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Samrat Chowk, Solapur

C E R T I F I C A T E

This is to certify that **Suvarnalaxmi Lambture (3502)** of Sixth Semester of Diploma in Computer technology of Institute **Solapur Education Society's Polytechnic, Solapur (0095)** has satisfactorily completed micro-project titled **Fighter Jet(2D Android Game)** in subject "**Mobile Application Development" (22617)** for academic year 2021-2022 as prescribed by Maharashtra State Board of Technical Education, Mumbai.

Place: Solapur

Enrolment No:1900950046

Date: / 05 / 2022

Exam Seat no:

Staff In-charge	Head of Dept	Principal
(Mrs. Trigule D.J.)	(Mr. Patil M.C)	(Bhawtankar A.A.) S.E.S. Polytechnic, Solapur

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Micro Project Report

Program:	Computer Technology
Course (Code):	Mobile Application Development (22617)
Academic Year:	2021-2022
Semester/Scheme:	6^{th} I
Title of microproject:	**Fighter Jet(2D Android Game)**
Name of the teacher:	Mrs. Trigule D.J

Group Member:	**Roll No.**
Suvarnalaxmi Lambture	3502

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Program: Computer Technology

Annexure I

Rubric Evaluation of Microproject

Title of Microproject: **Fighter Jet(2D Android Game)**

Sr.no	Roll No.	Name of Candidate
1	3502	Suvarnalaxmi Lambture

Sr. No	**Criteria**	**Marks Obtained (Out of 2)**	**Indicators for different level of Performance (Evaluation Scale 0 to 2)**		
			Poor (0)	**Average (1)**	**Good (2)**
1	Submission of Project proposal/Report		Not Submitted anything in time	proposal or project report submitted in time	Project proposal & project report submitted in time
2	CO/Microproject mapping		Not attained any CO/Micro.Pro.	Attained some CO/ Micro.Pro.	Attained maximum CO/ Micro.Pro.
3	Content of project/Formatting		Not contains relevant information	Contains some relevant information	Contains maximum relevant information
4	**Total Marks (06)**				
5	**Question/ Answers (04)**				
Out of (10)					

Name & Sign of Teacher

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Program: Computer Technology

Micro Project Proposal

Academic Year:2021-2022 Class: CM 6I

Course: Mobile Application Development Course Code:22617

Roll No:3502 Exam Seat no:

Title of Microproject: **Fighter Jet(2D Android Game)**

Sr.no	Roll No.	Name of Candidate	Signature
1	3502	Suvarnalaxmi Lambture	

Key Points: Android,Java,Android Studio

Stationary/ Material / Tool Required:

Software:Android Studio,JDK 1.8,OS:Windows 11,Documentation:Microsoft Word

References:

https://o7planning.org/10521/android-2d-game-tutorial-for-beginners

https://www.simplifiedcoding.net/android-game-development-tutorial-1/

Sign of Teacher

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Samrat Chowk, Solapur

Program: Computer Technology

CO/Microproject Mapping

Academic Year:2021-2022 Class:CM 6I

Course: Mobile Application Development Course Code:22617

Roll No:3502 Exam Seat no:

Title of Microproject: **Fighter Jet(2D Android Game)**

Course Outcomes:

CO a	Interpret features of Android operating system
CO b	Configure Android Environment and development tools
CO c	Develop rich user interfaces by using layouts and controls
CO d	Use user interface components for android application development
CO e	Create android application using database
CO f	Publish Android Applications

Title of Microproject	CO1	CO2	CO3	CO4	CO5
Fighter Jet (2D Android Game)	✓	✓	✓	-	✓

*put – (dash) if cannot mapped with CO

Sign of Teacher

Code:

AndroidManifest.xml

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools">

    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.FighterJet"
        tools:targetApi="31">
        <activity
            android:name=".GameActivity"
            android:screenOrientation="landscape"
            android:theme="@style/Theme.FighterJet.noActionBar" />
        <activity
            android:name=".MainActivity"
            android:exported="true"
            android:screenOrientation="landscape"
            android:theme="@style/Theme.FighterJet.noActionBar">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>
</manifest>
```

activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
 <RelativeLayout 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"
    tools:context=".MainActivity">
    <ImageView
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:src="@drawable/background"
        android:scaleType="centerCrop"/>
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:textSize="48sp"
        android:text="Fighter Jet"
        android:textColor="#000000"
        android:layout_above="@id/play"
        android:layout_below="@id/highScoreTxt"
        android:layout_centerHorizontal="true"/>
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Play"
        android:textSize="64sp"
        android:layout_centerInParent="true"
        android:textColor="#000000"
        android:id="@+id/play"/>
    <TextView
        android:id="@+id/highScoreTxt"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentRight="true"
        android:layout_margin="16dp"
        android:text="High Score"
        android:textColor="#000000"
        android:textSize="24sp" />
    <ImageView
        android:id="@+id/volumeCtrl"
        android:layout_width="36dp"
        android:layout_height="36dp"
        android:layout_alignParentBottom="true"
        android:layout_margin="16dp"
        android:src="@drawable/ic_baseline_volume_up_24"/>
</RelativeLayout>
```

MainActivity.java

```
package com.suvarnalaxmi.fighterjet;
import androidx.appcompat.app.AppCompatActivity;
import android.content.Intent;
import android.content.SharedPreferences;
import android.os.Bundle;
import android.view.View;
import android.view.WindowManager;
import android.widget.ImageView;
import android.widget.TextView;
public class MainActivity extends AppCompatActivity {
   private boolean isMute;
   @Override
   protected void onCreate(Bundle savedInstanceState) {
      super.onCreate(savedInstanceState);
getWindow().setFlags(WindowManager.LayoutParams.FLAG_FULLSCREEN,WindowMana
ger.LayoutParams.FLAG_FULLSCREEN);
      setContentView(R.layout.activity_main);
      findViewById(R.id.play).setOnClickListener(new View.OnClickListener() {
         @Override
         public void onClick(View view) {
           startActivity(new Intent(MainActivity.this,GameActivity.class));
         }
      });
      TextView highScoreTxt=findViewById(R.id.highScoreTxt);
      final SharedPreferences prefs=getSharedPreferences("game",MODE_PRIVATE);
      highScoreTxt.setText("HighScore: "+prefs.getInt("highscore",0));
      isMute=prefs.getBoolean("isMute",false);
      final ImageView volumeCtrl=findViewById(R.id.volumeCtrl);
      if (isMute)
         volumeCtrl.setImageResource(R.drawable.ic_baseline_volume_off_24);
      else
         volumeCtrl.setImageResource(R.drawable.ic_baseline_volume_up_24);
      volumeCtrl.setOnClickListener(new View.OnClickListener() {
         @Override
         public void onClick(View view) {
            isMute=!isMute;
            if (isMute)
               volumeCtrl.setImageResource(R.drawable.ic_baseline_volume_off_24);
            else
               volumeCtrl.setImageResource(R.drawable.ic_baseline_volume_up_24);
            SharedPreferences.Editor editor=prefs.edit();
            editor.putBoolean("isMute",isMute);
            editor.apply();

         }
      });
   }
}
```

Background.java

```
package com.suvarnalaxmi.fighterjet;
import android.content.res.Resources;
import android.graphics.Bitmap;
import android.graphics.BitmapFactory;
public class Background {
   int x=0,y=0;
   Bitmap background;
   Background(int screenX, int screenY, Resources res){
      background= BitmapFactory.decodeResource(res, R.drawable.background);
      background=Bitmap.createScaledBitmap(background,screenX,screenY,false);
   }
}
```

Bullet.java

```
package com.suvarnalaxmi.fighterjet;
import static com.suvarnalaxmi.fighterjet.GameView.screenRatioX;
import static com.suvarnalaxmi.fighterjet.GameView.screenRatioY;
import android.content.res.Resources;
import android.graphics.Bitmap;
import android.graphics.BitmapFactory;
import android.graphics.Rect;
public class Bullet {
   int x,y,width,height;
   Bitmap bullet;
   Bullet(Resources res){
      bullet= BitmapFactory.decodeResource(res,R.drawable.bullet);
      width=bullet.getWidth();
      height=bullet.getHeight();
      width/=4;
      height/=4;
      width = (int) (width * screenRatioX);
      height = (int) (height * screenRatioY);
      bullet=Bitmap.createScaledBitmap(bullet,width,height,false);
   }
   Rect getCollisionShape(){
      return new Rect(x,y,x+width,y+height);
   }
}
```

Bird.java

```
package com.suvarnalaxmi.fighterjet;
import static com.suvarnalaxmi.fighterjet.GameView.screenRatioX;
import static com.suvarnalaxmi.fighterjet.GameView.screenRatioY;
import android.content.res.Resources;
import android.graphics.Bitmap;
import android.graphics.BitmapFactory;
import android.graphics.Rect;
public class Bird {
   public int speed=20;
   public boolean wasShot=true;
   int x=0,y,width,height,birdCounter=1;
   Bitmap bird1,bird2,bird3,bird4;
   Bird(Resources res){
      bird1= BitmapFactory.decodeResource(res,R.drawable.bird1);
      bird2= BitmapFactory.decodeResource(res,R.drawable.bird2);
      bird3= BitmapFactory.decodeResource(res,R.drawable.bird3);
      bird4= BitmapFactory.decodeResource(res,R.drawable.bird4);
      width=bird1.getWidth();
      height=bird1.getHeight();
      width/=6;
      height/=6;
      width = (int) (width * screenRatioX);
      height = (int) (height * screenRatioY);
      bird1 = Bitmap.createScaledBitmap(bird1,width,height,false);
      bird2 = Bitmap.createScaledBitmap(bird2,width,height,false);
      bird3 = Bitmap.createScaledBitmap(bird3,width,height,false);
      bird4 = Bitmap.createScaledBitmap(bird4,width,height,false);
      y =- height;    }
   Bitmap getBird(){
      if(birdCounter==1){
         birdCounter++;
         return bird1;       }
      if(birdCounter==2){
         birdCounter++;
         return bird2;       }
      if(birdCounter==3){
         birdCounter++;
         return bird3;       }
         birdCounter=1;
         return bird4;    }
   Rect getCollisionShape(){
      return new Rect(x,y,x+width,y+height);
   }
}
```

Flight.java

```
package com.suvarnalaxmi.fighterjet;
import static com.suvarnalaxmi.fighterjet.GameView.screenRatioX;
import static com.suvarnalaxmi.fighterjet.GameView.screenRatioY;
import android.content.res.Resources;
import android.graphics.Bitmap;
import android.graphics.BitmapFactory;
import android.graphics.Rect;
public class Flight {
   int toShoot=0;
   boolean isGoingUp=false;
   int x,y,width,height,wingCounter=0,shootCounter=1;
   Bitmap flight1,flight2,shoot1,shoot2,shoot3, shoot4,shoot5,dead;
   private GameView gameView;
   Flight(GameView gameView,int screenY, Resources res){
   this.gameView = gameView;
      flight1= BitmapFactory.decodeResource(res, R.drawable.fly1);
      flight2= BitmapFactory.decodeResource(res, R.drawable.fly2);
      width=flight1.getWidth();
      height=flight1.getHeight();
      width /= 4;
      height /= 4;
      width = (int) (width * screenRatioX);
      height = (int) (height * screenRatioY);
      flight1=Bitmap.createScaledBitmap(flight1,width,height,false);
      flight2=Bitmap.createScaledBitmap(flight2,width,height,false);
      shoot1=BitmapFactory.decodeResource(res, R.drawable.shoot1);
      shoot2=BitmapFactory.decodeResource(res, R.drawable.shoot2);
      shoot3=BitmapFactory.decodeResource(res, R.drawable.shoot3);
      shoot4=BitmapFactory.decodeResource(res, R.drawable.shoot4);
      shoot5=BitmapFactory.decodeResource(res, R.drawable.shoot5);
      shoot1=Bitmap.createScaledBitmap(shoot1,width,height,false);
      shoot2=Bitmap.createScaledBitmap(shoot2,width,height,false);
      shoot3=Bitmap.createScaledBitmap(shoot3,width,height,false);
      shoot4=Bitmap.createScaledBitmap(shoot4,width,height,false);
      shoot5=Bitmap.createScaledBitmap(shoot5,width,height,false);
      dead=BitmapFactory.decodeResource(res,R.drawable.dead);
      dead=Bitmap.createScaledBitmap(dead,width,height,false);
      y = screenY / 2;
      x = (int)( 64 * screenRatioX);
   }
   Bitmap getFlight(){
      if(toShoot!=0){
         if(shootCounter==1){
           shootCounter++;
           return shoot1;   }
         if(shootCounter==2){
            shootCounter++;
            return shoot2;  }
```

```
            if(shootCounter==3){
                shootCounter++;
                return shoot3;  }
            if(shootCounter==4){
                shootCounter++;
                return shoot4;  }
            shootCounter = 1;
            toShoot--;
            gameView.newBullet();
            return shoot5;   }
        if (wingCounter==0){
            wingCounter++;
            return flight1;   }
        wingCounter--;
        return flight2;    }
    Rect getCollisionShape(){
        return new Rect(x,y,x+width,y+height);    }
    Bitmap getDead(){
        return dead;    }}
```

GameActivity.java

```
package com.suvarnalaxmi.fighterjet;
import androidx.appcompat.app.AppCompatActivity;
import android.graphics.Point;
import android.os.Bundle;
import android.view.WindowManager;
public class GameActivity extends AppCompatActivity {
    private GameView gameView;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
getWindow().setFlags(WindowManager.LayoutParams.FLAG_FULLSCREEN,WindowMana
ger.LayoutParams.FLAG_FULLSCREEN);
        Point point=new Point();
        getWindowManager().getDefaultDisplay().getSize(point);
        gameView=new GameView(this,point.x,point.y);
        setContentView(gameView);
    }
    @Override
    protected void onPause() {
        super.onPause();
        gameView.pause();    }
    @Override
    protected void onResume() {
        super.onResume();
        gameView.resume();    }
}
```

GameView.java

```
package com.suvarnalaxmi.fighterjet;
import android.content.Context;
import android.content.Intent;
import android.content.SharedPreferences;
import android.graphics.Canvas;
import android.graphics.Color;
import android.graphics.Paint;
import android.graphics.Rect;
import android.media.AudioAttributes;
import android.media.AudioManager;
import android.media.SoundPool;
import android.os.Build;
import android.view.MotionEvent;
import android.view.SurfaceView;
import java.util.ArrayList;
import java.util.List;
import java.util.Random;
public class GameView extends SurfaceView implements Runnable{
    private Thread thread;
    private boolean isPlaying,isGameOver=false;
    private int screenX,screenY,score=0;
    public static float screenRatioX,screenRatioY;
    private Paint paint;
    private Bird[] birds;
    private SharedPreferences prefs;
    private Random random;
    private SoundPool soundPool;
    private List<Bullet> bullets;
    private int sound;
    private Flight flight;
    private GameActivity activity;
    private Background background1,background2;
    public GameView(GameActivity activity,int screenX,int screenY) {
        super(activity);
        this.activity=activity;
        prefs=activity.getSharedPreferences("game",Context.MODE_PRIVATE);
        if(Build.VERSION.SDK_INT >= Build.VERSION_CODES.M){
            AudioAttributes audioAttributes=new AudioAttributes.Builder()
                    .setContentType(AudioAttributes.CONTENT_TYPE_MUSIC)
                    .setUsage(AudioAttributes.USAGE_GAME)
                    .build();
            soundPool=new SoundPool.Builder()
                    .setAudioAttributes(audioAttributes)
                    .build();
        }else
            soundPool=new SoundPool(1, AudioManager.STREAM_MUSIC,0);
        sound = soundPool.load(activity,R.raw.shoot,1);
```

```
    this.screenX=screenX;
    this.screenY=screenY;
    screenRatioX=1920f/screenX;
    screenRatioY=1080f/screenY;
    background1=new Background(screenX,screenY,getResources());
    background2=new Background(screenX,screenY,getResources());
    flight=new Flight(this,screenY,getResources());
    bullets =new ArrayList<>();
    background2.x=screenX;
    paint=new Paint();
    paint.setTextSize(128);
    paint.setColor(Color.WHITE);
    birds = new Bird[4];
    for(int i=0;i<4;i++){
        Bird bird =new Bird(getResources());
        birds[i] = bird;        }
    random = new Random();    }
@Override
public void run(){
    while (isPlaying){
        update();
        draw();
        sleep();        }    }
private void update(){
    background1.x -= 10 * screenRatioX;
    background2.x -= 10 * screenRatioX;
    if(background1.x + background1.background.getWidth() < 0){
        background1.x = screenX;        }
    if(background2.x + background2.background.getWidth() < 0){
        background2.x = screenX;        }
    if (flight.isGoingUp)
        flight.y-=30*screenRatioY;
    else
        flight.y+=30*screenRatioY;
    if (flight.y<0)
        flight.y=0;
    if(flight.y>=screenY-flight.height)
        flight.y=screenY-flight.height;
    List<Bullet> trash=new ArrayList<>();
    for (Bullet bullet : bullets){
        if(bullet.x > screenX)
            trash.add(bullet);
        bullet.x += 50 * screenRatioX;
        for (Bird bird:birds) {
            if(Rect.intersects(bird.getCollisionShape(),
                    bullet.getCollisionShape())){
                score++;
                bird.x =-500;
                bullet.x=screenX + 500;
                bird.wasShot=true;              }       }       }
```

```
    for (Bullet bullet :trash)
        bullets.remove(bullet);
    for(Bird bird:birds) {
        bird.x -=bird.speed;
        if(bird.x + bird.width < 0){
            if(!bird.wasShot){
                isGameOver=true;
                return;              }
            int bound =(int)(30 * screenRatioX);
            bird.speed =random.nextInt(bound);
            if(bird.speed < 10 * screenRatioX)
                bird.speed =(int)(10 * screenRatioX);
            bird.x = screenX;
            bird.y=random.nextInt(screenY - bird.height);
            bird.wasShot=false;          }
        if(Rect.intersects(bird.getCollisionShape(),flight.getCollisionShape())){
            isGameOver=true;
            return;          }    }    }
private void draw(){
    if(getHolder().getSurface().isValid()){
        Canvas canvas = getHolder().lockCanvas();
        canvas.drawBitmap(background1.background, background1.x, background1.y, paint);
        canvas.drawBitmap(background2.background, background2.x, background2.y, paint);
        for(Bird bird:birds)
            canvas.drawBitmap(bird.getBird(),bird.x,bird.y,paint);
        canvas.drawText(score+"",screenX/2f,150,paint);
        if(isGameOver){
            isPlaying=false;
            canvas.drawBitmap(flight.getDead(),flight.x,flight.y,paint);
            getHolder().unlockCanvasAndPost(canvas);
            saveIfHighScore();
            waitBeforeExiting();
            return;          }
        canvas.drawBitmap(flight.getFlight(),flight.x,flight.y,paint);
        for(Bullet bullet:bullets)
            canvas.drawBitmap(bullet.bullet,bullet.x,bullet.y,paint);
        getHolder().unlockCanvasAndPost(canvas);       }    }
private void waitBeforeExiting() {
    try {
        Thread.sleep(3000);
        activity.startActivity(new Intent(activity,MainActivity.class));
        activity.finish();
    } catch (InterruptedException e) {
        e.printStackTrace();       }    }
private void saveIfHighScore() {
    if(prefs.getInt("highscore",0) < score){
        SharedPreferences.Editor editor=prefs.edit();
        editor.putInt("highscore",score);
        editor.apply();       }    }
private void sleep(){
```

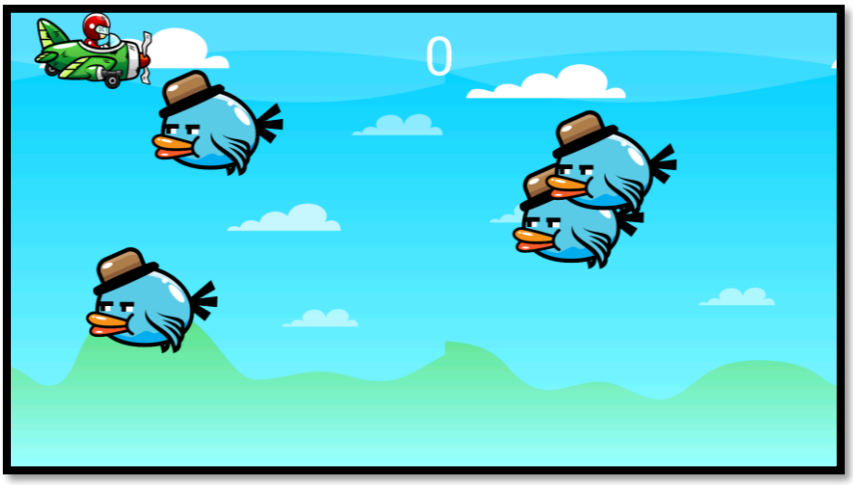
```
            try {
                Thread.sleep(17);
            } catch (InterruptedException e) {
                e.printStackTrace();
            }    }
        public void resume(){
            isPlaying=true;
            thread=new Thread(this);
            thread.start();    }
        public void pause(){
            try {
                isPlaying=false;
                thread.join();
            } catch (InterruptedException e) {
                e.printStackTrace();        }    }
        @Override
        public boolean onTouchEvent(MotionEvent event) {
            switch (event.getAction()){
                case MotionEvent.ACTION_DOWN:
                    if(event.getX() < screenX / 2){
                        flight.isGoingUp = true;     }
                    break;
                case MotionEvent.ACTION_UP:
                    flight.isGoingUp = false;
                    if(event.getX() > screenX / 2)
                        flight.toShoot++;
                    break;        }
            return true;    }
        public void newBullet() {
            if(!prefs.getBoolean("isMute",false))
                soundPool.play(sound,1,1,0,0,1);
            Bullet bullet= new Bullet(getResources());
            bullet.x = flight.x + flight.width;
            bullet.y = flight.y + (flight.height/2);
            bullets.add(bullet);

        }
    }
```

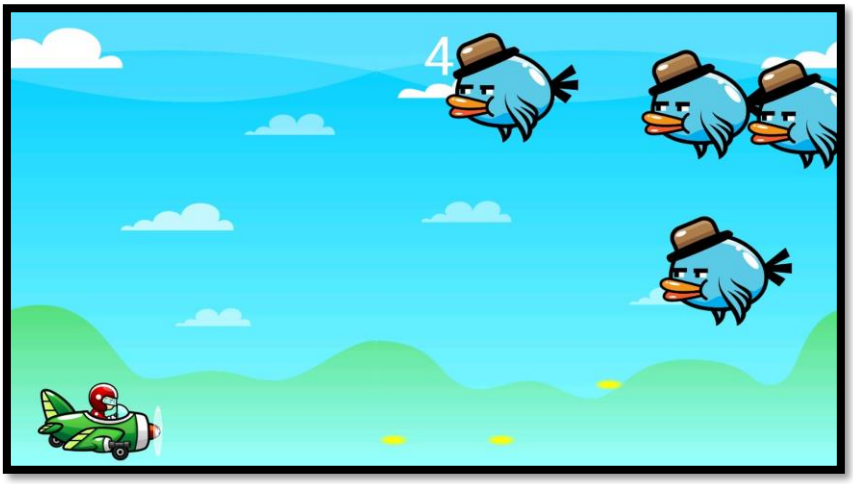
Output:

First Screen on opening the app

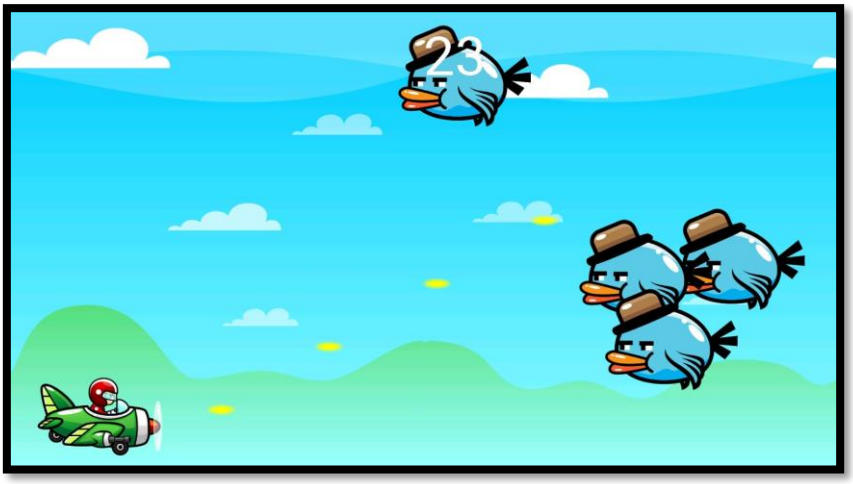
When the jet crashes against the bird the game ends



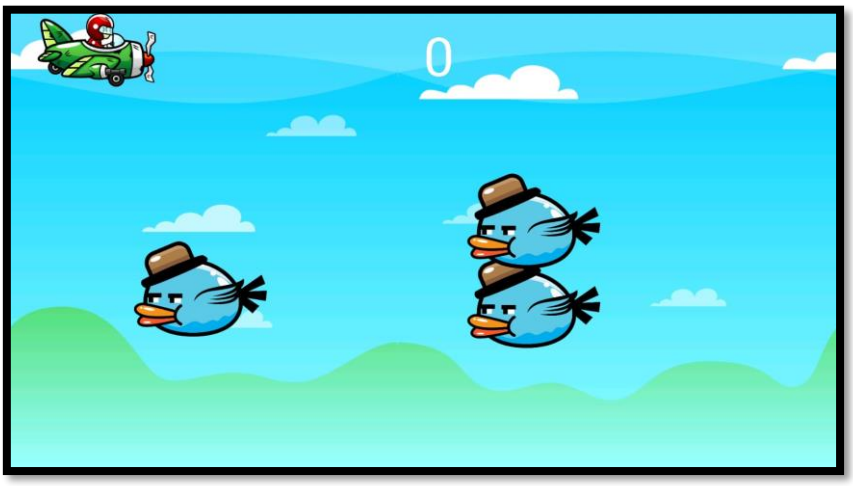
When bullets are fired at birds through jet



The score being updated when the bullet hits a bird



When the bird passes the screen ,the game ends.



High Score updated.