Assignment 3

Graphical Primitives and Animation

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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)

```xml
<?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"
    tools:context=".MainActivity">

    <Button
        android:id="@+id/shapesButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginTop="50dp"
        android:text="@string/primitive_shapes"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/animateButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="@string/animations"
        app:layout_constraintBottom_toTopOf="@+id/transformButton"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/shapesButton" />

    <Button
        android:id="@+id/transformButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="@string/transformations"
        android:layout_marginBottom="50dp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent" />
</androidx.constraintlayout.widget.ConstraintLayout>
```

Java (MainActivity.java)

```java
package com.madlab.graphicalprimitivesandanimation;

import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.graphics.drawable.shapes.Shape;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;

public class MainActivity extends AppCompatActivity {

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

        // Get references to the 3 buttons
        final Button shapesButton = findViewById(R.id.shapesButton);
        final Button animateButton = findViewById(R.id.animateButton);
        final Button transformButton = findViewById(R.id.transformButton);

        // Set On-Click Listeners to all of them
        shapesButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                Intent shapesIntent = new Intent(MainActivity.this, ShapesActivity.class);
                startActivity(shapesIntent);
            }
        });
        animateButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                Intent animateIntent = new Intent(MainActivity.this, AnimateActivity.class);
                startActivity(animateIntent);
            }
        });
        transformButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                Intent transformIntent = new Intent(MainActivity.this, TransformActivity.class);
                startActivity(transformIntent);
            }
        });
    }
}
```

Primitive Shapes

XML (activity_shapes.xml)

```xml
<?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"
    tools:context=".ShapesActivity">

    <ImageView
        android:id="@+id/canvasImage"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:srcCompat="@color/white"/>

</androidx.constraintlayout.widget.ConstraintLayout>
```

Java (ShapesActivity.java)

```java
package com.madlab.graphicalprimitivesandanimation;

import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.graphics.*;
import android.widget.ImageView;

public class ShapesActivity extends AppCompatActivity {

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

        // Getting a reference to the canvas (ImageView)
        final ImageView canvasImage = findViewById(R.id.canvasImage);

        // Setting up a Bit map over which graphics can be drawn
        Bitmap bitmap = Bitmap.createBitmap(1080, 1920, Bitmap.Config.
    ARGB_8888);
        canvasImage.setImageBitmap(bitmap);
        Canvas canvas = new Canvas(bitmap);
        Paint paint = new Paint();
        paint.setTextSize(50);

        // Painting the shapes with their names as captions
        paint.setColor(Color.rgb(41, 22, 72));
        canvas.drawText("Rectangle", 150, 1050, paint);
        canvas.drawRect(50, 100, 450, 1000, paint);

        paint.setColor(Color.rgb(80, 0, 40));
        canvas.drawText("Square", 710, 700, paint);
        canvas.drawRect(550 ,150 ,1050 ,650, paint);

        paint.setColor(Color.rgb(0, 77, 81));
        canvas.drawText("Circle", 750, 1200, paint);
        canvas.drawCircle(800, 1000, 150, paint);

        paint.setColor(Color.rgb(165, 56, 0));
        canvas.drawText("Arc", 250, 1450, paint);
        RectF oval = new RectF(50, 1150, 550, 1400);
        canvas.drawArc(oval, 0, 180, false, paint);

        paint.setColor(Color.BLACK);
        canvas.drawText("Line", 900, 1500, paint);
        canvas.drawLine(820, 1300, 820, 1700, paint);
    }
}
```

Animation using an Image

XML (activity_animate.xml)

```xml
<?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"
    tools:context=".AnimateActivity">

    <ImageView
        android:id="@+id/canvasAnimate"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        android:src="@drawable/car"/>

</androidx.constraintlayout.widget.ConstraintLayout>
```

Java (AnimateActivity.java)

```java
package com.madlab.graphicalprimitivesandanimation;

import androidx.appcompat.app.AppCompatActivity;
import android.animation.*;
import android.os.Bundle;
import android.widget.ImageView;

public class AnimateActivity extends AppCompatActivity {

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

        // Getting a reference to the canvas (ImageView)
        ImageView canvasAnimate = findViewById(R.id.canvasAnimate);

        ObjectAnimator moveForwards = ObjectAnimator.ofFloat(canvasAnimate, "x", 150).setDuration(1000);
        ObjectAnimator moveBackwards = ObjectAnimator.ofFloat(canvasAnimate, "x", -150).setDuration(2000);
        ObjectAnimator moveToOriginal = ObjectAnimator.ofFloat(canvasAnimate, "x", 0).setDuration(2000);
        AnimatorSet animation = new AnimatorSet();

        // Reverse the direction
        animation.play(moveBackwards).before(moveForwards);
        animation.play(moveForwards).before(moveToOriginal);

        // Loop
        animation.addListener(new AnimatorListenerAdapter() {
            @Override
            public void onAnimationEnd(Animator animation) {
                super.onAnimationEnd(animation);
                animation.start();
            }
        });

        // Start the animation
        animation.start();
    }
}
```

Transformations

XML (activity_transform.xml)

```xml
<?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"
    tools:context=".TransformActivity">

    <ImageView
        android:id="@+id/rotateImage"
        android:layout_width="150dp"
        android:layout_height="150dp"
        android:layout_marginTop="50dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:srcCompat="@drawable/ic_rotate"/>

    <ImageView
        android:id="@+id/profileImage"
        android:layout_width="150dp"
        android:layout_height="150dp"
        app:layout_constraintBottom_toTopOf="@+id/zoomImage"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/rotateImage"
        app:srcCompat="@drawable/ic_profile" />

    <ImageView
        android:id="@+id/zoomImage"
        android:layout_width="75dp"
        android:layout_height="75dp"
        android:layout_marginBottom="50dp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:srcCompat="@drawable/ic_zoom"/>

</androidx.constraintlayout.widget.ConstraintLayout>
```

Animation XML (`rotate.xml`)

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

Animation XML (`fade.xml`)

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

Animation XML (`zoom.xml`)

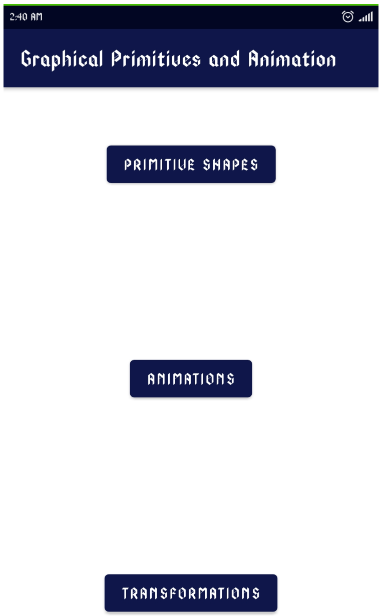
```xml
<?xml version="1.0" encoding="utf-8"?>
<set xmlns:android="http://schemas.android.com/apk/res/android">
    <scale
        xmlns:android="http://schemas.android.com/apk/res/android"
        android:duration="2000"
        android:fromXScale="1"
        android:fromYScale="1"
        android:pivotX="50%"
        android:pivotY="50%"
        android:toXScale="2"
        android:toYScale="2"
        android:repeatCount="infinite"
        android:repeatMode="reverse">
    </scale>
</set>
```

Java (TransformActivity.java)

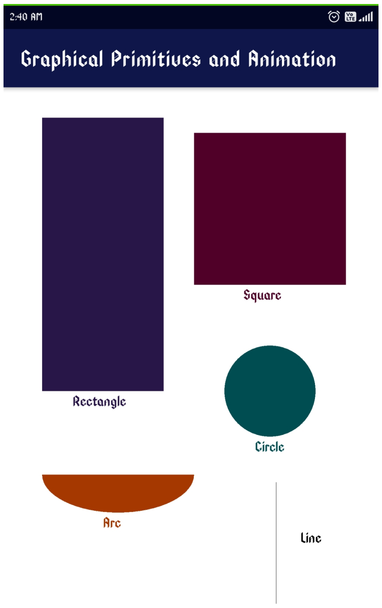
```java
package com.madlab.graphicalprimitivesandanimation;

import androidx.appcompat.app.AppCompatActivity;
import android.view.animation.Animation;
import android.view.animation.AnimationUtils;
import android.os.Bundle;
import android.widget.ImageView;

public class TransformActivity extends AppCompatActivity {

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

        // Get the 3 ImageViews
        final ImageView rotateImage = findViewById(R.id.rotateImage);
        final ImageView profileImage = findViewById(R.id.profileImage);
        final ImageView zoomImage = findViewById(R.id.zoomImage);

        // Define the animations using the XML resources
        Animation rotateAnimation = AnimationUtils.loadAnimation(getApplicationContext(), R.anim.rotate);
        Animation fadeAnimation = AnimationUtils.loadAnimation(getApplicationContext(), R.anim.fade);
        Animation zoomAnimation = AnimationUtils.loadAnimation(getApplicationContext(), R.anim.zoom);

        // Start the animations
        rotateImage.startAnimation(rotateAnimation);
        profileImage.startAnimation(fadeAnimation);
        zoomImage.startAnimation(zoomAnimation);
    }
}
```

App Screenshots

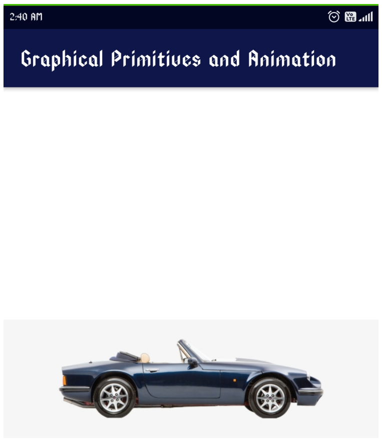
Home

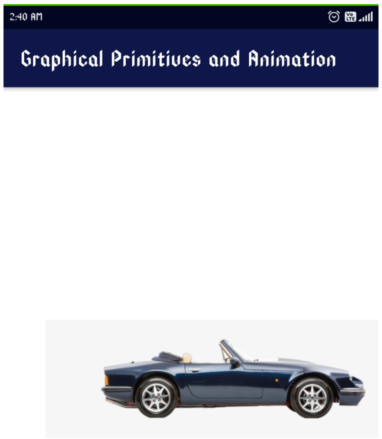


Graphical Primitives

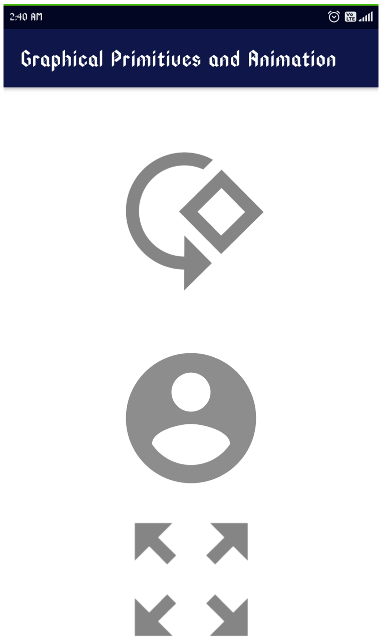


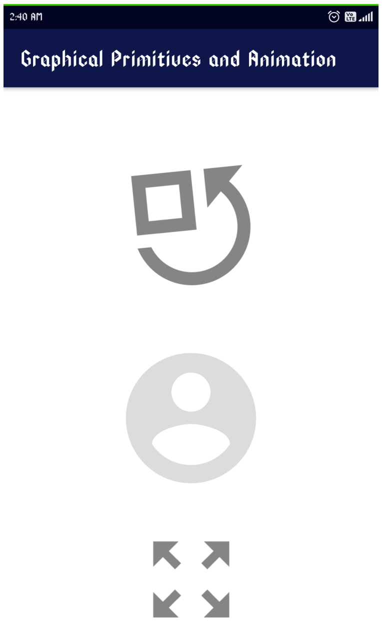
Animation





Transformation


2:40 AM
Graphical Primitives and Animation


2:40 AM
Graphical Primitives and Animation