

EXPERIMENT 6

Aim :

Develop a Game Application for Mobile Phone using Android Studio.

Theory :

The Tic Tac Toe Game is a two-player game. Each player chooses between X and O. Only one move at a time is allowed simultaneously. In a move, a player can choose any position from a 3×3 grid. The goal here is to get three consecutive X or O in a horizontal, vertical, or diagonal direction. There will be a single activity in this application. This activity will show a 3×3 grid. The status of the game will be displayed at the bottom.

Requirements :

- Android Studio
- Knowledge of XML and JAVA
- Android emulator (or) Android Mobile

Steps for Tic Tac Toe Game Application :

Step 1: Create a **New Project**

Create a new project in Android Studio and select **Java** as the programming language.

Step 2: Before going to the coding section, first we have to do some pre-task

Save the images of **Grid X** and **O** in drawable folder in resources. Go to **app > res > drawable**.

Change the style to **NoActionBar** in **themes.xml** file:

```
<style name="AppTheme" parent="Theme.AppCompat.NoActionBar">
```

Step 3: Working with **activity_main.xml** file

The XML codes are used to build the structure of the activity as well as its styling part. It contains a **TextView** at the very top of the activity to display the title. Then it contains an **ImageView** of the grid and in each box, there is an **ImageView**. At the bottom of the activity, there is a **TextView** to display the status of the game.

Step 4: Working with **MainActivity.java** file

We will create a two-dimensional array that will store all the winning positions. We will create a function that will run when a box inside the grid is clicked. Inside this function, we will first check if the box selected is empty or not. After that, we will set the image of X if the last move was of O or we will set the image of O if the last move was of X. Then we will check if the move has reached the winning position and then reset the game.

Code :

activity_main.xml file

```
<?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="@color/green"
    tools:context=".MainActivity">
    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="23dp"
        android:text="Tic Tac Toe"
        android:textSize="45sp"
        android:textStyle="bold"
        app:fontFamily="cursive"
        app:layout_constraintLeft_toLeftOf="parent"
        app:layout_constraintRight_toRightOf="parent"
        app:layout_constraintTop_toTopOf="parent" />
    <ImageView
        android:id="@+id/imageView"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:contentDescription="Start"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/textView"
        app:srcCompat="@drawable/grid" />
    <LinearLayout
        android:id="@+id/linearLayout"
        android:layout_width="0dp"
        android:layout_height="420dp"
        android:orientation="vertical"
        app:layout_constraintBottom_toBottomOf="@+id/imageView"
        app:layout_constraintEnd_toEndOf="@+id/imageView"
        app:layout_constraintStart_toStartOf="@+id/imageView"
        app:layout_constraintTop_toTopOf="@+id/imageView">
        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:layout_weight="1"
            android:orientation="horizontal">
```

```
<ImageView
    android:id="@+id/imageView0"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:layout_weight="1"
    android:onClick="playerTap"
    android:padding="20sp"
    android:tag="0" />
<ImageView
    android:id="@+id/imageView1"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:layout_weight="1"
    android:onClick="playerTap"
    android:padding="20sp"
    android:tag="1" />
<ImageView
    android:id="@+id/imageView2"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:layout_weight="1"
    android:onClick="playerTap"
    android:padding="20sp"
    android:tag="2" />
</LinearLayout>
<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:layout_weight="1"
    android:orientation="horizontal">
    <ImageView
        android:id="@+id/imageView3"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_weight="1"
        android:onClick="playerTap"
        android:padding="20sp"
        android:tag="3" />
    <ImageView
        android:id="@+id/imageView4"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_weight="1"
        android:onClick="playerTap"
        android:padding="20sp"
        android:tag="4" />
    <ImageView
        android:id="@+id/imageView5"
```

```

        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_weight="1"
        android:onClick="playerTap"
        android:padding="20sp"
        android:tag="5" />
    </LinearLayout>    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:layout_weight="1"
        android:orientation="horizontal">
        <ImageView
            android:id="@+id/imageView6"
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:layout_weight="1"
            android:onClick="playerTap"
            android:padding="20sp"
            android:tag="6" />
        <ImageView
            android:id="@+id/imageView7"
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:layout_weight="1"
            android:onClick="playerTap"
            android:padding="20sp"
            android:tag="7" />
        <ImageView
            android:id="@+id/imageView8"
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            android:layout_weight="1"
            android:onClick="playerTap"
            android:padding="20sp"
            android:tag="8" />
    </LinearLayout>    </LinearLayout>    <TextView
        android:id="@+id/status"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginBottom="15sp"
        android:text="Status"
        android:textSize="28sp"
        android:textStyle="italic"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/linearLayout" />
</androidx.constraintlayout.widget.ConstraintLayout>

```

Code :**MainActivity.java file**

```
import android.os.Bundle;
import android.view.View;
import android.widget.ImageView;
import android.widget.TextView;

import androidx.appcompat.app.AppCompatActivity;

public class MainActivity extends AppCompatActivity {
    boolean gameActive = true;
    int activePlayer = 0;
    int[] gameState = {2, 2, 2, 2, 2, 2, 2, 2, 2};
    int[][] winPositions = {{0, 1, 2}, {3, 4, 5}, {6, 7, 8},
        {0, 3, 6}, {1, 4, 7}, {2, 5, 8},
        {0, 4, 8}, {2, 4, 6}};
    public static int counter = 0;
    public void playerTap(View view) {
        ImageView img = (ImageView) view;
        int tappedImage = Integer.parseInt(img.getTag().toString());
        if (!gameActive) {
            gameReset(view);
        }
        if (gameState[tappedImage] == 2) {
            counter++;
            if (counter == 9) {
                gameActive = false;
            }
            gameState[tappedImage] = activePlayer;
            img.setTranslationY(-1000f);
            if (activePlayer == 0) {
                img.setImageResource(R.drawable.x);
                activePlayer = 1;
                TextView status = findViewById(R.id.status);
                status.setText("O's Turn - Tap to play");
            } else {
                img.setImageResource(R.drawable.o);
                activePlayer = 0;
                TextView status = findViewById(R.id.status);
                status.setText("X's Turn - Tap to play");
            }
            img.animate().translationYBy(1000f).setDuration(300);
        }
        int flag = 0;
        for (int[] winPosition : winPositions) {
            if (gameState[winPosition[0]] == gameState[winPosition[1]] &&
                gameState[winPosition[1]] == gameState[winPosition[2]] &&
```

```

        gameState[winPosition[0]] != 2) {
            flag = 1;
            String winnerStr;
            gameActive = false;
            if (gameState[winPosition[0]] == 0) {
                winnerStr = "X has won";
            } else {
                winnerStr = "O has won";
            }
            TextView status = findViewById(R.id.status);
            status.setText(winnerStr);
        }
    }
    if (counter == 9 && flag == 0) {
        TextView status = findViewById(R.id.status);
        status.setText("Match Draw");
    }
}

public void gameReset(View view) {
    gameActive = true;
    activePlayer = 0;
    for (int i = 0; i < gameState.length; i++) {
        gameState[i] = 2;
    }

    ((ImageView) findViewById(R.id.imageView0)).setImageResource(0);
    ((ImageView) findViewById(R.id.imageView1)).setImageResource(0);
    ((ImageView) findViewById(R.id.imageView2)).setImageResource(0);
    ((ImageView) findViewById(R.id.imageView3)).setImageResource(0);
    ((ImageView) findViewById(R.id.imageView4)).setImageResource(0);
    ((ImageView) findViewById(R.id.imageView5)).setImageResource(0);
    ((ImageView) findViewById(R.id.imageView6)).setImageResource(0);
    ((ImageView) findViewById(R.id.imageView7)).setImageResource(0);
    ((ImageView) findViewById(R.id.imageView8)).setImageResource(0);

    TextView status = findViewById(R.id.status);
    status.setText("X's Turn - Tap to play");
}

@Override

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

```

App Screenshots :

