AIN-SHAMS UNIVERCITY

FACULTY OF ENGINEERING

CSE 437: MOBILE COMPUTING

Matching Game

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Submitted to:

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INTRODUCTION

A simple matching game application that allow user match the hidden photos based on his memory, the application also play the name of the animal whenever it appears and there is a timer attached above which helps to calculate the user score.

Before you play a new game, you can check the highest score from the high score button found in the main page. Finally, you can exit the game from main page.

When you finish and your score is displayed, you have 2 options either to go back or to restart a new game.

You must wait half a second before you click on another button in order to make the animal name sound finish.

Photos are got from *https://commons.wikimedia.org/*
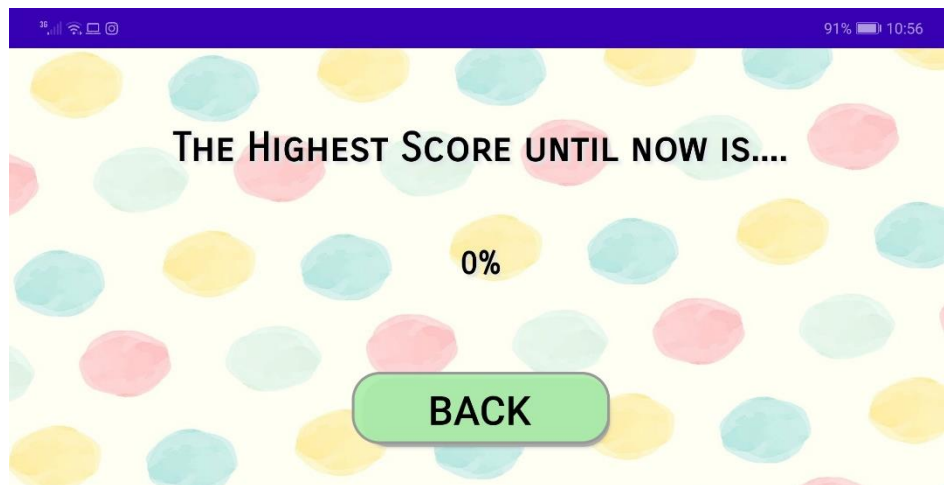
SCREENSHOTS

App starts with this activity showing the design, game title and 3 buttons new game, high score, and exit.

Sequence of Game

Starting with text view with game name and 3 buttons

1. User wants to check highest score till now.
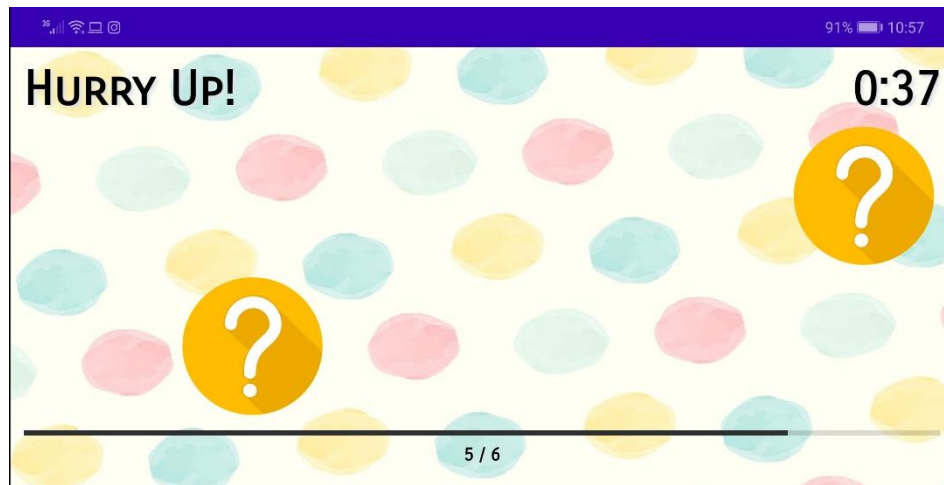

2. User starts new game.
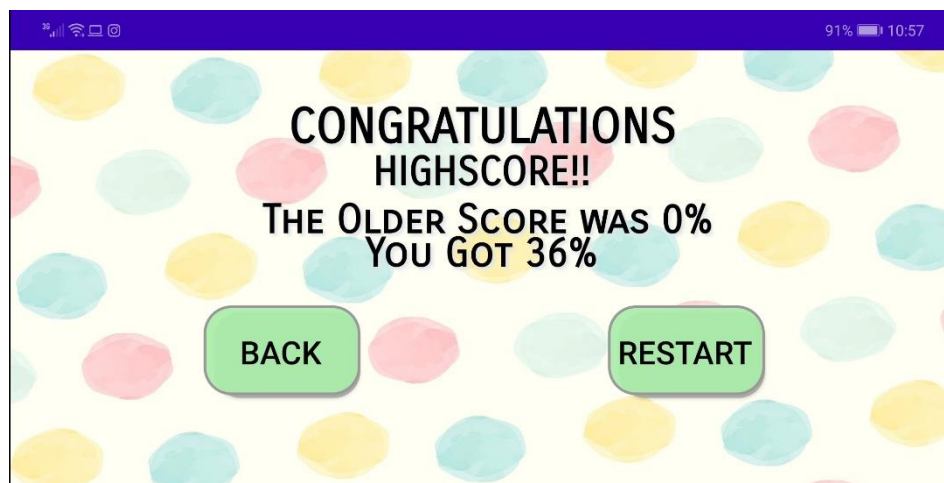

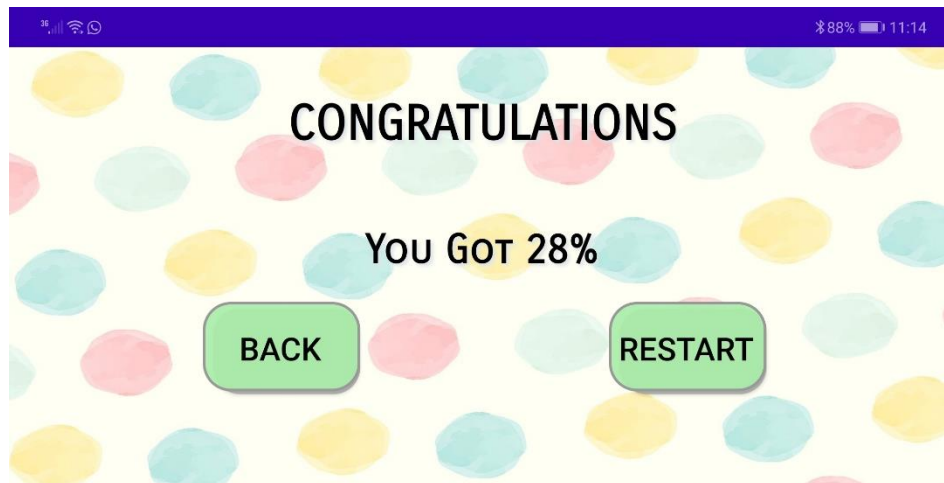3. User choose 2 photos not alike.

4. User chooses 2 alike photos.

5. User ends Game.

6. Score displayed at the end whit extra message if user got high score or without it.

7. Played another game and scored less score.

8. User clicks back.

9. User checks high score now.

10. User clicks back and exit game.

CODES

Code contains commented part for a convert button was used before the user interaction is minimized and the value is updated automatically.

String.xml

```xml
<resources>
    <string name="app_name">Matching Game</string>
    <string name="intro">MEMORY GAME!!</string>
    <string name="newGame">New Game</string>
    <string name="showHigh">High Score</string>
    <string name="exit">Exit Game</string>

    <string name="highScore">The Highest Score until now is....</string>
    <string name="backBtn">Back</string>

    <string name="topTxt">Hurry Up!</string>
    <string name="time">...</string>

    <string name="congrats">CONGRATULATIONS</string>
    <string name="msg">You scored </string>
    <string name="ifHighScore">HIGH SCORE!!</string>
    <string name="restart">Restart</string>

</resources>
```

Style.xml

```xml
<resources>
    <!-- Base application theme. -->
    <style name="AppTheme" parent="Theme.AppCompat.Light.NoActionBar">
        <!-- Customize your theme here. -->
        <item name="colorPrimary">@color/colorPrimary</item>
        <item name="colorPrimaryDark">@color/colorPrimaryDark</item>
        <item name="colorAccent">@color/colorAccent</item>
        <item name="android:splitMotionEvents">false</item>
        <item name="android:windowEnableSplitTouch">false</item>
    </style>

</resources>
```

activity_Game.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="@drawable/app1"
    tools:context=".Game">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_marginStart="10dp"
        android:layout_marginTop="10dp"
        android:layout_marginEnd="10dp"
        android:layout_marginBottom="10dp"
        android:orientation="vertical"
        android:textAlignment="center"
        android:weightSum="6"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent">

        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="0dp"
            android:layout_weight="0.7"
            android:orientation="horizontal"
            android:textAlignment="gravity">

            <TextView
                android:id="@+id/welcomTxt"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:fontFamily="sans-serif-smallcaps"
                android:outlineAmbientShadowColor="#EEAAEEAA"
                android:outlineSpotShadowColor="#EEAAEEAA"
                android:shadowColor="#DFE5EA"
                android:shadowDx="6"
                android:shadowDy="6"
                android:shadowRadius="6"
                android:text="@string/topTxt"
                android:textAlignment="center"
                android:textColor="#000000"
                android:textSize="36sp"
                android:textStyle="bold" />

            <TextView
                android:id="@+id/time"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:layout_weight="1"
                android:fontFamily="sans-serif-smallcaps"
                android:foregroundGravity="fill_horizontal"
                android:outlineAmbientShadowColor="#EEAAEEAA"
                android:outlineSpotShadowColor="#EEAAEEAA"
                android:shadowColor="#DFE5EA"
                android:shadowDx="6"
                android:shadowDy="6"
                android:shadowRadius="6"
                android:text="@string/time"
```

```xml
                    android:textAlignment="viewEnd"
                    android:textColor="#000000"
                    android:textSize="36sp"
                    android:textStyle="bold" />
        </LinearLayout>

        <TableLayout
            android:id="@+id/table"
            android:layout_width="match_parent"
            android:layout_height="0dp"
            android:layout_marginTop="10dp"
            android:layout_weight="4.5"
            android:gravity="center">

            <TableRow
                android:layout_width="match_parent"
                android:layout_height="0dp"
                android:layout_weight="1"
                android:gravity="center">

                <LinearLayout
                    android:layout_width="0dp"
                    android:layout_height="match_parent"
                    android:layout_weight="1"
                    android:orientation="vertical">

                    <Button
                        android:id="@+id/b1"
                        android:layout_width="wrap_content"
                        android:layout_height="wrap_content"
                        android:background="@drawable/placeholder" />
                </LinearLayout>

                <LinearLayout
                    android:layout_width="0dp"
                    android:layout_height="match_parent"
                    android:layout_weight="1"
                    android:orientation="vertical">

                    <Button
                        android:id="@+id/b2"
                        android:layout_width="wrap_content"
                        android:layout_height="wrap_content"
                        android:background="@drawable/placeholder" />
                </LinearLayout>

                <LinearLayout
                    android:layout_width="0dp"
                    android:layout_height="match_parent"
                    android:layout_weight="1"
                    android:orientation="vertical">

                    <Button
                        android:id="@+id/b3"
                        android:layout_width="wrap_content"
                        android:layout_height="wrap_content"
                        android:background="@drawable/placeholder" />
                </LinearLayout>

                <LinearLayout
                    android:layout_width="0dp"
                    android:layout_height="match_parent"
                    android:layout_weight="1"
                    android:orientation="vertical">
```

```xml
            <Button
                android:id="@+id/b4"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:background="@drawable/placeholder" />
        </LinearLayout>

        <LinearLayout
            android:layout_width="0dp"
            android:layout_height="match_parent"
            android:layout_weight="1"
            android:orientation="vertical">

            <Button
                android:id="@+id/b5"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:background="@drawable/placeholder" />
        </LinearLayout>

        <LinearLayout
            android:layout_width="0dp"
            android:layout_height="match_parent"
            android:layout_weight="1"
            android:orientation="vertical">

            <Button
                android:id="@+id/b6"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:background="@drawable/placeholder" />
        </LinearLayout>
    </TableRow>

    <TableRow
        android:layout_width="match_parent"
        android:layout_height="0dp"
        android:layout_weight="1"
        android:gravity="center">

        <LinearLayout
            android:layout_width="0dp"
            android:layout_height="match_parent"
            android:layout_weight="1"
            android:orientation="vertical">

            <Button
                android:id="@+id/b7"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:background="@drawable/placeholder" />
        </LinearLayout>

        <LinearLayout
            android:layout_width="0dp"
            android:layout_height="match_parent"
            android:layout_weight="1"
            android:orientation="vertical">

            <Button
                android:id="@+id/b8"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:background="@drawable/placeholder" />
        </LinearLayout>
```

```xml
        <LinearLayout
            android:layout_width="0dp"
            android:layout_height="match_parent"
            android:layout_weight="1"
            android:orientation="vertical">

            <Button
                android:id="@+id/b9"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:background="@drawable/placeholder" />
        </LinearLayout>

        <LinearLayout
            android:layout_width="0dp"
            android:layout_height="match_parent"
            android:layout_weight="1"
            android:orientation="vertical">

            <Button
                android:id="@+id/b10"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:background="@drawable/placeholder" />
        </LinearLayout>

        <LinearLayout
            android:layout_width="0dp"
            android:layout_height="match_parent"
            android:layout_weight="1"
            android:orientation="vertical">

            <Button
                android:id="@+id/b11"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:background="@drawable/placeholder" />
        </LinearLayout>

        <LinearLayout
            android:layout_width="0dp"
            android:layout_height="match_parent"
            android:layout_weight="1"
            android:orientation="vertical">

            <Button
                android:id="@+id/b12"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:background="@drawable/placeholder" />
        </LinearLayout>
    </TableRow>

</TableLayout>

<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="0dp"
    android:layout_weight="0.7"
    android:gravity="center"
    android:orientation="vertical">

    <ProgressBar
        android:id="@+id/progressBar"
```

```
style="@android:style/Widget.DeviceDefault.Light.ProgressBar.Horizontal"
                android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:max="6"
                android:progress="0"
                android:progressTint="#2D2F31" />

        <TextView
            android:id="@+id/scoretxt"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:fontFamily="sans-serif-smallcaps"
            android:outlineAmbientShadowColor="#EEAAEEAA"
            android:outlineSpotShadowColor="#EEAAEEAA"
            android:shadowColor="#DFE5EA"
            android:shadowDx="6"
            android:shadowDy="6"
            android:shadowRadius="6"
            android:text="0 / 6"
            android:textAlignment="center"
            android:textColor="#000000"
            android:textSize="14sp"
            android:textStyle="bold" />

    </LinearLayout>

</LinearLayout>

</androidx.constraintlayout.widget.ConstraintLayout>
```

activity_high_score.xml

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:background="@drawable/app1"

    android:layout_height="match_parent"
    tools:context=".HighScore">

    <TextView
        android:id="@+id/placeHolder"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:fontFamily="sans-serif-smallcaps"
        android:outlineAmbientShadowColor="#EEAAEEAA"
        android:outlineSpotShadowColor="#EEAAEEAA"
        android:shadowColor="#DFE5EA"
        android:shadowDx="6"
        android:shadowDy="6"
        android:shadowRadius="6"
        android:text="@string/highScore"
        android:textAlignment="center"
        android:textColor="#000000"
        android:textSize="30sp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.498"
```

```
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toTopOf="parent"
            app:layout_constraintVertical_bias="0.194" />

        <TextView
            android:id="@+id/highScorePlace"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:fontFamily="sans-serif-smallcaps"
            android:outlineAmbientShadowColor="#EEAAEEAA"
            android:outlineSpotShadowColor="#EEAAEEAA"
            android:shadowColor="#DFE5EA"
            android:shadowDx="6"
            android:shadowDy="6"
            android:shadowRadius="6"
            android:textColor="#000000"
            android:textSize="24sp"
            android:textStyle="bold"
            app:layout_constraintBottom_toBottomOf="parent"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toBottomOf="@+id/placeHolder"
            app:layout_constraintVertical_bias="0.258" />

        <Button
            android:id="@+id/backBtn"
            android:layout_width="196dp"
            android:layout_height="56dp"
            android:layout_marginHorizontal="30dp"
            android:layout_marginTop="140dp"
            android:background="@drawable/shape"
            android:text="@string/backBtn"
            android:textColor="#000000"
            android:textSize="30sp"
            app:layout_constraintBottom_toBottomOf="parent"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintHorizontal_bias="0.499"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toBottomOf="@+id/placeHolder"
            app:layout_constraintVertical_bias="0.228" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

activity_high_score_after_game.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:background="@drawable/app1"
    android:layout_height="match_parent"
    tools:context=".HighScoreAfterGame">

    <TextView
        android:id="@+id/congrats"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:fontFamily="sans-serif-smallcaps"
        android:outlineAmbientShadowColor="#EEAAEEAA"
        android:outlineSpotShadowColor="#EEAAEEAA"
        android:shadowColor="#DFE5EA"
        android:shadowDx="6"
        android:shadowDy="6"
        android:shadowRadius="6"
        android:text="@string/congrats"
        android:textColor="#000000"
        android:textSize="36sp"
        android:textStyle="bold"
        app:layout_constraintBottom_toTopOf="@+id/PlayerScorePlaceHolder"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.398" />

    <TextView
        android:id="@+id/PlayerScorePlaceHolder"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:fontFamily="sans-serif-smallcaps"
        android:outlineAmbientShadowColor="#EEAAEEAA"
        android:outlineSpotShadowColor="#EEAAEEAA"
        android:shadowColor="#DFE5EA"
        android:shadowDx="6"
        android:shadowDy="6"
        android:shadowRadius="6"
        android:textColor="#000000"
        android:textSize="30sp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.499"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.456" />

    <TextView
        android:id="@+id/ifHighScore"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:fontFamily="sans-serif-smallcaps"
        android:outlineAmbientShadowColor="#EEAAEEAA"
        android:outlineSpotShadowColor="#EEAAEEAA"
        android:shadowColor="#DFE5EA"
        android:shadowDx="6"
        android:shadowDy="6"
        android:shadowRadius="6"
```

```xml
            android:textAlignment="center"
            android:textColor="#000000"
            android:textSize="30sp"
            android:textStyle="bold"
            app:layout_constraintBottom_toTopOf="@+id/PlayerScorePlaceHolder"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintHorizontal_bias="0.499"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toBottomOf="@+id/congrats"
            app:layout_constraintVertical_bias="0.349" />

    <Button
            android:id="@+id/backBtn"
            android:layout_width="120dp"
            android:layout_height="69dp"
            android:background="@drawable/shape"
            android:text="@string/backBtn"
            android:textColor="#000000"
            android:textSize="24sp"
            app:layout_constraintBottom_toBottomOf="parent"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintHorizontal_bias="0.243"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toTopOf="parent"
            app:layout_constraintVertical_bias="0.73" />

    <Button
            android:id="@+id/restartBtn"
            android:layout_width="120dp"
            android:layout_height="69dp"
            android:background="@drawable/shape"
            android:text="@string/restart"
            android:textColor="#000000"
            android:textSize="24sp"
            app:layout_constraintBottom_toBottomOf="parent"
            app:layout_constraintEnd_toEndOf="parent"
            app:layout_constraintHorizontal_bias="0.759"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintTop_toTopOf="parent"
            app:layout_constraintVertical_bias="0.73" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

activity_main.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="@drawable/app1"
    android:outlineAmbientShadowColor="#3C3F41"
    android:outlineSpotShadowColor="#000000"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/welcomeTxt"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:fontFamily="sans-serif-smallcaps"
        android:outlineAmbientShadowColor="#EEAAEEAA"
        android:outlineSpotShadowColor="#EEAAEEAA"
        android:shadowColor="#DFE5EA"
        android:shadowDx="6"
        android:shadowDy="6"
        android:shadowRadius="6"
        android:text="@string/intro"
        android:textColor="#000000"
        android:textSize="48sp"
        android:textStyle="bold"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintLeft_toLeftOf="parent"
        app:layout_constraintRight_toRightOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.073" />

    <LinearLayout
        android:layout_width="0dp"
        android:layout_height="0dp"
        android:layout_marginBottom="20dp"
        android:gravity="clip_vertical|center_horizontal"
        android:orientation="vertical"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/welcomeTxt">

        <Button
            android:id="@+id/newGameBtn"
            android:layout_width="196dp"
            android:layout_height="0dp"
            android:layout_marginHorizontal="30dp"
            android:layout_marginTop="15dp"
            android:layout_weight="1"
            android:background="@drawable/shape"
            android:text="@string/newGame"
            android:textColor="#000000"
            android:textSize="30sp" />

        <Button
            android:id="@+id/highScoreBtn"
            android:layout_width="196dp"
            android:layout_height="0dp"
            android:layout_marginHorizontal="30dp"
            android:layout_marginTop="15dp"
            android:layout_weight="1"
```

```xml
            android:background="@drawable/shape"
            android:text="@string/showHigh"
            android:textSize="30sp" />

        <Button
            android:id="@+id/exitBtn"
            android:layout_width="196dp"
            android:layout_height="0dp"
            android:layout_marginHorizontal="30dp"
            android:layout_marginTop="15dp"
            android:layout_weight="1"
            android:background="@drawable/shape"
            android:text="@string/exit"
            android:textSize="30sp" />

    </LinearLayout>

</androidx.constraintlayout.widget.ConstraintLayout>
```

Game.java

```java
// Abdelrahman Amr Issawi
// 16P6001
// Photos are got from https://commons.wikimedia.org/
// Version 5.2

package com.example.matchinggame;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.media.Image;
import android.media.MediaPlayer;
import android.os.AsyncTask;
import android.os.Bundle;
import android.os.Handler;
import android.util.Log;
import android.view.View;
import android.view.WindowManager;
import android.widget.Button;
import android.widget.ProgressBar;
import android.widget.TableLayout;
import android.widget.TextView;

import java.io.IOException;
import java.util.ArrayList;
import java.util.Collections;
import java.util.List;
import java.util.Timer;
import java.util.TimerTask;

import com.example.matchinggame.R.drawable.*;
enum state
{
    zero, one, two;
}


public class Game extends AppCompatActivity{
    Button[] btns = new Button[12];
    //int click = 0;
    int score = 0;
    boolean exceed = false;
    int lastClick = -1;
    public int seconds = 0;
    public int minutes = 0;
    Timer t;
    ProgressBar pgsBar;
    Intent scoreIntent;
    boolean started = false;
    TableLayout table;
    MediaPlayer kbSound;
    state s = state.zero;


    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_game);

        final TextView scoreLbl = findViewById(R.id.scoretxt);
        pgsBar = findViewById(R.id.progressBar);
        final List<Integer> images = new ArrayList<>();
        scoreIntent = new Intent(Game.this, HighScoreAfterGame.class);
```

```java
        table = findViewById(R.id.table);

        images.add(R.drawable.camel);
        images.add(R.drawable.coala);
        images.add(R.drawable.fox);
        images.add(R.drawable.Lion);
        images.add(R.drawable.monkey);
        images.add(R.drawable.wolf);
        images.add(R.drawable.camel);
        images.add(R.drawable.coala);
        images.add(R.drawable.fox);
        images.add(R.drawable.Lion);
        images.add(R.drawable.monkey);
        images.add(R.drawable.wolf);

        btns[0] = findViewById(R.id.b1);
        btns[1] = findViewById(R.id.b2);
        btns[2] = findViewById(R.id.b3);
        btns[3] = findViewById(R.id.b4);
        btns[4] = findViewById(R.id.b5);
        btns[5] = findViewById(R.id.b6);
        btns[6] = findViewById(R.id.b7);
        btns[7] = findViewById(R.id.b8);
        btns[8] = findViewById(R.id.b9);
        btns[9] = findViewById(R.id.b10);
        btns[10] = findViewById(R.id.b11);
        btns[11] = findViewById(R.id.b12);
        Collections.shuffle(images);

        //Declare the timer
        t = new Timer();
        //Set the schedule function and rate
        t.scheduleAtFixedRate(new TimerTask() {
            @Override
            public void run() {
                runOnUiThread(new Runnable() {
                    @Override
                    public void run() {
                        TextView timeLbl = findViewById(R.id.time);

timeLbl.setText(String.valueOf(minutes)+":"+String.valueOf(seconds));
                        seconds += 1;
                        if(seconds == 60)
                        {

timeLbl.setText(String.valueOf(minutes)+":"+String.valueOf(seconds));
                            seconds=0;
                            minutes=minutes+1;
                        }
                    }
                });
            }
        }, 0, 1000);

        // handle game
        for (int i = 0; i < btns.length ; i++) {
            btns[i].setText("back");
            btns[i].setTextSize(0.0F);
            final int tmp = i; //instead of declaring i as final
            btns[i].setOnClickListener(new View.OnClickListener() {
                @Override
                public void onClick(final View v) {

                    // Closing UI interaction
```

```java
getWindow().setFlags(WindowManager.LayoutParams.FLAG_NOT_TOUCHABLE,
WindowManager.LayoutParams.FLAG_NOT_TOUCHABLE);

                    //Handle touching un opened cards
                    if (btns[tmp].getText().equals("back") && !exceed && (s ==
state.zero || s == state.one)) {
                        btns[tmp].setBackgroundResource(images.get(tmp));
//replace photo
                        btns[tmp].setText(images.get(tmp)); //update text

                        //Log.d("TestError", "tmp = " + tmp + " Exceed = " +
exceed + " state = " + s);
                        if (s == state.zero) {
                            lastClick = tmp;
                            s = state.one;
                        }
                        else if (s == state.one) {
                            s = state.two;
                            exceed = true;
                        }
                        //play sound
                        if(kbSound!=null){
                            if(kbSound.isPlaying()) {
                                kbSound.stop();
                                kbSound.release();
                            }
                        }
                        playTheSound(v, images.get(tmp).toString());
                        kbSound.setOnCompletionListener(new
MediaPlayer.OnCompletionListener() {
                            @Override
                            public void onCompletion(MediaPlayer mp) {
                                kbSound.reset();
                            }
                        });

                        //Open UI after 700 ms
                        Handler handlerSound = new Handler();
                        handlerSound.postDelayed(new Runnable() {
                            public void run() {
getWindow().clearFlags(WindowManager.LayoutParams.FLAG_NOT_TOUCHABLE);
                            }
                        }, 500);

                    } else if (!btns[tmp].getText().equals("back") && !(s ==
state.zero)) { //Handle opened cards
                        btns[tmp].setBackgroundResource(R.drawable.placeholder);
                        btns[tmp].setText("back");
                        lastClick = -1;
                        if (exceed) {
                            exceed = false;
                        }

                        if (s == state.one) {
                            s = state.zero;
                        }
                        else if (s == state.two) {
                            s = state.one;
                        }
                        Handler handler0 = new Handler();
                        handler0.postDelayed(new Runnable() {
                            public void run() {
getWindow().clearFlags(WindowManager.LayoutParams.FLAG_NOT_TOUCHABLE);
```

```java
                            }
                        }, 500);

                    }

                    //Handle when 2 cards are opened
                    if (s == state.two) {
                        exceed = true;
                        if (btns[tmp].getText().equals(btns[lastClick].getText()))
{

//getWindow().setFlags(WindowManager.LayoutParams.FLAG_NOT_TOUCHABLE,
WindowManager.LayoutParams.FLAG_NOT_TOUCHABLE);
                            final int tmp1 = tmp;
                            final int tmp2 = lastClick;

                            score++;
                            pgsBar.setProgress(score);
                            scoreLbl.setText(score + " / 6");

                            btns[tmp].setEnabled(false);
                            btns[lastClick].setEnabled(false);

                            s = state.zero;
                            lastClick = -1;

                            Handler handler2 = new Handler();
                            handler2.postDelayed(new Runnable() {
                                public void run() {
                                    //btns[tmp].setVisibility(View.GONE);
                                    //btns[lastClick].setVisibility(View.GONE);
                                    btns[tmp1].setAlpha(0);
                                    btns[tmp2].setAlpha(0);
                                    exceed = false;

getWindow().clearFlags(WindowManager.LayoutParams.FLAG_NOT_TOUCHABLE);
                                }
                            }, 800);

                            if (score == 6){

//getWindow().setFlags(WindowManager.LayoutParams.FLAG_NOT_TOUCHABLE,
WindowManager.LayoutParams.FLAG_NOT_TOUCHABLE);
                                stopTimer();
                                scoreIntent.putExtra("MIN", minutes+"");
                                scoreIntent.putExtra("SEC", seconds+"");
                                Handler handler3 = new Handler();
                                handler3.postDelayed(new Runnable() {
                                    public void run() {
                                        //Log.d("TIME", "MIN = " + minutes + " SEC
= " + seconds);

                                        minutes = 0;
                                        seconds=0;
                                        Runtime.getRuntime().gc();
                                        finish();

getWindow().clearFlags(WindowManager.LayoutParams.FLAG_NOT_TOUCHABLE);
                                        startActivity(scoreIntent);
                                    }
                                }, 500);
                            }
                        }
                        else if
(!btns[tmp].getText().equals(btns[lastClick].getText())) {
```

```java
//getWindow().setFlags(WindowManager.LayoutParams.FLAG_NOT_TOUCHABLE,
WindowManager.LayoutParams.FLAG_NOT_TOUCHABLE);
                                final int tmp1 = tmp;
                                final int tmp2 = lastClick;

                                s = state.zero;
                                lastClick = -1;
                                Handler handler4 = new Handler();
                                handler4.postDelayed(new Runnable() {
                                    public void run() {

btns[tmp1].setBackgroundResource(R.drawable.placeholder);
                                        btns[tmp1].setText("back");

btns[tmp2].setBackgroundResource(R.drawable.placeholder);
                                        btns[tmp2].setText("back");
                                        exceed = false;

getWindow().clearFlags(WindowManager.LayoutParams.FLAG_NOT_TOUCHABLE);
                                    }
                                }, 800);
                            }

                        }

                        Log.d("VARi", "State = " + s + " Exceed = " + exceed + " Last
Click = " + lastClick);
                    }
                });

            }

        }
    public void stopTimer(){
        t.cancel();
    }

    // to create the click sound
    public void playTheSound(View v, String s){
        switch (s){
            case "2131099750":
                kbSound = MediaPlayer.create(this, R.raw.lion);
                kbSound.start();
                break;

            case "2131099745":
                kbSound = MediaPlayer.create(this, R.raw.coala);
                kbSound.start();
                break;

            case "2131099744":
                kbSound = MediaPlayer.create(this, R.raw.camel);
                kbSound.start();
                break;

            case "2131099747":
                kbSound = MediaPlayer.create(this, R.raw.fox);
                kbSound.start();
                break;

            case "2131099751":
                kbSound = MediaPlayer.create(this, R.raw.monkey);
                kbSound.start();
                break;
```

```
        case "2131099768":
            kbSound = MediaPlayer.create(this, R.raw.wolf);
            kbSound.start();
            break;

        default:
            kbSound = MediaPlayer.create(this, R.raw.keypressstandard);
            kbSound.start();
            break;
        }

    }
}

//Lion:  2131099750
//Coala: 2131099745
//camel: 2131099744
//fox:   2131099747
//mokey: 2131099751
//wolf:  2131099768
```

HighScore.java

```java
// Abdelrahman Amr Issawi
// 16P6001
// Photos are got from https://commons.wikimedia.org/
// Version 5.2


package com.example.matchinggame;

import androidx.appcompat.app.AppCompatActivity;

import android.content.SharedPreferences;
import android.graphics.drawable.Drawable;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;

public class HighScore extends AppCompatActivity {
    Button back;
    TextView highScoreLbl;
    TextView label;

    public static final String PREFS_NAME = " MyHighScore";
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_high_score);

        back = findViewById(R.id.backBtn);
        highScoreLbl = findViewById(R.id.highScorePlace);
        label = findViewById(R.id.placeHolder);


        back.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Runtime.getRuntime().gc();
                finish();
            }
        });

        SharedPreferences highScore = getSharedPreferences(PREFS_NAME ,0);
        String exsitHS = highScore.getString("HighScore", "NotFound");
        highScoreLbl.setText( exsitHS + "%");
    }
}
```

HighScoreAfterGame.java

```java
// Abdelrahman Amr Issawi
// 16P6001
// Photos are got from https://commons.wikimedia.org/
// Version 5.2


package com.example.matchinggame;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.content.SharedPreferences;
import android.os.Bundle;
import android.util.Log;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;

public class HighScoreAfterGame extends AppCompatActivity {
    TextView currentScore;
    TextView HighScore;
    int hs;
    Button back;
    Button restart;
    Intent home;
    public static final String PREFS_NAME = " MyHighScore";
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_high_score_after_game);
        currentScore = findViewById(R.id.PlayerScorePlaceHolder);
        HighScore = findViewById(R.id.ifHighScore);
        SharedPreferences highScore = getSharedPreferences(PREFS_NAME ,0);

        back = findViewById(R.id.backBtn);
        back.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Runtime.getRuntime().gc();
                finish();
            }
        });

        home = new Intent(HighScoreAfterGame.this, Game.class);
        restart = findViewById(R.id.restartBtn);
        restart.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                startActivity(home);
                Runtime.getRuntime().gc();
                finish();
            }
        });

        Intent time = getIntent();
        int totalSec = Integer.parseInt(time.getStringExtra("MIN")) *60 +
Integer.parseInt(time.getStringExtra("SEC"));
        int temp = (18 * 100)/ totalSec;
        String exsitHS = highScore.getString ("HighScore", "NotFound");
        if (!exsitHS.equals("NotFound")) {
            hs = Integer.parseInt(exsitHS);
        }
        Log.d("TIMEAFTER", "current = " + temp + " high = " + hs+ " totalSec " +
```

```java
totalSec);
        //Log.d("TIME", "MIN = " + time.getStringExtra("MIN") + " SEC = " +
time.getStringExtra("SEC"));
        if (temp > hs){
            HighScore.setText("HIGHSCORE!!\n The Older Score was " +hs +"%");
            SharedPreferences settings = getSharedPreferences (PREFS_NAME,0);
            SharedPreferences.Editor editor = settings.edit();
            editor.putString("HighScore", temp+"");
            editor.commit();
        }

        //String score = time.getStringExtra("MIN") + ":" +
time.getStringExtra("SEC");
        String score = temp + "%";
        currentScore.setText("You Got " + score);


    }
}
```

Mainactivity.java

```java
// Abdelrahman Amr Issawi
// 16P6001
// Photos are got from https://commons.wikimedia.org/
// Version 5.2

package com.example.matchinggame;
import androidx.appcompat.app.AppCompatActivity;
import android.content.Intent;
import android.content.SharedPreferences;
import android.media.MediaPlayer;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;

public class MainActivity extends AppCompatActivity implements
View.OnClickListener {
    Button newGame;
    Button highScore;
    Button exit;
    Intent highScoreAct;
    Intent game;
    public static final String PREFS_NAME = " MyHighScore";
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        highScoreAct = new Intent(MainActivity.this, HighScore.class);
        game = new Intent(MainActivity.this, Game.class);

        SharedPreferences hs = getSharedPreferences (PREFS_NAME,0);
        SharedPreferences.Editor editor = hs.edit();
        String tmp = hs.getString ("HighScore", "NotFound");
        if (tmp.equals("NotFound"))
            editor.putString("HighScore", 0+"");
        editor.commit();
        //editor.putString("HighScore", 0+"");
        //editor.commit();
        newGame = findViewById(R.id.newGameBtn);
        highScore = findViewById(R.id.highScoreBtn);
        exit = findViewById(R.id.exitBtn);

        newGame.setOnClickListener(this);
        highScore.setOnClickListener(this);
        exit.setOnClickListener(this);
    }
    @Override
    public void onClick(View v) {
        switch (v.getId()) {
            case R.id.newGameBtn:
                startActivity(game);
                break;

            case R.id.highScoreBtn:
                startActivity(highScoreAct);
                break;

            case R.id.exitBtn:
                System.exit(0);
                break;
        }
    }
}
```