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CSE-A
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LAB-9

Application Apk:
https://drive.google.com/file/d/1tcc-DKHSVz5EN6CJcoTLWEnsMOeLttG8/view?usp=sharing

Mobile Application Development Laboratory – 9

Experiment Name: Working With Sqlite database, Action Bar and Widgets.

Date: 19-04-2021

Aim: Design an Android application using Android Studio with the following specifications.

i) Colour matching game - Have 6 different color boxes and 6 textviews with the name of the colours. The user can drag the text and place it on the boxes. Slightly dim the colour of the box, when the text is dragged inside the box. Have a button, upon clicking check whether the colour matches with the text. Have menu items for exiting the game, and refreshing the game.

ii) Upon matching (player wins or loses), display the notification and restart the game. Upon clicking on the notification, redirect to a page with score card which displays previous 3 results of the user.

Description of App: (The detailed working can be seen in screenshots)

Upon entering, there are 6 colors and 6 Color Codes, you can drag and drop the color codes onto the color and press submit. The notification will redirect you to the

Note: Whenever a user does something unexpected like not giving input etc, then I flash a message.

Device Specifications:
Both the app run on min SDK version of 16 (so anything above API 16 - Android 4.1 - Jelly Bean would run this app which is 99.8% of devices). Currently, I have run it on Pixel API 30 for outputs. Only default libraries were used for making any app and nothing additional.

Name: Pixel_3
Resolution: 1080 X 2220
API: 30
Target: Android 11.0
hw.lcd.height: 2220
hw.accelerometer: yes
hw.device.manufacturer: Google
hw.lcd.width: 1080
hw.lcd.density: 440
hw.cpu.ncore: 6
hw.sensors.proximity: yes
hw.sensors.orientation: yes
hw.gpu.enabled: yes

Technical Concepts Learnt:

- **Ui perspective:**
    1. To Highlight the border of the text view using shape, solid and stroke.

- **Application Perspective:**

1. Drag and Drop
2. Notification
3. Shared Preferences
4. Intent and bundles

Source Code: The link of my app zip

activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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:orientation="vertical"
   tools:context=".MainActivity">

   <TextView
       android:layout_width="wrap_content"
       android:layout_height="wrap_content"
       android:layout_gravity="center_horizontal"
       android:layout_marginVertical="20dp"
       android:text="Drag &amp;amp; Drop the colours"
       android:textColor="@color/black"
```

```
        android:textSize="30sp"
        android:textStyle="bold|italic" />

    <LinearLayout
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginVertical="20dp"
        android:orientation="horizontal">

        <TextView
            android:id="@+id/t1"
            android:layout_width="87dp"
            android:layout_height="50dp"
            android:layout_marginHorizontal="20dp"
            android:background="@drawable/back"
            android:gravity="center"
            android:textColor="@color/black"
            android:textSize="16sp" />

        <TextView
            android:id="@+id/t2"
            android:layout_width="87dp"
            android:layout_height="50dp"
            android:layout_marginHorizontal="20dp"
            android:background="@drawable/back"
            android:gravity="center"
            android:textColor="@color/black"
            android:textSize="16sp" />

        <TextView
            android:id="@+id/t3"
            android:layout_width="87dp"
            android:layout_height="50dp"
            android:layout_marginHorizontal="20dp"
            android:background="@drawable/back"
            android:gravity="center"
            android:textColor="@color/black"
            android:textSize="16sp" />


    </LinearLayout>

    <LinearLayout
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginVertical="20dp"
        android:orientation="horizontal">
```

```
    <TextView
        android:id="@+id/t4"
        android:layout_width="87dp"
        android:layout_height="50dp"
        android:layout_marginHorizontal="20dp"
        android:background="@drawable/back"
        android:gravity="center"
        android:textColor="@color/black"
        android:textSize="16sp" />

    <TextView
        android:id="@+id/t5"
        android:layout_width="87dp"
        android:layout_height="50dp"
        android:layout_marginHorizontal="20dp"
        android:background="@drawable/back"
        android:gravity="center"
        android:textColor="@color/black"
        android:textSize="16sp" />

    <TextView
        android:id="@+id/t6"
        android:layout_width="87dp"
        android:layout_height="50dp"
        android:layout_marginHorizontal="20dp"
        android:background="@drawable/back"
        android:gravity="center"
        android:textColor="@color/black"
        android:textSize="16sp" />


</LinearLayout>

<LinearLayout
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginVertical="20dp"
    android:orientation="horizontal">

    <Button
        android:id="@+id/c1"
        android:layout_width="87dp"
        android:layout_height="60dp"
        android:layout_marginHorizontal="20dp" />

    <Button
```

```
            android:id="@+id/c2"
            android:layout_width="87dp"
            android:layout_height="60dp"
            android:layout_marginHorizontal="20dp" />

        <Button
            android:id="@+id/c3"
            android:layout_width="87dp"
            android:layout_height="60dp"
            android:layout_marginHorizontal="20dp" />


    </LinearLayout>

    <LinearLayout
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginVertical="20dp"
        android:orientation="horizontal">

        <Button
            android:id="@+id/c4"
            android:layout_width="87dp"
            android:layout_height="60dp"
            android:layout_marginHorizontal="20dp" />

        <Button
            android:id="@+id/c5"
            android:layout_width="87dp"
            android:layout_height="60dp"
            android:layout_marginHorizontal="20dp" />

        <Button
            android:id="@+id/c6"
            android:layout_width="87dp"
            android:layout_height="60dp"
            android:layout_marginHorizontal="20dp" />


    </LinearLayout>

    <Button
        android:id="@+id/submit"
        android:layout_width="200dp"
        android:layout_height="wrap_content"
        android:layout_gravity="center_horizontal"
        android:layout_marginTop="40dp"
```

```
        android:text="Submit" />

</LinearLayout>
```

activity_score.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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:orientation="vertical"
    tools:context=".ScoreActivity">

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center_horizontal"
        android:layout_marginVertical="20dp"
        android:text="Your last 3 scores are"
        android:textColor="@color/black"
        android:textSize="30sp"
        android:textStyle="bold|italic" />

    <TextView
        android:id="@+id/s1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center_horizontal"
        android:layout_marginVertical="10dp"
        android:textColor="@color/black"
        android:textSize="20sp"
        android:textStyle="bold|italic" />

    <TextView
        android:id="@+id/s2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center_horizontal"
        android:layout_marginVertical="10dp"
        android:textColor="@color/black"
        android:textSize="20sp"
        android:textStyle="bold|italic" />
```

```
    <TextView
        android:id="@+id/s3"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_gravity="center_horizontal"
        android:layout_marginVertical="10dp"
        android:textColor="@color/black"
        android:textSize="20sp"
        android:textStyle="bold|italic" />

</LinearLayout>
```

menu.xml

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

    <item
        android:id="@+id/newGame"
        android:title="New Game"/>

    <item
        android:id="@+id/refresh"
        android:title="Refresh"/>

    <item
        android:id="@+id/exit"
        android:title="Exit"/>
</menu>
```

MainActivity.java

```
package com.example.lab9;

import androidx.annotation.RequiresApi;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.NotificationCompat;
import androidx.core.app.NotificationManagerCompat;

import android.app.Notification;
import android.app.NotificationManager;
import android.app.PendingIntent;
import android.content.ClipData;
import android.content.Context;
import android.content.Intent;
import android.content.SharedPreferences;
```

```
import android.os.Build;
import android.os.Bundle;
import android.view.DragEvent;
import android.view.Menu;
import android.view.MenuItem;
import android.view.MotionEvent;
import android.view.View;
import android.widget.Button;
import android.widget.ImageView;
import android.widget.TextView;
import android.widget.Toast;

import java.util.Random;

public class MainActivity extends AppCompatActivity {

   TextView t1, t2, t3, t4, t5, t6;
   Button c1, c2, c3, c4, c5, c6, submit;
   String s[] = {"Gray", "Red", "LightRed", "DarkBlue", "SkyBlue", "LightGreen",
"DarkGreen", "LimeYellow", "DarkYellow", "Orange", "GreenBlue", "Pink", "Violet",
"Purple"};
   int score = 0;
   String a1 = "NP", a2 = "NP", a3 = "NP";
   NotificationManagerCompat notificationManager;

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

       t1 = findViewById(R.id.t1);
       t2 = findViewById(R.id.t2);
       t3 = findViewById(R.id.t3);
       t4 = findViewById(R.id.t4);
       t5 = findViewById(R.id.t5);
       t6 = findViewById(R.id.t6);

       c1 = findViewById(R.id.c1);
       c2 = findViewById(R.id.c2);
       c3 = findViewById(R.id.c3);
       c4 = findViewById(R.id.c4);
       c5 = findViewById(R.id.c5);
       c6 = findViewById(R.id.c6);
       submit = findViewById(R.id.submit);

       shuffleArray(14);
       t1.setText(s[0]);
```

```
        t2.setText(s[1]);
        t3.setText(s[2]);
        t4.setText(s[3]);
        t5.setText(s[4]);
        t6.setText(s[5]);

        shuffleArray(6);
        c1.setBackgroundColor(getResources().getColor(colour(s[0])));
        c2.setBackgroundColor(getResources().getColor(colour(s[1])));
        c3.setBackgroundColor(getResources().getColor(colour(s[2])));
        c4.setBackgroundColor(getResources().getColor(colour(s[3])));
        c5.setBackgroundColor(getResources().getColor(colour(s[4])));
        c6.setBackgroundColor(getResources().getColor(colour(s[5])));

        t1.setOnTouchListener(new ChoiceTouchListener());
        t2.setOnTouchListener(new ChoiceTouchListener());
        t3.setOnTouchListener(new ChoiceTouchListener());
        t4.setOnTouchListener(new ChoiceTouchListener());
        t5.setOnTouchListener(new ChoiceTouchListener());
        t6.setOnTouchListener(new ChoiceTouchListener());

        c1.setOnDragListener(new ChoiceDragListener());
        c2.setOnDragListener(new ChoiceDragListener());
        c3.setOnDragListener(new ChoiceDragListener());
        c4.setOnDragListener(new ChoiceDragListener());
        c5.setOnDragListener(new ChoiceDragListener());
        c6.setOnDragListener(new ChoiceDragListener());

        notificationManager = NotificationManagerCompat.from(this);

        SharedPreferences sp = getSharedPreferences("myprefs", Context.MODE_PRIVATE);
        SharedPreferences.Editor ed = sp.edit();
        if (!sp.contains("s1")) {
            ed = sp.edit();
            ed.putString("s1", a1);
            ed.putString("s2", a2);
            ed.putString("s3", a3);
            ed.commit();
        }

        SharedPreferences.Editor finalEd = ed;

        submit.setOnClickListener(new View.OnClickListener() {

            @RequiresApi(api = Build.VERSION_CODES.M)
            @Override
            public void onClick(View v) {
```

```
                if (c1.getText().toString().matches("") ||
c2.getText().toString().matches("") || c3.getText().toString().matches("") ||
c4.getText().toString().matches("") || c5.getText().toString().matches("") ||
c6.getText().toString().matches("")) {
                    Toast.makeText(MainActivity.this, "Please fill all the options",
Toast.LENGTH_SHORT).show();
                    return;
                }
                score = 0;
                if (c1.getText().toString().matches(s[0]))
                    score++;
                if (c2.getText().toString().matches(s[1]))
                    score++;
                if (c3.getText().toString().matches(s[2]))
                    score++;
                if (c4.getText().toString().matches(s[3]))
                    score++;
                if (c5.getText().toString().matches(s[4]))
                    score++;
                if (c6.getText().toString().matches(s[5]))
                    score++;
                a1 = sp.getString("s1", "");
                a2 = sp.getString("s2", "");
                a3 = sp.getString("s3", "");
                a3 = a2;
                a2 = a1;
                a1 = String.valueOf(score);
                finalEd.putString("s1", a1);
                finalEd.putString("s2", a2);
                finalEd.putString("s3", a3);
                finalEd.apply();
                sendNotif();
                newGame();
            }
        });
    }


    public int colour(String s) {
        if (s.matches("Gray"))
            return R.color.Gray;
        if (s.matches("Red"))
            return R.color.Red;
        if (s.matches("LightRed"))
            return R.color.LightRed;
        if (s.matches("DarkBlue"))
            return R.color.DarkBlue;
```

```
        if (s.matches("SkyBlue"))
            return R.color.SkyBlue;
        if (s.matches("LightGreen"))
            return R.color.LightGreen;
        if (s.matches("DarkGreen"))
            return R.color.DarkGreen;
        if (s.matches("LimeYellow"))
            return R.color.LimeYellow;
        if (s.matches("DarkYellow"))
            return R.color.DarkYellow;
        if (s.matches("Orange"))
            return R.color.Orange;
        if (s.matches("GreenBlue"))
            return R.color.GreenBlue;
        if (s.matches("Pink"))
            return R.color.Pink;
        if (s.matches("Violet"))
            return R.color.Violet;
        if (s.matches("Purple"))
            return R.color.Purple;
        return 0;
    }

    private void swap(int i, int change) {
        String helper = s[i];
        s[i] = s[change];
        s[change] = helper;
    }

    public void shuffleArray(int n) {
        Random random = new Random();
        random.nextInt();
        for (int i = 0; i < n; i++) {
            int change = i + random.nextInt(n - i);
            swap(i, change);
        }
    }

    public void refresh() {
        c1.setText("");
        c2.setText("");
        c3.setText("");
        c4.setText("");
        c5.setText("");
        c6.setText("");
    }
```

```
    public void newGame() {
        refresh();

        shuffleArray(14);
        t1.setText(s[0]);
        t2.setText(s[1]);
        t3.setText(s[2]);
        t4.setText(s[3]);
        t5.setText(s[4]);
        t6.setText(s[5]);

        shuffleArray(6);
        c1.setBackgroundColor(getResources().getColor(colour(s[0])));
        c2.setBackgroundColor(getResources().getColor(colour(s[1])));
        c3.setBackgroundColor(getResources().getColor(colour(s[2])));
        c4.setBackgroundColor(getResources().getColor(colour(s[3])));
        c5.setBackgroundColor(getResources().getColor(colour(s[4])));
        c6.setBackgroundColor(getResources().getColor(colour(s[5])));
    }

    public void sendNotif() {
        String title = "You Lost";
        if (score == 6)
            title = "You Won";
        String message = "Your score is " + score + "/6";
        Intent i = new Intent(this, ScoreActivity.class);
        PendingIntent pi = PendingIntent.getActivity(this, 1, i,
PendingIntent.FLAG_UPDATE_CURRENT);
        Notification notification = new NotificationCompat.Builder(this,
App.CHANNEL_1_ID)
                .setSmallIcon(R.drawable.ic_refresh)
                .setContentTitle(title)
                .setContentText(message)
                .setPriority(NotificationCompat.PRIORITY_HIGH)
                .setCategory(NotificationCompat.CATEGORY_MESSAGE)
                .setContentIntent(pi)
                .setAutoCancel(true)
                .build();
        notificationManager.notify(1, notification);
    }

    private final class ChoiceTouchListener implements View.OnTouchListener {

        @Override
        public boolean onTouch(View v, MotionEvent event) {
            if ((event.getAction() == MotionEvent.ACTION_DOWN) && ((TextView)
v).getText().toString() != null) {
```

```
            ClipData data = ClipData.newPlainText("", "");
            View.DragShadowBuilder shadowBuilder = new View.DragShadowBuilder(v);
            v.startDrag(data, shadowBuilder, v, 0);
            return true;
        } else
            return false;
    }
}


@Override
public boolean onCreateOptionsMenu(Menu menu) {
    getMenuInflater().inflate(R.menu.menu, menu);
    return true;
}

@Override
public boolean onOptionsItemSelected(MenuItem item) {
    int id = item.getItemId();
    switch (id) {
        case R.id.newGame:
            Toast.makeText(this, "New Game", Toast.LENGTH_SHORT).show();
            newGame();
            return true;
        case R.id.refresh:
            Toast.makeText(this, "Refreshed", Toast.LENGTH_SHORT).show();
            refresh();
            return true;
        case R.id.exit:
            Toast.makeText(this, "Exiting", Toast.LENGTH_SHORT).show();
            finish();
            return true;
        default:
            return super.onOptionsItemSelected(item);
    }
}


public final class ChoiceDragListener implements View.OnDragListener {

    @Override
    public boolean onDrag(View v, DragEvent event) {
        switch (event.getAction()) {
            case DragEvent.ACTION_DRAG_STARTED:
                break;

            case DragEvent.ACTION_DRAG_ENTERED:
```

```
                    break;

                case DragEvent.ACTION_DRAG_EXITED:
                    break;

                case DragEvent.ACTION_DRAG_ENDED:
                    break;

                case DragEvent.ACTION_DROP:
                    TextView t = (TextView) event.getLocalState();
                    String s = t.getText().toString();
                    ((Button) v).setText(s);
                    break;
            }
            return true;
        }
    }
}
```

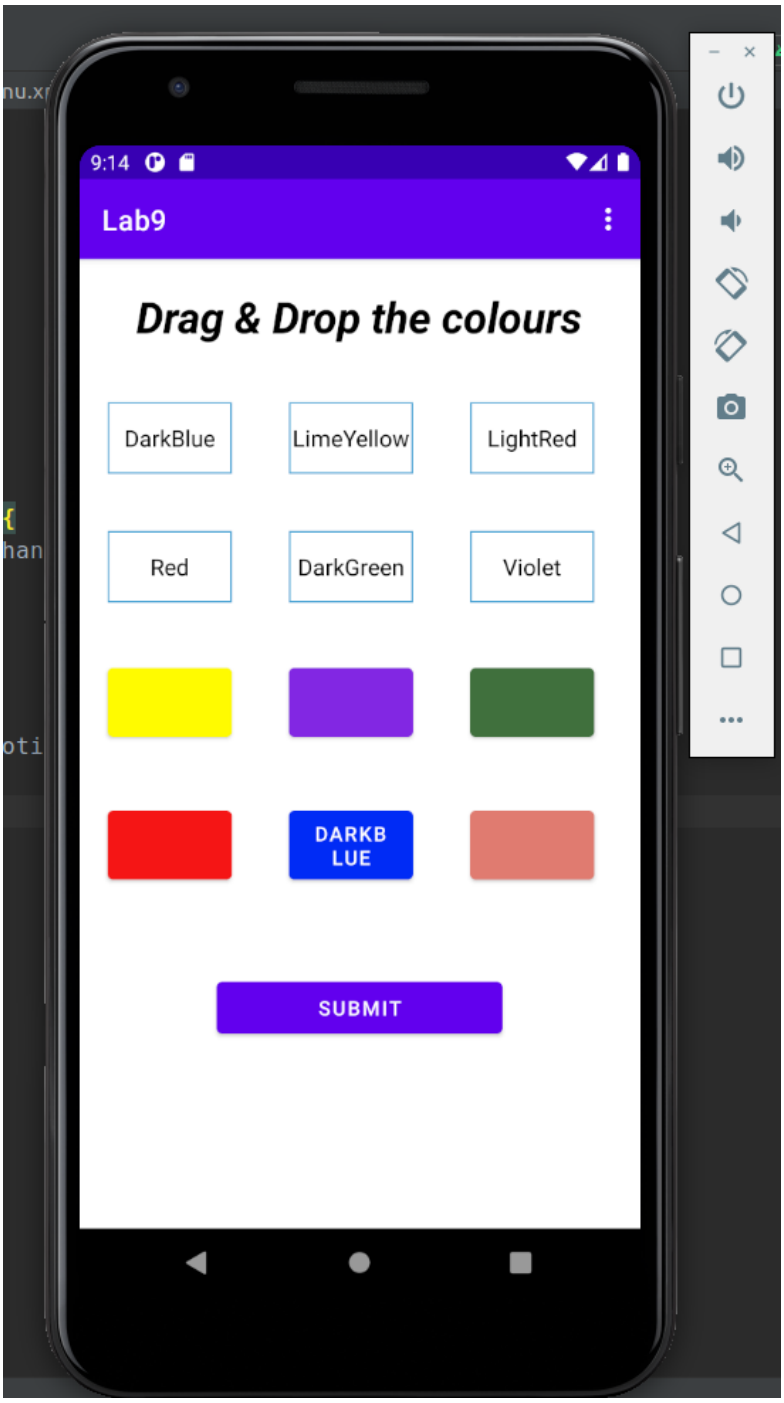
ScoreActivity.java

```
package com.example.lab9;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Context;
import android.content.SharedPreferences;
import android.os.Bundle;
import android.widget.TextView;

public class ScoreActivity extends AppCompatActivity {
    TextView s1,s2,s3;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_score);
        s1 = findViewById(R.id.s1);
        s2 = findViewById(R.id.s2);
        s3 = findViewById(R.id.s3);
        SharedPreferences sp = getSharedPreferences("myprefs", Context.MODE_PRIVATE);
        s1.setText(sp.getString("s1",""));
        s2.setText(sp.getString("s2",""));
        s3.setText(sp.getString("s3",""));
    }
}
```

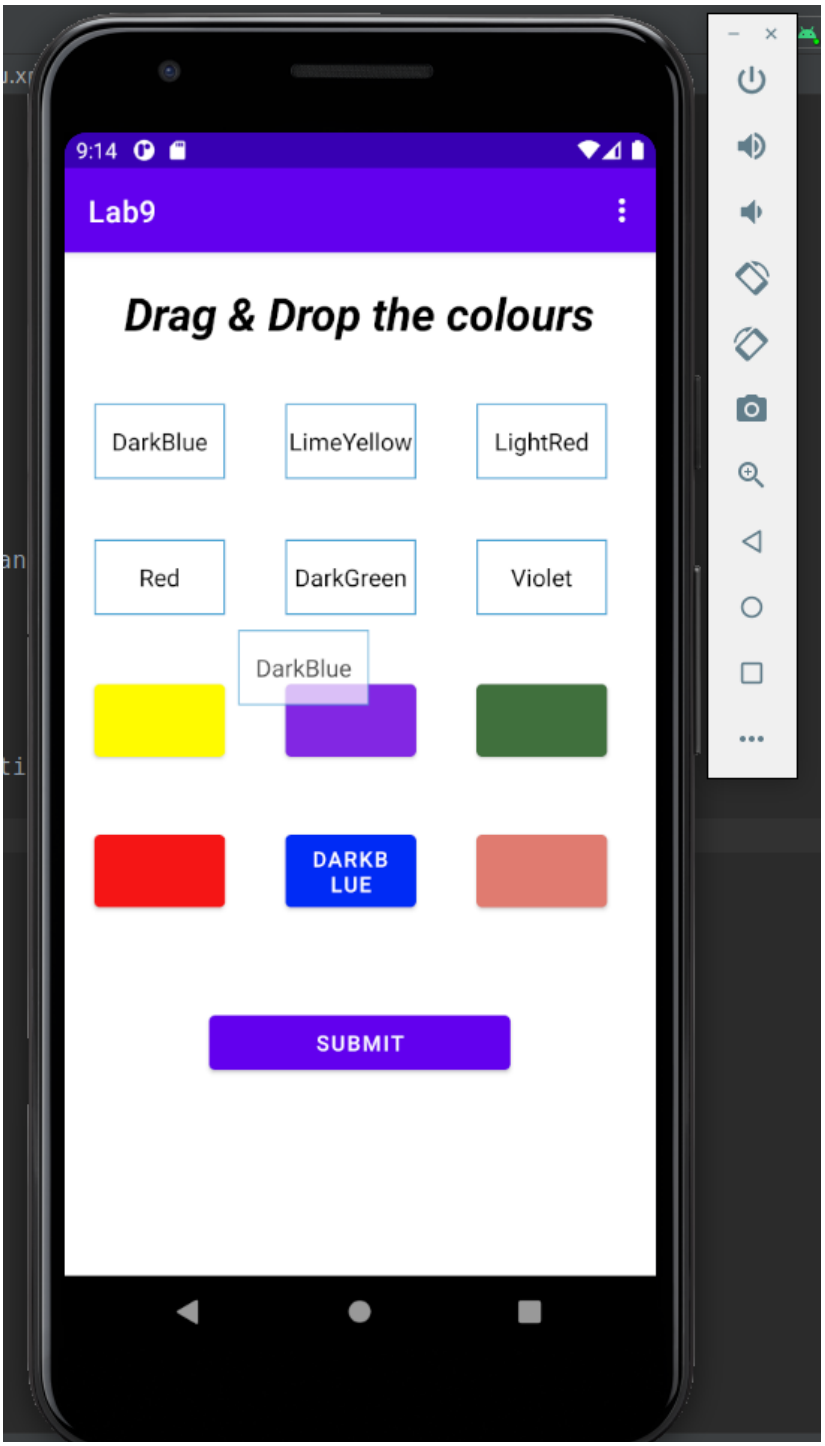
App.java

```
package com.example.lab9;

import android.app.Application;
import android.app.NotificationChannel;
import android.app.NotificationManager;
import android.os.Build;

public class App extends Application {
   public static final String CHANNEL_1_ID = "channel1";
   @Override
   public void onCreate() {
       super.onCreate();
       createNotificationChannels();
   }
   private void createNotificationChannels() {
       if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.O) {
           NotificationChannel channel1 = new NotificationChannel(
                   CHANNEL_1_ID,
                   "Channel 1",
                   NotificationManager.IMPORTANCE_HIGH
           );
           channel1.setDescription("This is Channel 1");
           NotificationManager manager =
getSystemService(NotificationManager.class);
           manager.createNotificationChannel(channel1);
       }
   }
}
```

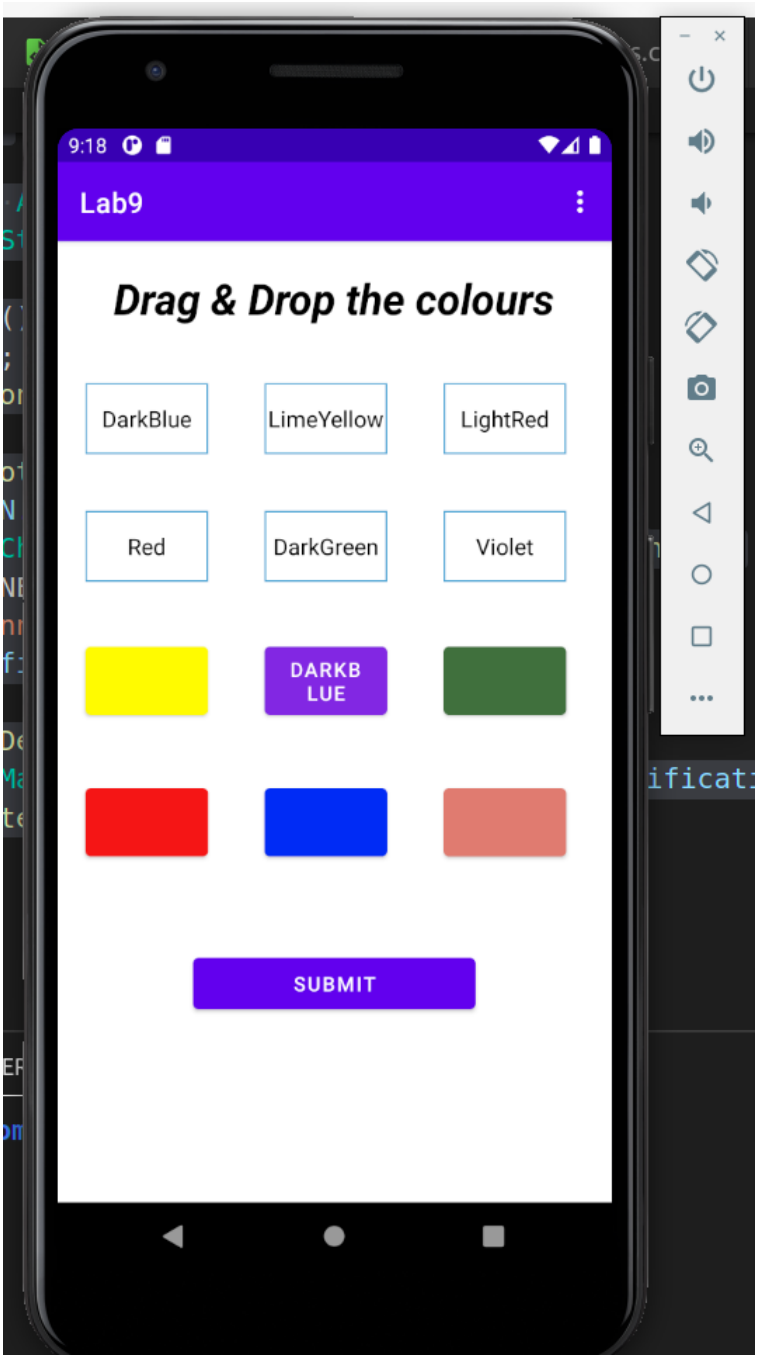
Screenshots:
Start:



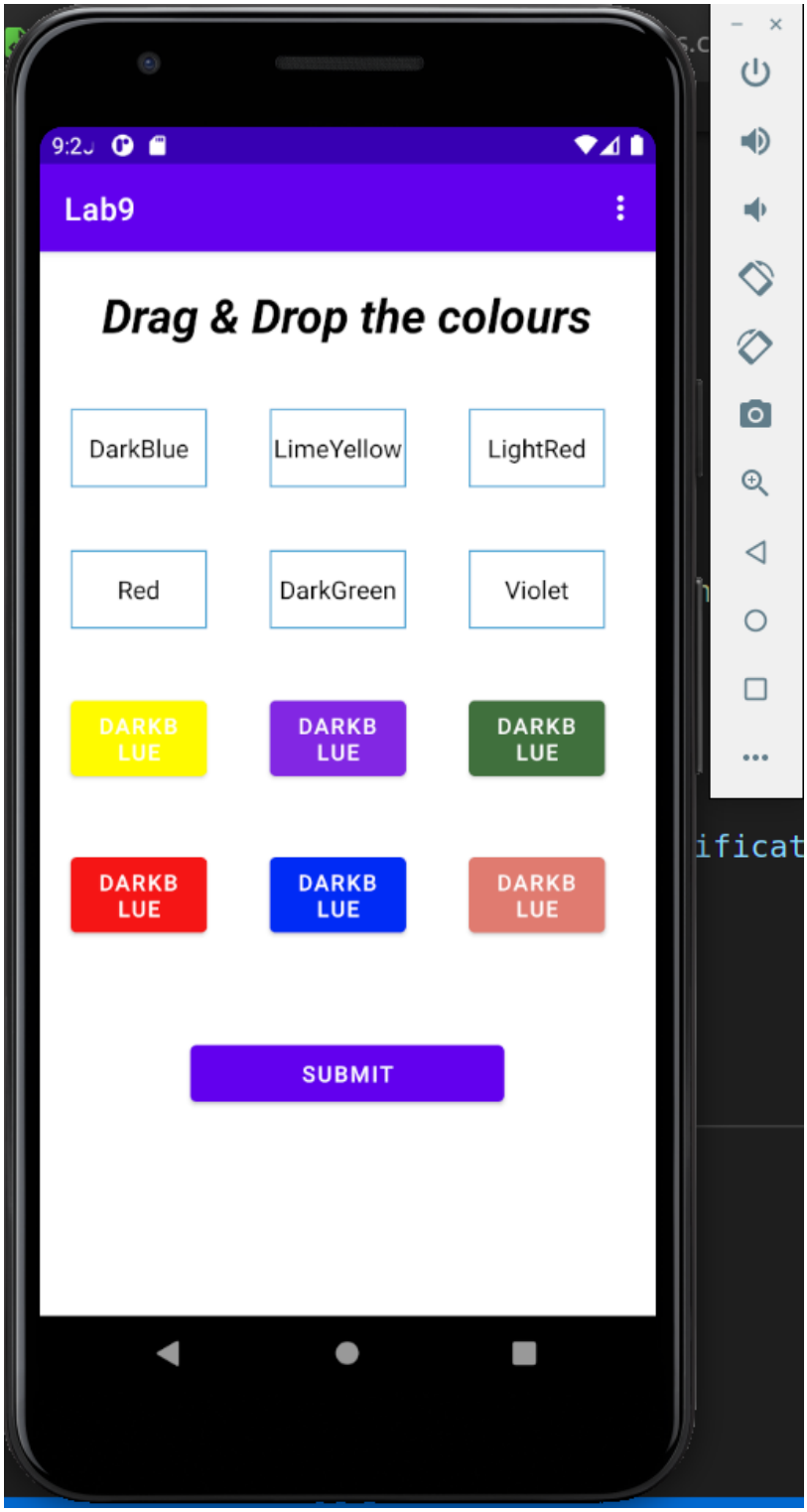
Dragging DarkBlue text on to the purple box:



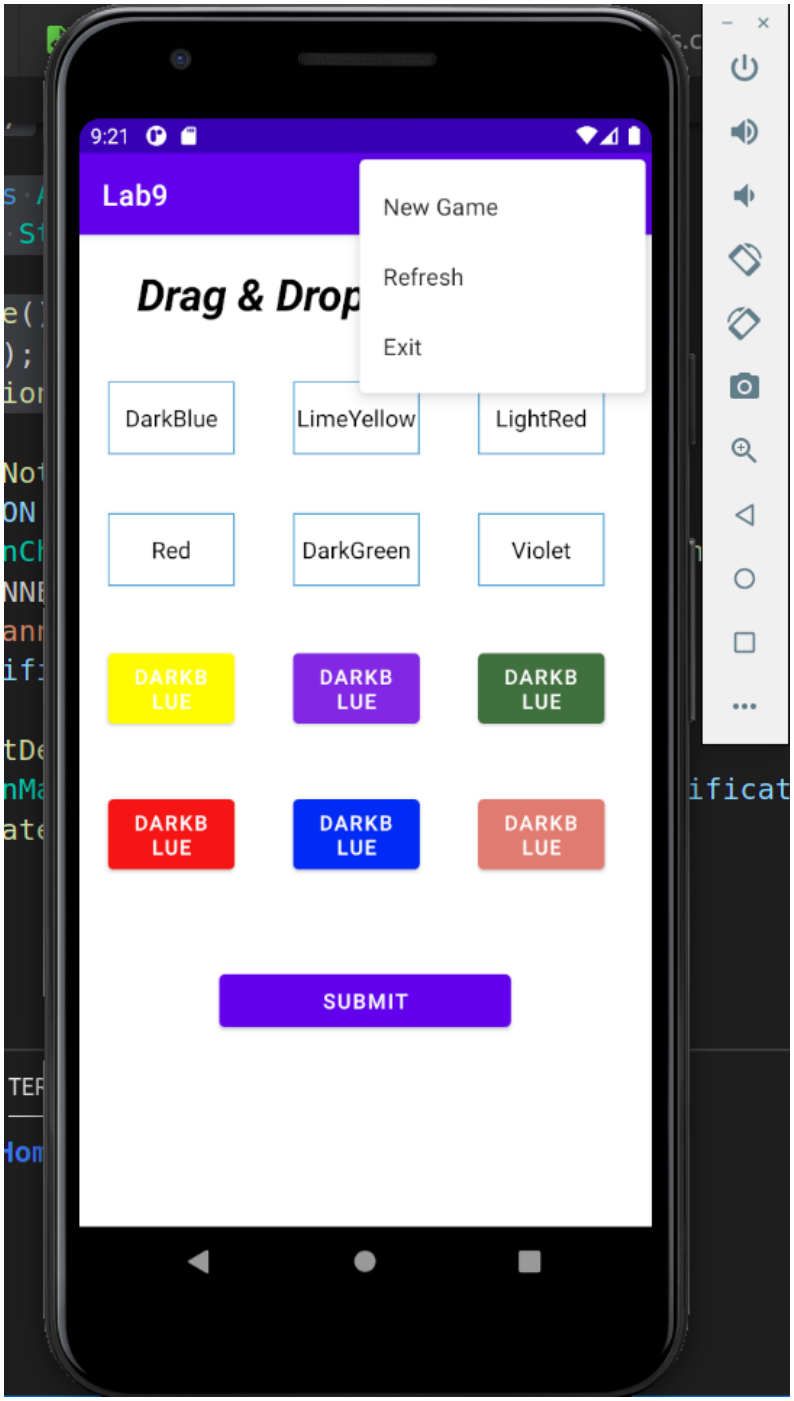
After I finger up, text goes to its place:



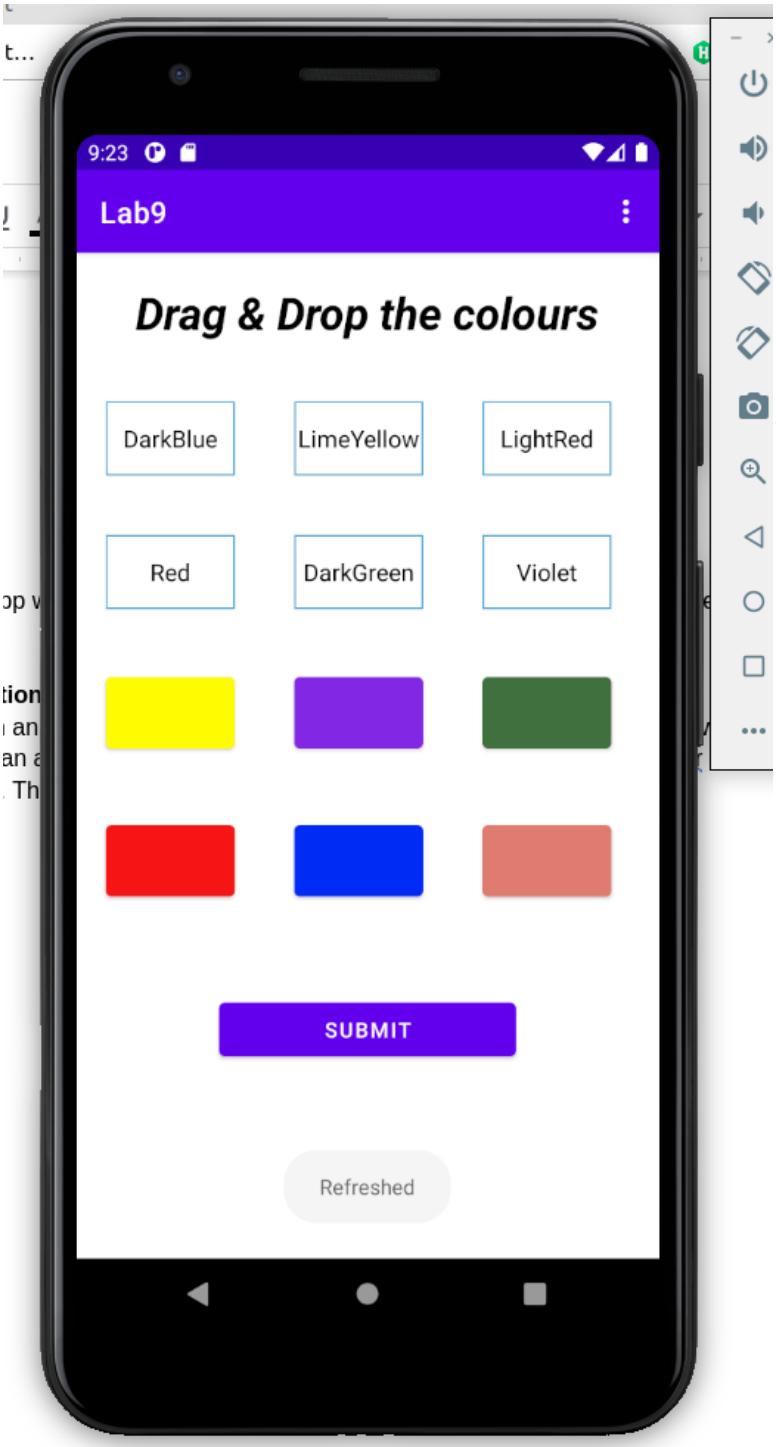
Let me put DarkBlue in all the boxes:



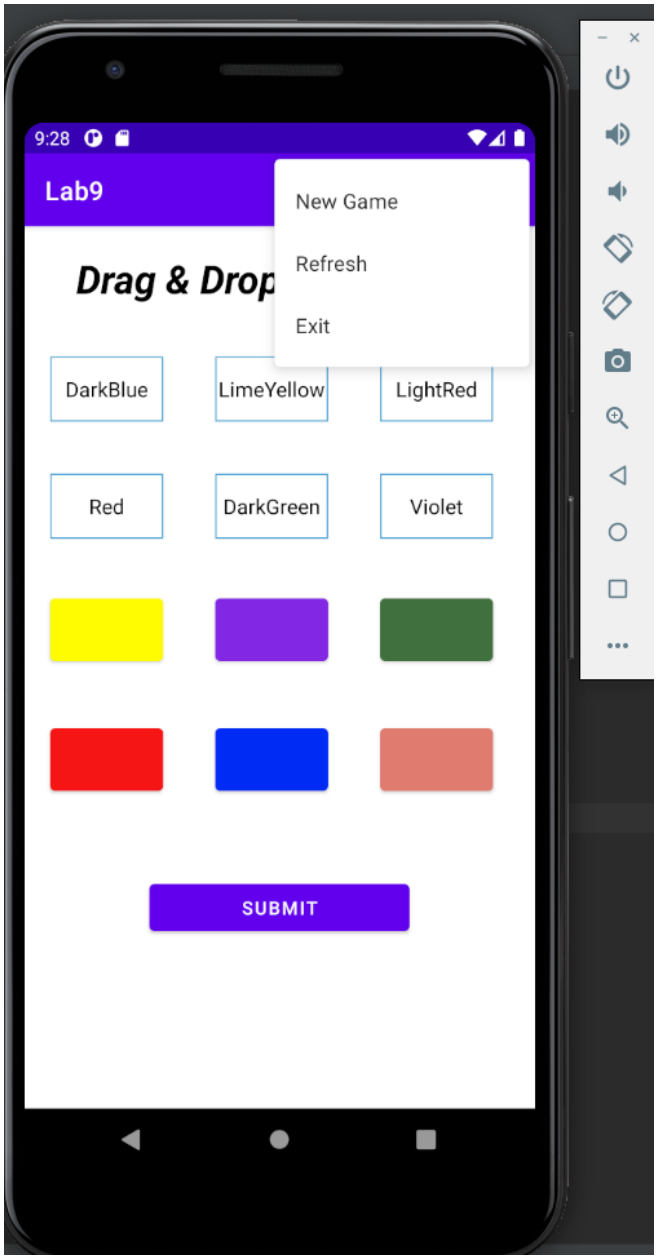
Since DarkBlue is obviously not correct value for all boxes so I can refresh(Which will erase any text present in the box):



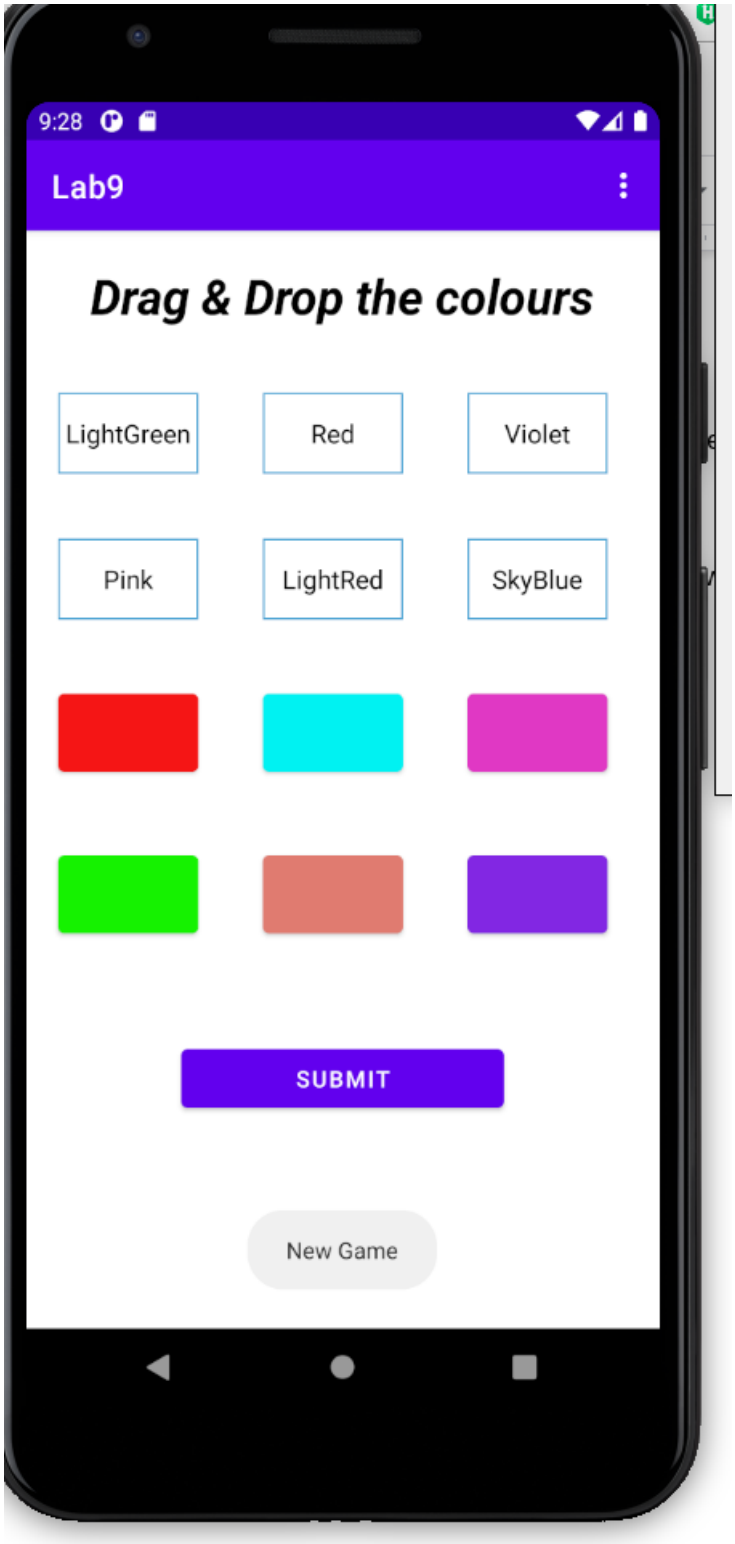
After clicking Refresh, all color boxes are empty: (I show a message using toast as well)



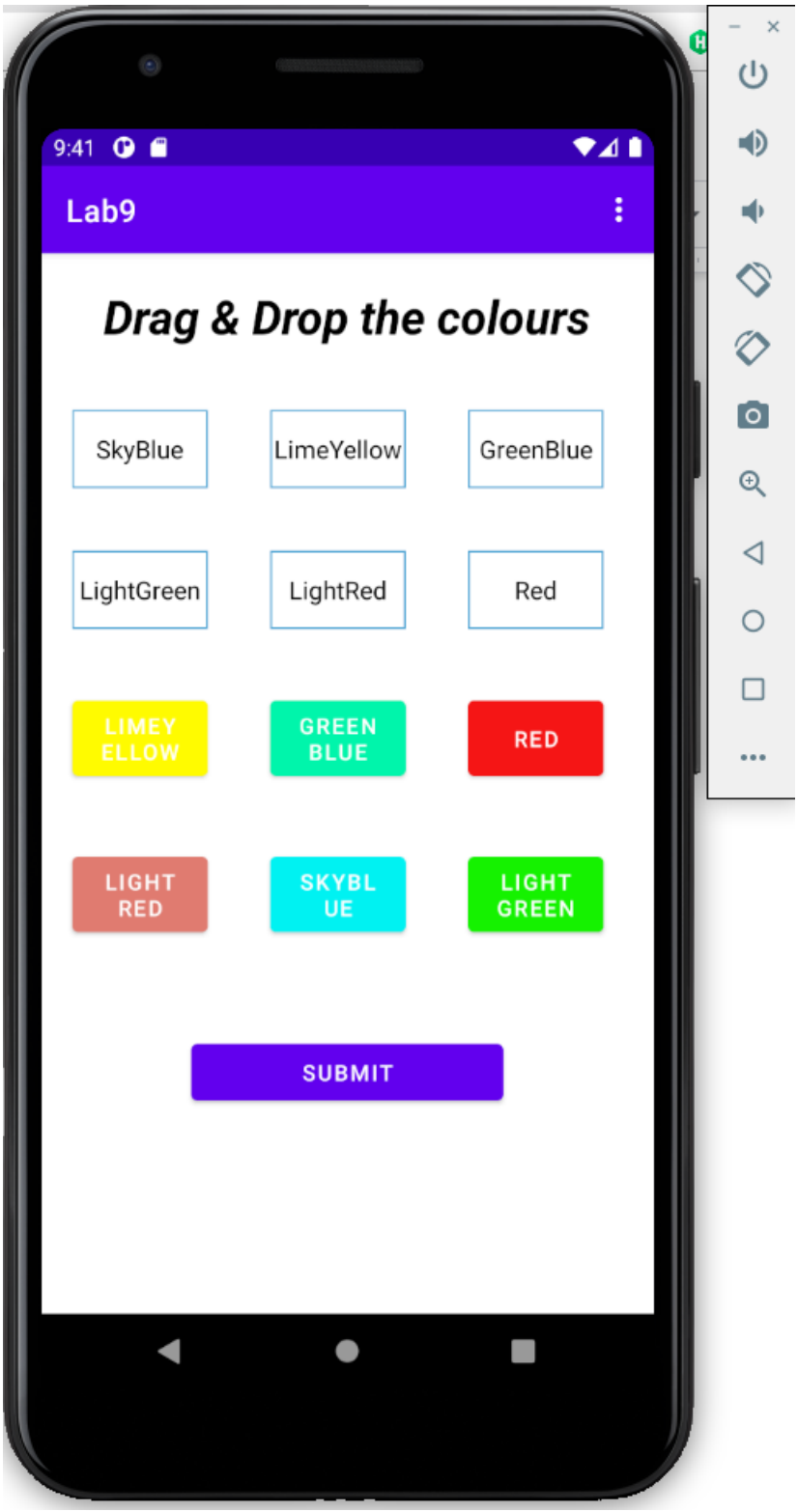
If I press new game, then it will generate a new Game with a different colour combination:



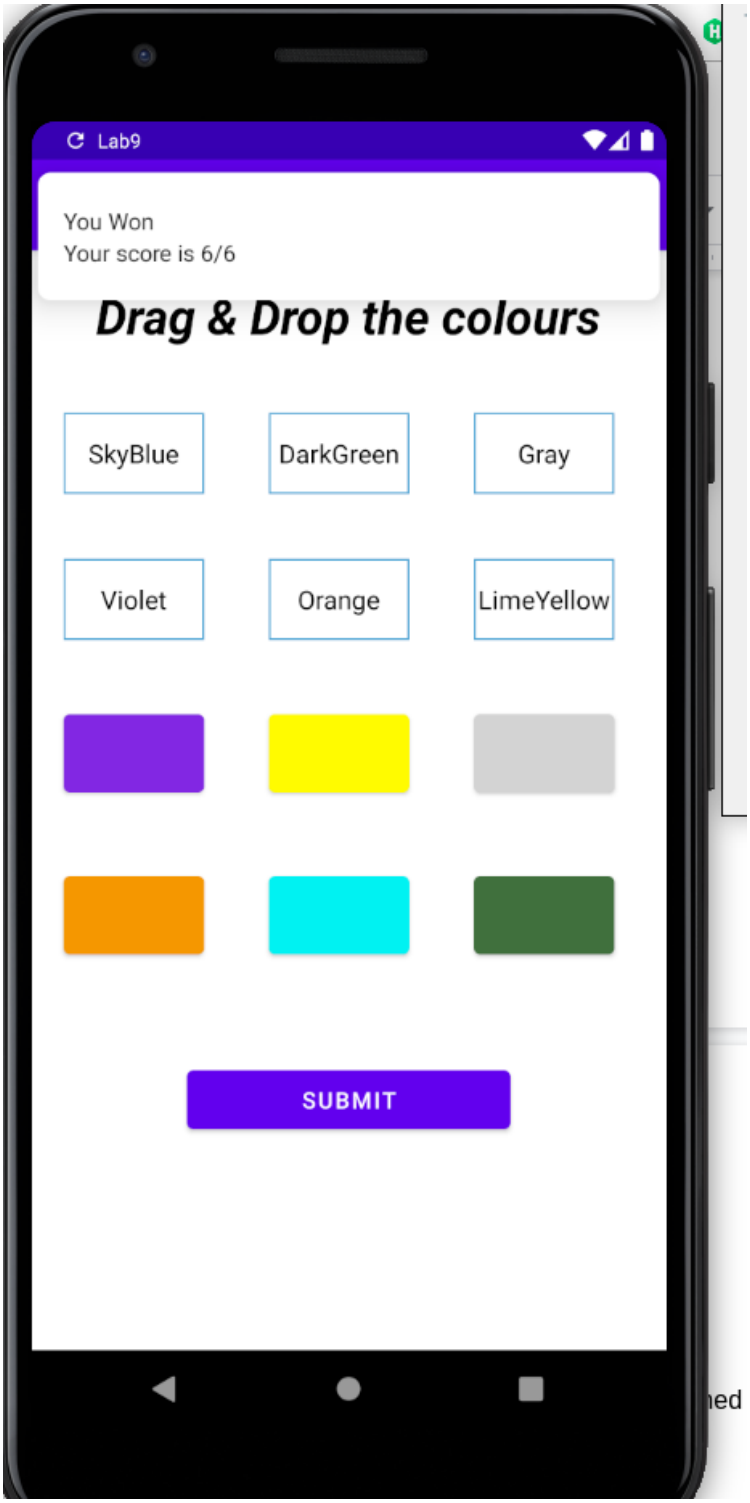
After I press:



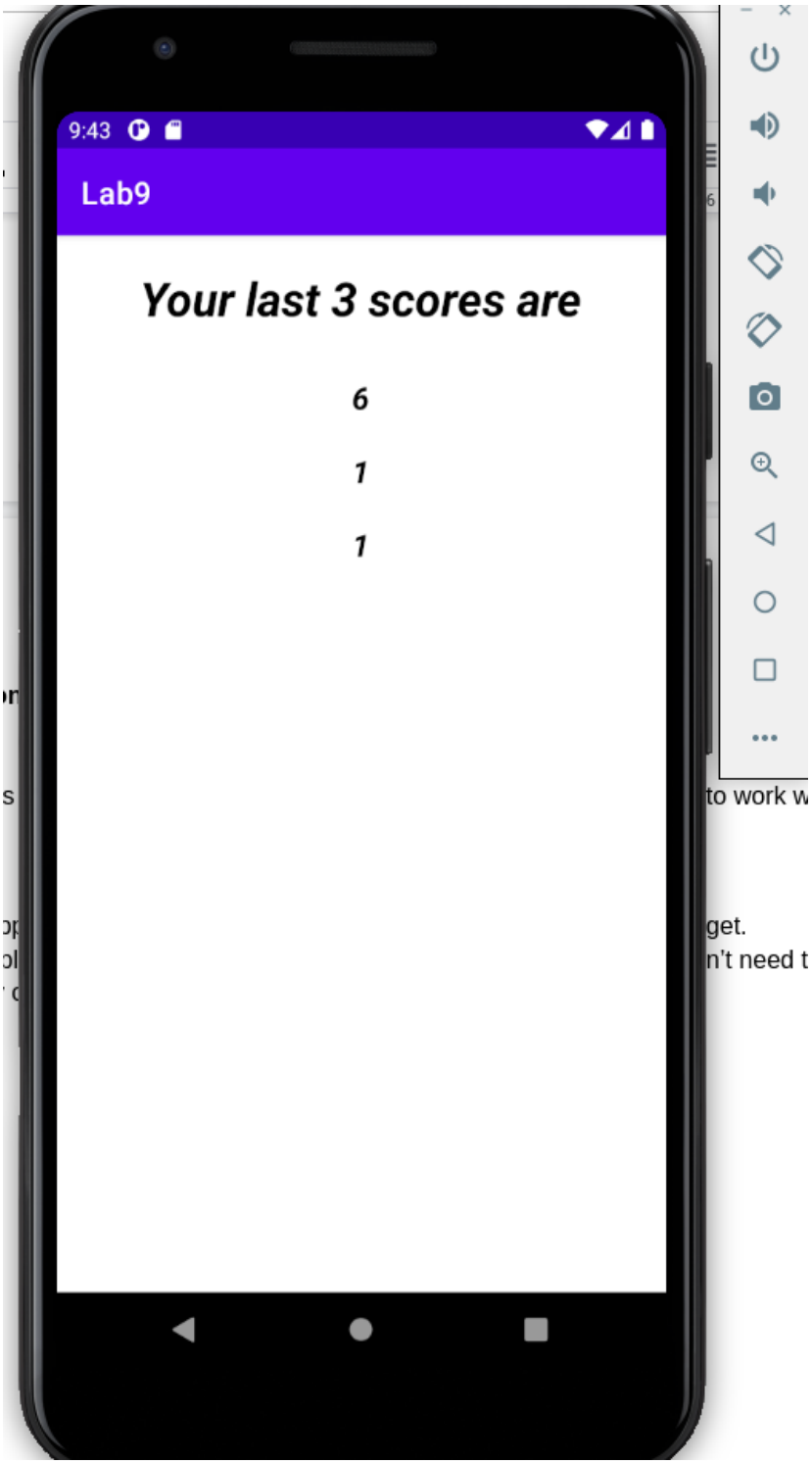
After putting all texts properly:



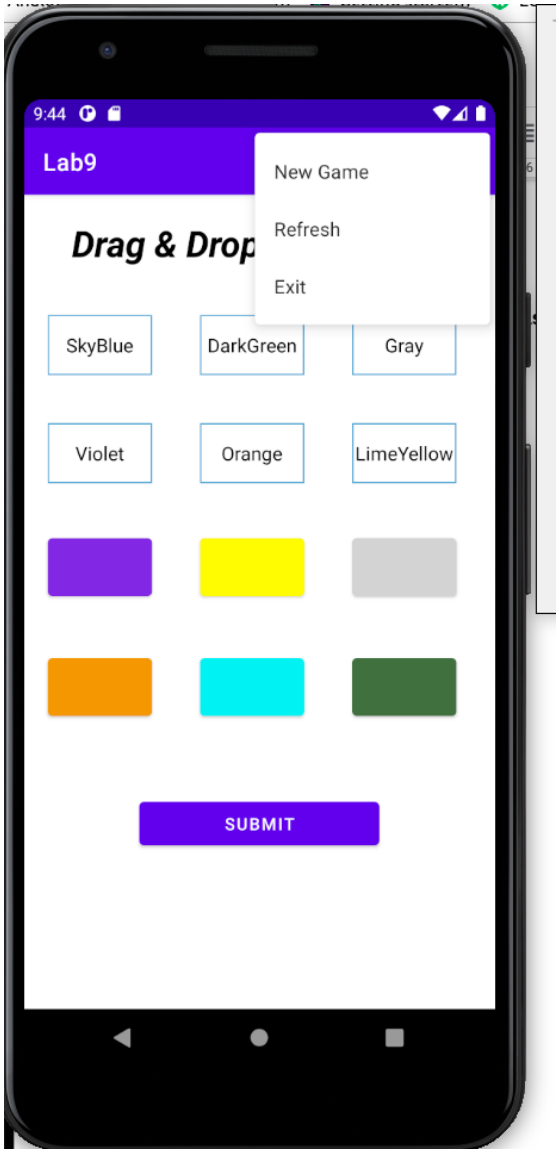
Now pressing Submit: (I get notification)



If I press On Notification: (will be redirected to score activity, where I can see the last 3 scores of mine):



Last Functionality - Exit:



If I press it exits:(Showing toast message):

Outcomes: The app was developed and run without any bugs/crashes. Thus, the App has been successfully built to play a colour matching game; upon submission, the game will notify about winning or not. Upon clicking the notification, it will redirect to show the last three scores of the contestant.

We learnt Drag & Drop and Notification in detail.

Practical Applications:

1. Can design an application that has drag operation.
2. Can create a website where users can just drag and drop their to-do item in their order; this way, it'll be more user friendly.