**20CYS404 - Android Application Development**

**End Sem Lab Exam**

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**Aim:** Create a Free Hand Drawing App

**Objective**: To Create a free hand drawing app where app contain a color palette where the user chooses the color. Paint brush types and size.

**Codes:**

# **MainActivity.java:**

*package com.example.paintapp;*

*import android.Manifest;*

*import android.content.DialogInterface;*

*import android.content.pm.PackageManager; import android.graphics.Color;*

*import android.os.Build; import android.os.Bundle;*

*import android.view.LayoutInflater; import android.view.View;*

*import android.widget.Button;*

*import android.widget.ImageView; import android.widget.SeekBar; import android.widget.Toast;*

*import androidx.annotation.NonNull;*

*import androidx.appcompat.app.AlertDialog;*

*import androidx.appcompat.app.AppCompatActivity; import androidx.core.app.ActivityCompat;*

*import androidx.core.content.ContextCompat;*

*public class MainActivity extends AppCompatActivity { private DrawingView drawingView;*

*private SeekBar brushSizeSeekBar;*

*private int red = 0, green = 0, blue = 0;*

*private Button redButton, greenButton, blueButton;*

*@Override*

*protected void onCreate(Bundle savedInstanceState) { super.onCreate(savedInstanceState);*

*setContentView(R.layout.activity\_main);*

*drawingView = findViewById(R.id.drawing\_view); brushSizeSeekBar = findViewById(R.id.brush\_size\_seekbar); redButton = findViewById(R.id.button\_red);*

*greenButton = findViewById(R.id.button\_green); blueButton = findViewById(R.id.button\_blue);*

*// Brush size seek bar listener*

*brushSizeSeekBar.setOnSeekBarChangeListener(new SeekBar.OnSeekBarChangeListener() {*

*@Override*

*public void onProgressChanged(SeekBar seekBar, int progress, boolean fromUser) {*

*drawingView.setBrushSize(progress);*

*}*

*@Override*

*public void onStartTrackingTouch(SeekBar seekBar) { }*

*});*

*@Override*

*public void onStopTrackingTouch(SeekBar seekBar) { }*

*// Color picker dialogs for Red, Green, Blue redButton.setOnClickListener(view ->*

*showColorPickerDialog("Red"));*

*greenButton.setOnClickListener(view -> showColorPickerDialog("Green"));*

*blueButton.setOnClickListener(view -> showColorPickerDialog("Blue"));*

*Button clearButton = findViewById(R.id.clear\_button); clearButton.setOnClickListener(view ->*

*drawingView.clearCanvas());*

*// Clear button*

*Button saveButton = findViewById(R.id.save\_button); saveButton.setOnClickListener(view -> {*

*if (Build.VERSION.SDK\_INT >= Build.VERSION\_CODES.Q) {*

*// For Android 10 and above, no need for WRITE\_EXTERNAL\_STORAGE permission*

*drawingView.saveCanvas(this);*

*} else {*

*// For Android 6.0 to 9.0, request WRITE\_EXTERNAL\_STORAGE permission*

*if (ContextCompat.checkSelfPermission(this, Manifest.permission.WRITE\_EXTERNAL\_STORAGE)*

*!= PackageManager.PERMISSION\_GRANTED) { ActivityCompat.requestPermissions(this,*

*new*

*String[]{Manifest.permission.WRITE\_EXTERNAL\_STORAGE}, 1);*

*} else {*

*drawingView.saveCanvas(this);*

*}*

*}*

*});*

*}*

*// Method to show the color picker dialog*

*private void showColorPickerDialog(final String colorType) {*

*// Inflate the custom dialog layout*

*LayoutInflater inflater = LayoutInflater.from(this); View colorPickerView =*

*inflater.inflate(R.layout.color\_picker\_dialog, null);*

*SeekBar redSeekBar =*

*colorPickerView.findViewById(R.id.seekBar\_red); SeekBar greenSeekBar =*

*colorPickerView.findViewById(R.id.seekBar\_green); SeekBar blueSeekBar =*

*colorPickerView.findViewById(R.id.seekBar\_blue); ImageView colorDisplay = colorPickerView.findViewById(R.id.color\_display);*

*redSeekBar.setProgress(red);*

*greenSeekBar.setProgress(green); blueSeekBar.setProgress(blue);*

*// Change color based on SeekBar values*

*SeekBar.OnSeekBarChangeListener colorChangeListener = new SeekBar.OnSeekBarChangeListener() {*

*@Override*

*public void onProgressChanged(SeekBar seekBar, int progress, boolean fromUser) {*

*red = redSeekBar.getProgress();*

*green = greenSeekBar.getProgress(); blue = blueSeekBar.getProgress();*

*// Update the color display*

*int selectedColor = Color.rgb(red, green, blue); colorDisplay.setBackgroundColor(selectedColor);*

*}*

*@Override*

*public void onStartTrackingTouch(SeekBar seekBar) { }*

*@Override*

*public void onStopTrackingTouch(SeekBar seekBar) { }*

*};*

*redSeekBar.setOnSeekBarChangeListener(colorChangeListener); greenSeekBar.setOnSeekBarChangeListener(colorChangeListener);*

*blueSeekBar.setOnSeekBarChangeListener(colorChangeListener);*

*// Create and show the dialog new AlertDialog.Builder(this)*

*.setTitle("Pick " + colorType + " Color")*

*.setView(colorPickerView)*

*.setPositiveButton("OK", new DialogInterface.OnClickListener() {*

*@Override*

*public void onClick(DialogInterface dialogInterface, int i) {*

*// Apply the selected color to the brush*

*int selectedColor = Color.rgb(red, green, blue); drawingView.setColor(String.format("#%06X",*

*(0xFFFFFF & selectedColor)));*

*}*

*})*

*.setNegativeButton("Cancel", null)*

*.show();*

*}*

*@Override*

*public void onRequestPermissionsResult(int requestCode, @NonNull String[] permissions, @NonNull int[] grantResults) {*

*super.onRequestPermissionsResult(requestCode, permissions, grantResults);*

*if (requestCode == 1 && grantResults.length > 0 &&*

*grantResults[0] == PackageManager.PERMISSION\_GRANTED) { drawingView.saveCanvas(this); // Call saveCanvas when*

*permission is granted*

*} else {*

*Toast.makeText(this, "Permission denied! Cannot save image.", Toast.LENGTH\_SHORT).show();*

*} } }*

**DrawingView.java:**

*package com.example.paintapp;*

*import android.content.ContentValues; import android.content.Context;*

*import android.graphics.\*; import android.net.Uri;*

*import android.os.Build;*

*import android.os.Environment;*

*import android.provider.MediaStore; import android.util.AttributeSet;*

*import android.view.MotionEvent; import android.view.View;*

*import android.widget.Toast; import java.io.IOException; import java.io.OutputStream;*

*public class DrawingView extends View { private Path drawPath;*

*private Paint drawPaint, canvasPaint;*

*private Canvas drawCanvas; private Bitmap canvasBitmap; private float brushSize;*

*private int paintColor = Color.BLACK;*

*public DrawingView(Context context, AttributeSet attrs) { super(context, attrs);*

*setupDrawing();*

*}*

*private void setupDrawing() { drawPath = new Path(); drawPaint = new Paint();*

*drawPaint.setColor(paintColor); drawPaint.setAntiAlias(true);*

*drawPaint.setStrokeWidth(brushSize); drawPaint.setStyle(Paint.Style.STROKE);*

*drawPaint.setStrokeJoin(Paint.Join.ROUND); drawPaint.setStrokeCap(Paint.Cap.ROUND); canvasPaint = new Paint(Paint.DITHER\_FLAG); brushSize = 20;*

*}*

*@Override*

*protected void onSizeChanged(int w, int h, int oldw, int oldh) { super.onSizeChanged(w, h, oldw, oldh);*

*canvasBitmap = Bitmap.createBitmap(w, h, Bitmap.Config.ARGB\_8888);*

*drawCanvas = new Canvas(canvasBitmap);*

*}*

*@Override*

*protected void onDraw(Canvas canvas) {*

*canvas.drawBitmap(canvasBitmap, 0, 0, canvasPaint); canvas.drawPath(drawPath, drawPaint);*

*}*

*@Override*

*public boolean onTouchEvent(MotionEvent event) { float touchX = event.getX();*

*float touchY = event.getY();*

*switch (event.getAction()) {*

*case MotionEvent.ACTION\_DOWN: drawPath.moveTo(touchX, touchY); break;*

*case MotionEvent.ACTION\_MOVE: drawPath.lineTo(touchX, touchY); break;*

*case MotionEvent.ACTION\_UP: drawCanvas.drawPath(drawPath, drawPaint); drawPath.reset();*

*break; default:*

*return false;*

*}*

*invalidate(); return true;*

*}*

*public void setColor(String newColor) { invalidate();*

*paintColor = Color.parseColor(newColor); drawPaint.setColor(paintColor);*

*}*

*public void setBrushSize(float newSize) { brushSize = newSize;*

*drawPaint.setStrokeWidth(brushSize);*

*}*

*public void clearCanvas() {*

*drawCanvas.drawColor(0, PorterDuff.Mode.CLEAR); invalidate();*

*}*

*public void saveCanvas(Context context) {*

*String fileName = "drawing\_" + System.currentTimeMillis() + ".png"; // Generate a unique filename*

*OutputStream outputStream; Uri imageUri = null;*

*// Set up content values for saving the image ContentValues values = new ContentValues();*

*values.put(MediaStore.Images.Media.DISPLAY\_NAME, fileName);*

*values.put(MediaStore.Images.Media.MIME\_TYPE, "image/png");*

*values.put(MediaStore.Images.Media.DATE\_ADDED, System.currentTimeMillis() / 1000);*

*values.put(MediaStore.Images.Media.DATE\_TAKEN, System.currentTimeMillis())*

*// Use the MediaStore API for Android 10 and above*

*if (Build.VERSION.SDK\_INT >= Build.VERSION\_CODES.Q) {*

*values.put(MediaStore.Images.Media.RELATIVE\_PATH,*

*Environment.DIRECTORY\_PICTURES); // Save to Pictures directory*

*imageUri =*

*context.getContentResolver().insert(MediaStore.Images.Media.EXTE RNAL\_CONTENT\_URI, values);*

*} else {*

*// For Android versions below 10, use the legacy method String imagesDir =*

*Environment.getExternalStoragePublicDirectory(Environment.DIRECT ORY\_PICTURES).toString();*

*values.put(MediaStore.Images.Media.DATA, imagesDir + "/" + fileName);*

*imageUri =*

*context.getContentResolver().insert(MediaStore.Images.Media.EXTE RNAL\_CONTENT\_URI, values);*

*}*

*if (imageUri != null) { try {*

*outputStream =*

*context.getContentResolver().openOutputStream(imageUri); if (outputStream != null) {*

*// Compress the bitmap as PNG and write it to the output*

*stream*

*canvasBitmap.compress(Bitmap.CompressFormat.PNG,*

*100, outputStream);*

*outputStream.flush(); outputStream.close();*

*// Show success message*

*Toast.makeText(context, "Image saved successfully in Gallery!", Toast.LENGTH\_SHORT).show();*

*} else {*

*Toast.makeText(context, "Error: Could not open output stream.", Toast.LENGTH\_SHORT).show();*

*}*

*} catch (IOException e) { e.printStackTrace();*

*Toast.makeText(context, "Error: Could not save image.", Toast.LENGTH\_SHORT).show();*

*}*

*} else {*

*Toast.makeText(context, "Error: Could not create file.", Toast.LENGTH\_SHORT).show();*

*} } }*

**AndroidManifest.xml:**

*<manifest*

*xmlns:android="http://schemas.android.com/apk/res/android">*

*<uses-permission*

*android:name="android.permission.WRITE\_EXTERNAL\_STORAGE"/>*

*<uses-permission*

*android:name="android.permission.READ\_EXTERNAL\_STORAGE"/>*

*<application*

*android:allowBackup="true" android:icon="@mipmap/amrita"*

*android:roundIcon="@mipmap/amrita"*

*android:label="@string/app\_name" android:supportsRtl="true"*

*android:theme="@style/Theme.PaintingApp">*

*<activity*

*android:name=".MainActivity" android:exported="true">*

*<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"?>*

# *<LinearLayout*

# *xmlns:android="http://schemas.android.com/apk/res/android" android:layout\_width="match\_parent"*

# *android:layout\_height="match\_parent" android:orientation="vertical"*

# *android:padding="20dp">*

# *<TextView*

# *android:id="@+id/app\_title"*

# *android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:text="Painting App Anusha -21030" android:textSize="20sp"*

# *android:textStyle="bold" android:layout\_gravity="center"*

# *android:textColor="@android:color/black" />*

# *<!-- Color Selection Buttons -->*

# *<LinearLayout*

# *android:layout\_width="match\_parent" android:layout\_height="wrap\_content" android:orientation="horizontal" android:gravity="center\_horizontal">*

# *<Button*

# *android:id="@+id/button\_red" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:text="R"*

# *android:backgroundTint="@color/red" />*

# *<Button*

# *android:id="@+id/button\_green" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:text="G"*

# *android:backgroundTint="@color/green" />*

# *<Button*

# *android:id="@+id/button\_blue" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:text="B"*

# *android:backgroundTint="@color/blue" />*

# *</LinearLayout>*

# *<!-- Drawing area -->*

# *<com.example.paintingapp.DrawingView android:id="@+id/drawing\_view"*

# *android:layout\_width="match\_parent" android:layout\_height="0dp"*

# *android:layout\_weight="1" android:background="#FFFFFF" />*

# *<!-- Brush size selection -->*

# *<SeekBar*

# *android:id="@+id/brush\_size\_seekbar" android:layout\_width="match\_parent" android:layout\_height="wrap\_content" android:max="50"*

# *android:progress="20" />*

# *<!-- Clear and Save buttons -->*

# *<LinearLayout*

# *android:layout\_width="match\_parent" android:layout\_height="wrap\_content" android:orientation="horizontal">*

# *<Button*

# *android:id="@+id/clear\_button" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:text="Clear" />*

# *<Button*

# *android:id="@+id/save\_button" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:text="Save" />*

# *</LinearLayout>*

# *</LinearLayout>*

# **Color\_picker\_dialog.xml:**

# *<?xml version="1.0" encoding="utf-8"?>*

# *<LinearLayout*

# *xmlns:android="http://schemas.android.com/apk/res/android" android:layout\_width="match\_parent"*

# *android:layout\_height="wrap\_content" android:orientation="vertical"*

# *android:padding="16dp">*

# *<TextView*

# *android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:text="Red" />*

# *<SeekBar*

# *android:id="@+id/seekBar\_red" android:layout\_width="match\_parent" android:layout\_height="wrap\_content" android:max="255" />*

# *<TextView*

# *android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:text="Green" />*

# *<SeekBar*

# *android:id="@+id/seekBar\_green" android:layout\_width="match\_parent" android:layout\_height="wrap\_content" android:max="255" />*

# *<TextView*

# *android:layout\_width="wrap\_content"*

# *android:layout\_height="wrap\_content" android:text="Blue" />*

# *<SeekBar*

# *android:id="@+id/seekBar\_blue" android:layout\_width="match\_parent" android:layout\_height="wrap\_content" android:max="255" />*

# *<!-- Show selected color -->*

# *<TextView*

# *android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:text="Selected Color:" />*

# *<ImageView*

# *android:id="@+id/color\_display" android:layout\_width="50dp" android:layout\_height="50dp" android:background="#000000" />*

# *</LinearLayout>*

# **Color.xml**

# *<resources>*

# *<color name="red">#FF0000</color>*

# *<color name="green">#00FF00</color>*

# *<color name="blue">#0000FF</color>*

# *<color name="purple\_500">#6200EE</color>*

# *<color name="purple\_700">#3700B3</color>*

# *<color name="teal\_200">#03DAC5</color>*

# *<color name="teal\_700">#018786</color>*

# *<color name="black">#000000</color>*

# *<color name="white">#FFFFFF</color>*

# *</resources>*

# **Themes.xml**

# *<resources xmlns:tools="http://schemas.android.com/tools">*

# *<style name="Theme.PaintingApp"*

# *parent="Theme.MaterialComponents.DayNight.DarkActionBar">*

# *<item name="colorPrimary">@color/purple\_500</item>*

# *<item name="colorPrimaryVariant">@color/purple\_700</item>*

# *<item name="colorSecondary">@color/teal\_200</item>*

# *<item name="android:statusBarColor"*

# *tools:targetApi="l">?attr/colorPrimaryVariant</item>*

# *</style>*

# *</resources>*

# Build.gradle.kts(app):

*plugins {*

*alias(libs.plugins.android.application)*

*}*

*android {*

*namespace = "com.example.paintingapp" compileSdk = 34*

*defaultConfig {*

*applicationId = "com.example.paintingapp" minSdk = 33*

*targetSdk = 34*

*versionCode = 1*

*versionName = "1.0"*

*testInstrumentationRunner =*

*"androidx.test.runner.AndroidJUnitRunner"*

*}*

*buildTypes {*

*release {*

*isMinifyEnabled = false proguardFiles(*

*getDefaultProguardFile("proguard-android-optimize.txt"), "proguard-rules.pro"*

*)*

*}*

*}*

*compileOptions {*

*sourceCompatibility = JavaVersion.VERSION\_1\_*

*targetCompatibility = JavaVersion.VERSION\_1\_8*

*}*

*}*

*dependencies {*

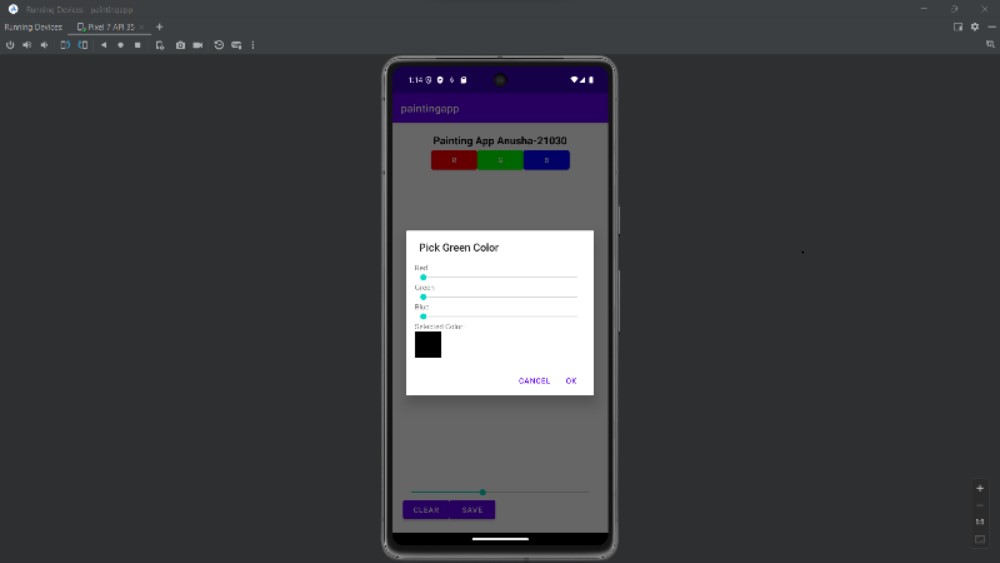
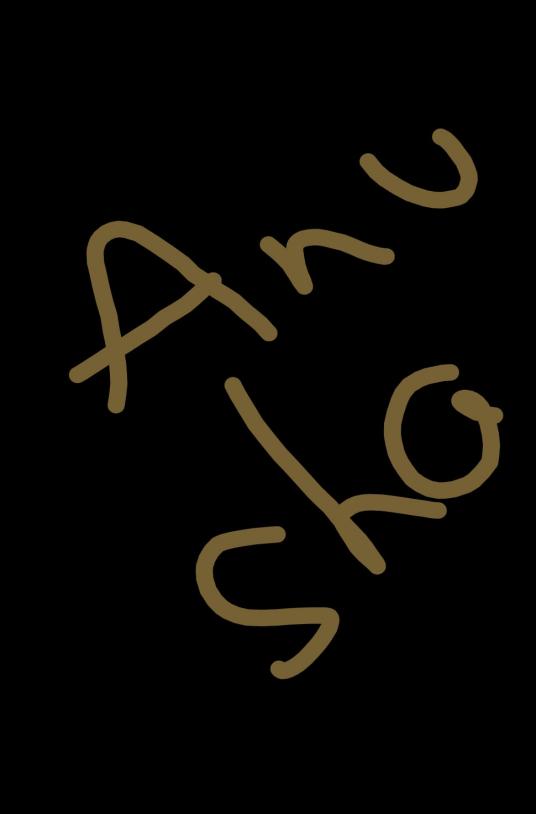
*implementation(libs.appcompat) implementation(libs.material) implementation(libs.activity) implementation(libs.constraintlayout) testImplementation(libs.junit)*

*androidTestImplementation(libs.ext.junit)*

*androidTestImplementation(libs.espresso.core)*

*}*

**OutPuts:**

* *