFront();
        startDragX = getTranslateX();
        startDragY = getTranslateY();
        dragAnchor = new
Point2D(me.getSceneX(), me.getSceneY());
    }
});
setOnMouseReleased(e -> { // to check if the
peice on it right position

    if (getTranslateX() < (10) &&
getTranslateX() > (-10) && getTranslateY() < (10)
&& getTranslateY() > (-10)) {
        setTranslateX(0);
        setTranslateY(0);
        setInactive();

    }
});
setOnMouseDragged(e -> {

    double newTranslateX = startDragX +
e.getSceneX() - dragAnchor.getX();
    double newTranslateY = startDragY +
e.getSceneY() - dragAnchor.getY();
    double minTranslateX = -45f - correctX;
    double maxTranslateX = (deskWidth -
Piece.SIZE + 50f) - correctX;
    double minTranslateY = -30f - correctY;
    double maxTranslateY = (deskHeight -
Piece.SIZE + 70f) - correctY;
    if ((newTranslateX > minTranslateX) &&
(newTranslateX < maxTranslateX)
&& (newTranslateY > minTranslateY) &&
(newTranslateY < maxTranslateY)) {
        setTranslateX(newTranslateX);
        setTranslateY(newTranslateY);

    }
});
}

public boolean checkd() { // to check if the game
finshid
    if (getTranslateY() == 0 && getTranslateX() ==
0) {
        return true;
    }
    return false;
}

```

```

private Shape createPiece() {
    Shape shape = createPieceRectangle();
    shape.setTranslateX(correctX);
    shape.setTranslateY(correctY);
    shape.setLayoutX(50f);
    shape.setLayoutY(50f);
    return shape;
}

private Rectangle createPieceRectangle() {
    Rectangle rec = new Rectangle();
    rec.setX(-50);
    rec.setY(-50);
    rec.setWidth(SIZE);
    rec.setHeight(SIZE);
    return rec;
}

public void setActive() { // to allow the pieces to
have an action
    setDisable(false);
    setEffect(new DropShadow());
    toFront();
}

public void setInactive() { // to not allow the pieces
to have an action
    setEffect(null);
    setDisable(true);
    toBack();
}

public double getCorrectX() {
    return correctX;
}

public double getCorrectY() {
    return correctY;
}
}

private BorderPane pane = new BorderPane();
private BorderPane pane1 = new BorderPane();
private BorderPane pane2 = new BorderPane();
private BorderPane pane3 = new BorderPane();
private RadioButton l1s = new RadioButton("Level 1");
private RadioButton l2 = new RadioButton("Level 2");
private RadioButton l3 = new RadioButton("Level 3");
private RadioButton l4 = new RadioButton("Level 4");

```

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```

private RadioButton l5 = new RadioButton("Level 5");
private ToggleGroup group = new ToggleGroup();
private Button letsgo = new Button("Let's Play");
private String simagefilename = "1.jpg";
Stage st = new Stage();

@Override
public void start(Stage primaryStage) throws Exception {

    BorderPane pane = new BorderPane();
    pane.setCenter(layoutpane(st, primaryStage));
    st.setTitle("Puzzle Game ");
    pane.setStyle("-fx-background:mistyrose");
    Scene s = new Scene(pane, 500, 500);

    s.getStylesheets().add(getClass().getClassLoader().getResource
("buttondesign.css.css").toExternalForm());
    st.setScene(s);
    st.show();
    letsgo.setId("yellow2");

    letsgo.setOnMouseMoved(e3 -> {
        mediaPlayer10.seek(Duration.ZERO);
        mediaPlayer10.play();
    });

    letsgo.setOnAction(e3 -> {
        st.close();
        pane.setCenter(layoutpane(st, primaryStage));
        primaryStage.show();
    });
}

public void setCountDown(LocalTime lt) { // stop watch
method
    Platform.runLater(() ->
l1.setText(lt.format(HH_MM_SS)));
}
void change(Text text) {
    if (millis == 1000) {
        secs++;
        millis = 0;
    }
    if (secs == 60) {
        mins++;
        secs = 0;
    }
    text.setText("Time: " + (((mins / 10) == 0) ? "0" :
"") + mins + ":" + (((secs / 10) == 0) ? "0" : "") + secs
}
}

```

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```

        + ":" + (((millis / 10) == 0) ? "00" :
(((millis / 100) == 0) ? "0" : "") ) + millis++);
}

//Welcoming Stage Pane creation.....
public BorderPane layoutpane(Stage prse, Stage
primaryStage) {

    VBox v = new VBox(15);
    Rectangle rcentermovingPane = new Rectangle(30, 30,
100, 100);
    rcentermovingPane.setFill(Color.TRANSPARENT);
    ImageView stbut = new ImageView("ic1.jpg");
    stbut.setFitHeight(40);
    stbut.setFitWidth(40);
    Button b1 = new Button("Start", stbut);
    ImageView scbut = new ImageView("ic2.jpg");
    scbut.setFitHeight(40);
    scbut.setFitWidth(40);
    Button b2 = new Button("Score", scbut);
    ImageView helbut = new ImageView("help.png");
    helbut.setFitHeight(30);
    helbut.setFitWidth(30);
    Button b33 = new Button("Help", helbut);

    ImageView exbut = new ImageView("ic3.png");
    exbut.setFitHeight(40);
    exbut.setFitWidth(40);
    Button b4 = new Button("Exit", exbut);
    v.getChildren().addAll(b1, b2, b33, b4);
    pane.setLeft(v);
    pane.setCenter(rcentermovingPane);

    Button Back = new Button("Back");
    b1.setPrefWidth(200);
    b1.setPrefHeight(5);
    b1.setMinHeight(55);
    b1.setId("yellow");

    b2.setPrefWidth(200);
    b2.setPrefHeight(5);
    b2.setId("yellow");
    b2.setMinHeight(55);

    b33.setPrefWidth(200);
    b33.setPrefHeight(5);
    b33.setId("yellow");
    b33.setMinHeight(55);

    b4.setPrefWidth(200);
    b4.setPrefHeight(5);
    b4.setId("yellow");
}

```

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```
b4.setHeight(55);

v.setAlignment(Pos.CENTER);
v.setPadding(new Insets(70, 40, 20, 65));

pane.setLeft(v);

// for background
Image m = new Image("gg2.png");
BackgroundImage im = new BackgroundImage(m,
BackgroundRepeat.NO_REPEAT, BackgroundRepeat.NO_REPEAT, null,
null);
BackgroundImage im2 = new BackgroundImage(m,
BackgroundRepeat.NO_REPEAT, BackgroundRepeat.NO_REPEAT, null,
null);

Background uh = new Background(im);
pane.setBackground(uh);

Back.setPrefWidth(150);
Back.setPrefHeight(30);
Back.setId("yellow2");

b1.setOnMouseMoved(efirst -> {// start button
    mediaPlayer2.seek(Duration.ZERO);
    mediaPlayer2.play();
});
b1.setOnAction(efirst -> {// start button

    Image m2 = new Image("gg3.jpg");
    BackgroundImage im22 = new BackgroundImage(m2,
BackgroundRepeat.NO_REPEAT, BackgroundRepeat.NO_REPEAT, null,
new BackgroundSize(prse.getWidth(),
prse.getHeight(), true, true, true, true));
    Background uh11 = new Background(im22);
    pane.setBackground(uh11);

    VBox v1 = new VBox();
    Label lchoose = new Label("Choose your level");
    lchoose.setFont(Font.font("Comic Sans MS",
FontWeight.MEDIUM, FontPosture.REGULAR, 14));
    panel1.setTop(v1);
    panel1.setPadding(new Insets(30, 10, 30, 30));

    HBox h = new HBox(50);
    h.getChildren().addAll(Back, letsGo);
    h.setAlignment(Pos.BOTTOM_CENTER);

    v1.getChildren().addAll(lchoose,
comingpane(primaryStage));
}
```



```

        pane.setCenter(pane1);
        pane1.setBottom(h);

        Back.setOnAction(e1 -> {
            pane.setLeft(v);
            pane.setCenter(rcentermovingPane);
            pane.setBackground(uh);
        });
    });

b33.setOnMouseMoved(e->{ // help button

    mediaPlayer3.seek(Duration.ZERO);
    mediaPlayer3.play();

});

b33.setOnAction(er -> { // help button
    pane.getChildren().clear();
    VBox v1 = new VBox();

    Text lr1 = new Text("How to Play:");
    lr1.setFont(Font.font("Comic Sans MS",
    FontWeight.BOLD, FontPosture.ITALIC, 20));
    Text lr2 = new Text(" 1.Press start button. \n
2.Choose the level that you want to play.\n 3.Press shuffle to
start playing.\n 4.Move the tiles to recreate the image by
dragging tiles adjacent\n to blanks.\n 5.Press stop button if you
want to stop the puzzle for a while.\n 6.Press finish button when
you finish playing\n 7.save youre score. \n 8.press score see
your score. ");
    Text lr3 = new Text("\nFeatures:");
    lr3.setFont(Font.font("Comic Sans MS",
    FontWeight.BOLD, FontPosture.ITALIC, 18));
    Text lr4 = new Text(" 1- Five increasing
difficulty levels. \n 2- Time Counting."+"\n\n Puzzle Game
Developers:\n Eng.Rose Al-Aslani - Eng.Sereen Bahadad- Eng.Maram
Al-Sofiani \n Eng.Dania Bajaba- Eng.Lama Al-Shohaib "+ "\n\n For
any suggestions contact us at : puzzlegamet@gmail.com");
    lr2.setFont(Font.font("Comic Sans MS",
    FontWeight.MEDIUM, FontPosture.REGULAR, 11.5));
    lr4.setFont(Font.font("Comic Sans MS",
    FontWeight.MEDIUM, FontPosture.REGULAR, 12));
    Image m2 = new Image("gg3.jpg");
    BackgroundImage im22 = new BackgroundImage(m2,
    BackgroundRepeat.NO_REPEAT, BackgroundRepeat.NO_REPEAT, null,
    new BackgroundSize(pane.getWidth(),
    pane.getHeight(), false, false, false, false));
    Background uh11 = new Background(im22);
    pane.setBackground(uh11);
}

```



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```
pane2.setTop(v1);
HBox h = new HBox();
h.getChildren().addAll(Back);

v1.getChildren().addAll(lr1, lr2, lr3, lr4);
h.setSpacing(180);
pane.setCenter(pane2);
pane2.setBottom(h);
v1.setPadding(new Insets(0, 0, 0, 3));
pane2.setPadding(new Insets(50, 20, 15, 40));

Back.setOnAction(e1 -> {

    pane.setLeft(v);
    pane.setCenter(rcentermovingPane);
    pane.setBackground(uh);
});

b2.setOnMouseMoved(efirst -> { // score button
    mediaPlayer4.seek(Duration.ZERO);
    mediaPlayer4.play();
});

b2.setOnAction(e -> {// score button
    Text lr4e = new Text();
    lr4e.setFont(Font.font("-fx-font-family: 'Fleftex'", FontWeight.BOLD, FontPosture.ITALIC, 20));
    TextArea a = new TextArea("\n Players\n scores:\n\n"+getFileType());
    a.setFont(Font.font("-fx-font-family: 'Fleftex'", FontWeight.BOLD, FontPosture.REGULAR, 15));
    a.setStyle("-fx-TextAlignment:JUSTIFY;");
    Text th= new Text (" The Highest Score:");
    Text th1= new Text (getHighScore());
    StackPane sp = new StackPane();
    th.setFill(Color.DARKRED);
    Rectangle r = new Rectangle(50,50);
    th1.setFont(Font.font("-fx-font-family: 'Fleftex'", FontWeight.BOLD, FontPosture.ITALIC, 12));
    th1.setFont(Font.font("-fx-font-family: 'Fleftex'", FontWeight.BOLD, FontPosture.ITALIC, 15));
    VBox vo = new VBox();
    vo.setAlignment(Pos.CENTER);

    ImageView cc= new ImageView("bbn.PNG");
    cc.setFitWidth(80);
    cc.setFitHeight(50);
    vo.getChildren().addAll(cc,th,th1);

    pane3.setTop(vo);
}

pane3.setTop(vo);
```



```

pane3.setPadding(new Insets(1, 10, 10, 10));
BorderPane.setAlignment(sp, Pos.TOP_CENTER);
a.setWrapText(true);

a.getScrollLeft();
a.setVisible(true);
a.setEditable(false);
a.setPrefHeight(200);
a.setPrefWidth(250);
Image m2 = new Image("gg3.jpg");
BackgroundImage im22 = new BackgroundImage(m2,
BackgroundRepeat.NO_REPEAT, BackgroundRepeat.NO_REPEAT, null,
new BackgroundSize(pane.getWidth(),
pane.getHeight(), false, false, false, false));
Background uh11 = new Background(im22);
pane.setBackground(uh11);
pane3.setTop(vo);

pane3.setBottom(Back);

pane3.setCenter(a);
pane3.setPadding(new Insets(50,50,25,50));
pane.setCenter(pane3);

pane.getChildren().remove(v);

Back.setOnMouseMoved(e1->{

    mediaPlayer8.seek(Duration.ZERO);
    mediaPlayer8.play();


});

Back.setOnAction(e1 -> { // back to main stage

    pane.setLeft(v);
    pane.setCenter(rcentermovingPane);
    pane.setBackground(uh);
});

});

b4.setOnMouseMoved(e -> { // exit button

    mediaPlayer9.seek(Duration.ZERO);
    mediaPlayer9.play();


});

b4.setOnAction(e -> {
    prse.close();
}

```

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```

        });

        return pane;
    }

//Play button Pane.....

public HBox comingpane(Stage primaryStage) { // creating
level pane

    pane.setPadding(new Insets(30, 30, 30, 30));
    HBox paneForridobutton = new HBox(15);

    paneForridobutton.setAlignment(Pos.BASELINE_CENTER);
    paneForridobutton.getChildren().addAll(l1s, l2, l3,
l4, l5);
    pane.setLeft(paneForridobutton);

    l1s.setFont(Font.font("Comic Sans MS", FontWeight.MEDIUM, FontPosture.REGULAR, 12));
    l2.setFont(Font.font("Comic Sans MS", FontWeight.MEDIUM, FontPosture.REGULAR, 12));
    l3.setFont(Font.font("Comic Sans MS", FontWeight.MEDIUM, FontPosture.REGULAR, 12));
    l4.setFont(Font.font("Comic Sans MS", FontWeight.MEDIUM, FontPosture.REGULAR, 12));
    l5.setFont(Font.font("Comic Sans MS", FontWeight.MEDIUM, FontPosture.REGULAR, 12));

    l1s.setToggleGroup(group);
    group.selectToggle(l1s);
    l2.setToggleGroup(group);
    l3.setToggleGroup(group);
    l4.setToggleGroup(group);
    l5.setToggleGroup(group);

    if (l1s.isSelected()) { // to initialize default
selection
        Image image = new Image("1.jpg");
        ImageView vi = new ImageView(image);
        start(primaryStage, image);

        vi.fitWidthProperty().bind(panel1.widthProperty().divide(1.75))
;

        vi.fitHeightProperty().bind(panel1.heightProperty().divide(1.75
));
        panel1.setCenter(vi);
    }
    l1s.setOnAction(e4 -> {
        if (l1s.isSelected()) {
            Image image = new Image("1.jpg");

```



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```
ImageView vi = new ImageView(image);
start(primaryStage, image);

vi.fitWidthProperty().bind(pane1.widthProperty().divide(1.75))
;

vi.fitHeightProperty().bind(pane1.heightProperty().divide(1.75));
    pane1.setCenter(vi);
}
};

l2.setOnAction(e5 -> {
    if (l2.isSelected()) {
        Image image = new Image("2.jpg");
        ImageView vi = new ImageView(image);
        start(primaryStage, image);

        vi.fitWidthProperty().bind(pane1.widthProperty().divide(1.75))
    ;

        vi.fitHeightProperty().bind(pane1.heightProperty().divide(1.75));
            pane1.setCenter(vi);
    }
};

l3.setOnAction(e6 -> {
    if (l3.isSelected()) {
        Image image = new Image("3.jpg");
        ImageView vi = new ImageView(image);
        start(primaryStage, image);

        vi.fitWidthProperty().bind(pane1.widthProperty().divide(1.75))
    ;

        vi.fitHeightProperty().bind(pane1.heightProperty().divide(1.75));
            pane1.setCenter(vi);
    }
};

l4.setOnAction(e7 -> {
    if (l4.isSelected()) {
        simagefilename = "4.jpg";
        Image image = new Image(simagefilename);
        ImageView vi = new ImageView(simagefilename);

        vi.fitWidthProperty().bind(pane1.widthProperty().divide(1.75))
    ;

        vi.fitHeightProperty().bind(pane1.heightProperty().divide(1.75));
    }
});
```



```
        start(primaryStage, image);

        pane1.setCenter(vi);

    }

});
```

l5.setOnAction(e8 -> {
 if (l5.isSelected()) {
 Image image = new Image("5.jpg", 1200,
670, false, false);
 ImageView vi = new ImageView("5.jpg");

 vi.fitWidthProperty().bind(pane1.widthProperty().divide(1.75))
;

 vi.fitHeightProperty().bind(pane1.heightProperty().divide(1.75))
);
 ;
 start(primaryStage, image);
 pane1.setCenter(vi);
 }
});
return paneForridobutton;
}
}

4- ScreenShot of the GUI Output and Explain the results:

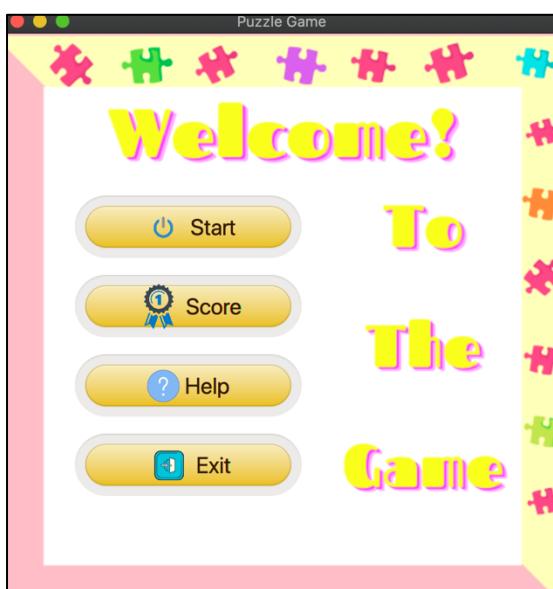


Figure 2: The main stage each button take the player to another stage.

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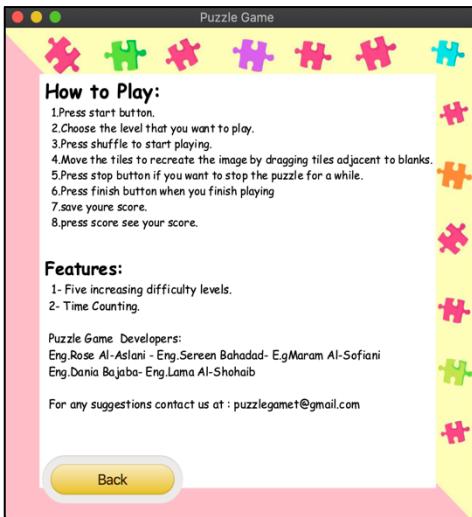


Figure 4: Inside the help button, the back button pressed to return back to the menu.

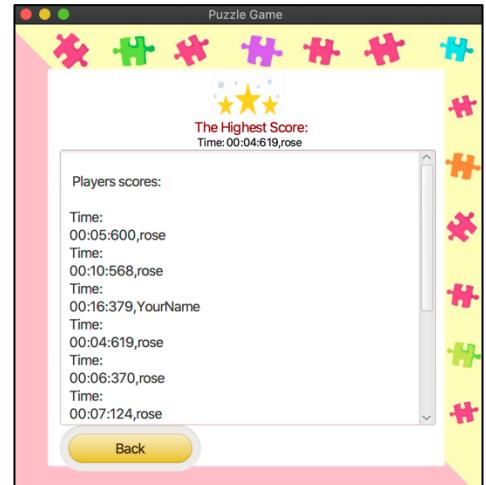


Figure 3: Inside the score button, all the players name and time took them to finish the game along with the highest score the game ever reordered, the back button pressed to return to the menu.

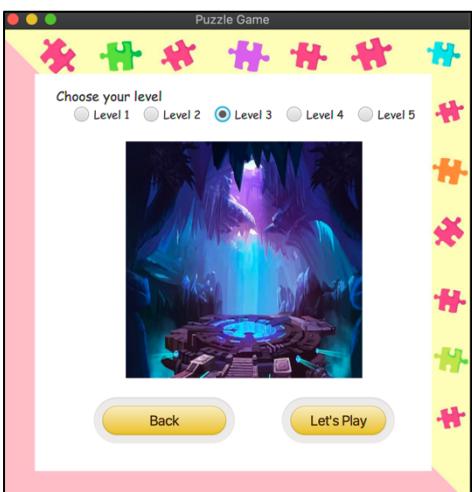


Figure 6: Inside the start button, let's play is pressed after choosing the level to go to the play stage.

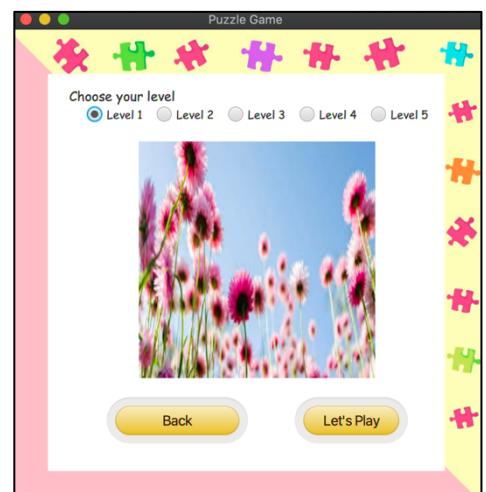


Figure 5: The default level was the first level, whenever the radio button is selected the level picture will be displayed, the back button used to return back to the menu.

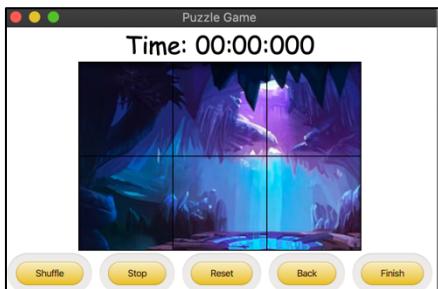


Figure 7: The game play stage, shuffle button to shuffle the pieces and start the game, stop/restart , back to the main stage, finish when the player finishes the game.



Figure 8: After finishing the game, the saving score stage will be shown. See all scores button to return back to the main stage. Save your score to save the player score and name.



5- Conclusion

In the end of this project the team had a better understanding in javaFX by applying the knowledge gained in Java “EE364” course in designing a puzzle game. This project also provided an opportunity to explore the features of JavaFX in designing games which offers a higher-level approach by coding. The team faced a few difficulties in getting the highest score and applying the memory path, both problems were solved until team members came up with the code shown throughout the report.

6- References:

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