

ASSIGNMENT 3

Graphical Primitives and Animation

SHASHANKA VENKATESH - 185001145

9th August, 2021

Learning Objective

Generate the following using graphical primitives.

Specifications

1. Draw shapes such as Line, Circle, Rectangle and Arc
2. Perform animation using any Image (Gif, Jpeg)
3. Perform transformation – Rotation, Zooming

Home (Main Activity)

XML (activity_main.xml)

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://
  //schemas.android.com/apk/res/android"
3   xmlns:app="http://schemas.android.com/apk/res-auto"
4   xmlns:tools="http://schemas.android.com/tools"
5   android:layout_width="match_parent"
6   android:layout_height="match_parent"
7   tools:context=".MainActivity">
8
9   <Button
10     android:id="@+id/shapesButton"
11     android:layout_width="wrap_content"
12     android:layout_height="wrap_content"
13     android:layout_marginTop="50dp"
14     android:text="@string/primitive_shapes"
15     app:layout_constraintEnd_toEndOf="parent"
16     app:layout_constraintStart_toStartOf="parent"
17     app:layout_constraintTop_toTopOf="parent" />
18
19   <Button
20     android:id="@+id/animateButton"
21     android:layout_width="wrap_content"
22     android:layout_height="wrap_content"
23     android:text="@string/animations"
24     app:layout_constraintBottom_toTopOf="@+id/transformButton"
25     app:layout_constraintEnd_toEndOf="parent"
26     app:layout_constraintStart_toStartOf="parent"
27     app:layout_constraintTop_toBottomOf="@+id/shapesButton" />
28
29   <Button
30     android:id="@+id/transformButton"
31     android:layout_width="wrap_content"
32     android:layout_height="wrap_content"
33     android:text="@string/transformations"
34     android:layout_marginBottom="50dp"
35     app:layout_constraintBottom_toBottomOf="parent"
36     app:layout_constraintEnd_toEndOf="parent"
37     app:layout_constraintStart_toStartOf="parent" />
38 </androidx.constraintlayout.widget.ConstraintLayout>
```

Java (MainActivity.java)

```
1 package com.madlab.graphicalprimitivesandanimation;
2
3 import androidx.appcompat.app.AppCompatActivity;
4
5 import android.content.Intent;
6 import android.graphics.drawable.shapes.Shape;
7 import android.os.Bundle;
8 import android.view.View;
9 import android.widget.Button;
10
11 public class MainActivity extends AppCompatActivity {
12
13     @Override
14     protected void onCreate(Bundle savedInstanceState) {
15         super.onCreate(savedInstanceState);
16         setContentView(R.layout.activity_main);
17
18         // Get references to the 3 buttons
19         final Button shapesButton = findViewById(R.id.shapesButton);
20         final Button animateButton = findViewById(R.id.animateButton);
21         final Button transformButton = findViewById(R.id.transformButton
22     );
23
24         // Set On-Click Listeners to all of them
25         shapesButton.setOnClickListener(new View.OnClickListener() {
26             @Override
27             public void onClick(View view) {
28                 Intent shapesIntent = new Intent(MainActivity.this,
29                 ShapesActivity.class);
30                 startActivity(shapesIntent);
31             }
32         });
33         animateButton.setOnClickListener(new View.OnClickListener() {
34             @Override
35             public void onClick(View view) {
36                 Intent animateIntent = new Intent(MainActivity.this,
37                 AnimateActivity.class);
38                 startActivity(animateIntent);
39             }
40         });
41         transformButton.setOnClickListener(new View.OnClickListener() {
42             @Override
43             public void onClick(View view) {
44                 Intent transformIntent = new Intent(MainActivity.this,
45                 TransformActivity.class);
46                 startActivity(transformIntent);
47             }
48         });
49     }
50 }
```

Primitive Shapes

XML (activity_shapes.xml)

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
3     xmlns:app="http://schemas.android.com/apk/res-auto"
4     xmlns:tools="http://schemas.android.com/tools"
5     android:layout_width="match_parent"
6     android:layout_height="match_parent"
7     tools:context=".ShapesActivity">
8
9     <ImageView
10         android:id="@+id/canvasImage"
11         android:layout_width="wrap_content"
12         android:layout_height="wrap_content"
13         app:layout_constraintBottom_toBottomOf="parent"
14         app:layout_constraintEnd_toEndOf="parent"
15         app:layout_constraintStart_toStartOf="parent"
16         app:layout_constraintTop_toTopOf="parent"
17         app:srcCompat="@color/white"/>
18
19 </androidx.constraintlayout.widget.ConstraintLayout>
```

Java (ShapesActivity.java)

```
1 package com.madlab.graphicalprimitivesandanimation;
2
3 import androidx.appcompat.app.AppCompatActivity;
4 import android.os.Bundle;
5 import android.graphics.*;
6 import android.widget.ImageView;
7
8 public class ShapesActivity extends AppCompatActivity {
9
10     @Override
11     protected void onCreate(Bundle savedInstanceState) {
12         super.onCreate(savedInstanceState);
13         setContentView(R.layout.activity_shapes);
14
15         // Getting a reference to the canvas (ImageView)
16         final ImageView canvasImage = findViewById(R.id.canvasImage);
17
18         // Setting up a Bit map over which graphics can be drawn
19         Bitmap bitmap = Bitmap.createBitmap(1080, 1920, Bitmap.Config.
20         ARGB_8888);
21         canvasImage.setImageBitmap(bitmap);
22         Canvas canvas = new Canvas(bitmap);
23         Paint paint = new Paint();
24         paint.setTextSize(50);
25
26         // Painting the shapes with their names as captions
27         paint.setColor(Color.rgb(41, 22, 72));
28         canvas.drawText("Rectangle", 150, 1050, paint);
29         canvas.drawRect(50, 100, 450, 1000, paint);
30
31         paint.setColor(Color.rgb(80, 0, 40));
32         canvas.drawText("Square", 710, 700, paint);
33         canvas.drawRect(550, 150, 1050, 650, paint);
34
35         paint.setColor(Color.rgb(0, 77, 81));
36         canvas.drawText("Circle", 750, 1200, paint);
37         canvas.drawCircle(800, 1000, 150, paint);
38
39         paint.setColor(Color.rgb(165, 56, 0));
40         canvas.drawText("Arc", 250, 1450, paint);
41         RectF oval = new RectF(50, 1150, 550, 1400);
42         canvas.drawArc(oval, 0, 180, false, paint);
43
44         paint.setColor(Color.BLACK);
45         canvas.drawText("Line", 900, 1500, paint);
46         canvas.drawLine(820, 1300, 820, 1700, paint);
47     }
48 }
```

Animation using an Image

XML (activity_animate.xml)

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
3     xmlns:app="http://schemas.android.com/apk/res-auto"
4     xmlns:tools="http://schemas.android.com/tools"
5     android:layout_width="match_parent"
6     android:layout_height="match_parent"
7     tools:context=".AnimateActivity">
8
9     <ImageView
10         android:id="@+id/canvasAnimate"
11         android:layout_width="wrap_content"
12         android:layout_height="wrap_content"
13         app:layout_constraintBottom_toBottomOf="parent"
14         app:layout_constraintEnd_toEndOf="parent"
15         app:layout_constraintStart_toStartOf="parent"
16         app:layout_constraintTop_toTopOf="parent"
17         android:src="@drawable/car"/>
18
19 </androidx.constraintlayout.widget.ConstraintLayout>
```

Java (AnimateActivity.java)

```
1 package com.madlab.graphicalprimitivesandanimation;
2
3 import androidx.appcompat.app.AppCompatActivity;
4 import android.animation.*;
5 import android.os.Bundle;
6 import android.widget.ImageView;
7
8 public class AnimateActivity extends AppCompatActivity {
9
10     @Override
11     protected void onCreate(Bundle savedInstanceState) {
12         super.onCreate(savedInstanceState);
13         setContentView(R.layout.activity_animate);
14
15         // Getting a reference to the canvas (ImageView)
16         ImageView canvasAnimate = findViewById(R.id.canvasAnimate);
17
18         ObjectAnimator moveForwards = ObjectAnimator.ofFloat(
19             canvasAnimate, "x", 150).setDuration(1000);
20         ObjectAnimator moveBackwards = ObjectAnimator.ofFloat(
21             canvasAnimate, "x", -150).setDuration(2000);
22         ObjectAnimator moveToOriginal = ObjectAnimator.ofFloat(
23             canvasAnimate, "x", 0).setDuration(2000);
24         AnimatorSet animation = new AnimatorSet();
25
26         // Reverse the direction
27         animation.play(moveBackwards).before(moveForwards);
28         animation.play(moveForwards).before(moveToOriginal);
29
30         // Loop
31         animation.addListener(new AnimatorListenerAdapter() {
32             @Override
33             public void onAnimationEnd(Animator animation) {
34                 super.onAnimationEnd(animation);
35                 animation.start();
36             }
37         });
38
39         // Start the animation
40         animation.start();
41     }
42 }
```

Transformations

XML (activity_transform.xml)

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://
  //schemas.android.com/apk/res/android"
3   xmlns:app="http://schemas.android.com/apk/res-auto"
4   xmlns:tools="http://schemas.android.com/tools"
5   android:layout_width="match_parent"
6   android:layout_height="match_parent"
7   tools:context=".TransformActivity">
8
9   <ImageView
10     android:id="@+id/rotateImage"
11     android:layout_width="150dp"
12     android:layout_height="150dp"
13     android:layout_marginTop="50dp"
14     app:layout_constraintEnd_toEndOf="parent"
15     app:layout_constraintStart_toStartOf="parent"
16     app:layout_constraintTop_toTopOf="parent"
17     app:srcCompat="@drawable/ic_rotate"/>
18
19   <ImageView
20     android:id="@+id/profileImage"
21     android:layout_width="150dp"
22     android:layout_height="150dp"
23     app:layout_constraintBottom_toTopOf="@+id/zoomImage"
24     app:layout_constraintEnd_toEndOf="parent"
25     app:layout_constraintStart_toStartOf="parent"
26     app:layout_constraintTop_toBottomOf="@+id/rotateImage"
27     app:srcCompat="@drawable/ic_profile" />
28
29   <ImageView
30     android:id="@+id/zoomImage"
31     android:layout_width="75dp"
32     android:layout_height="75dp"
33     android:layout_marginBottom="50dp"
34     app:layout_constraintBottom_toBottomOf="parent"
35     app:layout_constraintEnd_toEndOf="parent"
36     app:layout_constraintStart_toStartOf="parent"
37     app:srcCompat="@drawable/ic_zoom"/>
38
39 </androidx.constraintlayout.widget.ConstraintLayout>
```


Animation XML (rotate.xml)

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <set xmlns:android="http://schemas.android.com/apk/res/android"
3     android:interpolator="@android:anim/cycle_interpolator">
4     <rotate android:fromDegrees="0"
5         android:toDegrees="360"
6         android:pivotX="50%"
7         android:pivotY="50%"
8         android:duration="4000"
9         android:repeatCount="infinite"
10        android:repeatMode="restart"/>
11 </set>
```

Animation XML (fade.xml)

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <set xmlns:android="http://schemas.android.com/apk/res/android">
3     <alpha
4         android:fromAlpha="0.0"
5         android:toAlpha="1.0"
6         android:duration="2000"
7         android:repeatCount="infinite"
8         android:repeatMode="reverse"/>
9 </set>
```

Animation XML (zoom.xml)

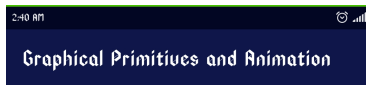
```
1 <?xml version="1.0" encoding="utf-8"?>
2 <set xmlns:android="http://schemas.android.com/apk/res/android">
3     <scale
4         xmlns:android="http://schemas.android.com/apk/res/android"
5         android:duration="2000"
6         android:fromXScale="1"
7         android:fromYScale="1"
8         android:pivotX="50%"
9         android:pivotY="50%"
10        android:toXScale="2"
11        android:toYScale="2"
12        android:repeatCount="infinite"
13        android:repeatMode="reverse">
14     </scale>
15 </set>
```

Java (TransformActivity.java)

```
1 package com.madlab.graphicalprimitivesandanimation;
2
3 import androidx.appcompat.app.AppCompatActivity;
4 import android.view.animation.Animation;
5 import android.view.animation.AnimationUtils;
6 import android.os.Bundle;
7 import android.widget.ImageView;
8
9 public class TransformActivity extends AppCompatActivity {
10
11     @Override
12     protected void onCreate(Bundle savedInstanceState) {
13         super.onCreate(savedInstanceState);
14         setContentView(R.layout.activity_transform);
15
16         // Get the 3 ImageView
17         final ImageView rotateImage = findViewById(R.id.rotateImage);
18         final ImageView profileImage = findViewById(R.id.profileImage);
19         final ImageView zoomImage = findViewById(R.id.zoomImage);
20
21         // Define the animations using the XML resources
22         Animation rotateAnimation = AnimationUtils.loadAnimation(
23             getApplicationContext(), R.anim.rotate);
24         Animation fadeAnimation = AnimationUtils.loadAnimation(
25             getApplicationContext(), R.anim.fade);
26         Animation zoomAnimation = AnimationUtils.loadAnimation(
27             getApplicationContext(), R.anim.zoom);
28
29         // Start the animations
30         rotateImage.startAnimation(rotateAnimation);
31         profileImage.startAnimation(fadeAnimation);
32         zoomImage.startAnimation(zoomAnimation);
33     }
34 }
```

App Screenshots

Home

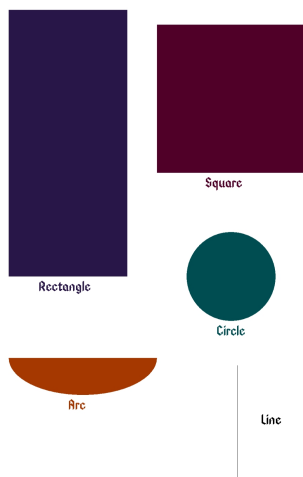
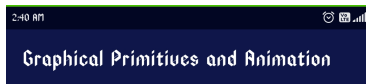


PRIMITIVE SHAPES

ANIMATIONS

TRANSFORMATIONS

Graphical Primitives



Animation



Transformation

