**Exercise 3 - Application using graphical primitives**

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CSE-A

**Aim**

Design a CAR using Shape drawables with the help of relevant shapes such as Line, Circle, Rectangle and Arc.

a. Move the car forward by pressing forward button so that car moves from a predefined starting point to the predefined endpoint.

b. On pressing backward button, rotate the car to 180 degrees from the current point to the starting point.

c. Implement a Tap-to-zoom animation on any image

d. Implement the Card flipping animation.

**Code**

activity\_main.xml

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

<RelativeLayout 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">

*- Car Group (Body + Wheels) >*

<RelativeLayout

android:id="@+id/carGroup"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content">

<RelativeLayout

android:id="@+id/carGroupF"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_margin="12dp">

*- Car Body >*

<ImageView

android:id="@+id/carBodyImageViewF"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_centerInParent="true"

android:src="@drawable/car\_body" >

*- Left Wheel >*

<ImageView

android:id="@+id/leftWheelImageViewF"

android:layout\_width="24dp"

android:layout\_height="24dp"

android:layout\_below="@id/carBodyImageViewF" android:layout\_marginEnd="-24dp"

android:layout\_toStartOf="@id/carBodyImageViewF" android:src="@drawable/wheel" >

*- Right Wheel >*

<ImageView

android:id="@+id/rightWheelImageViewF"

android:layout\_width="24dp"

android:layout\_height="24dp"

android:layout\_below="@id/carBodyImageViewF" android:layout\_marginStart="-24dp"

android:layout\_toEndOf="@id/carBodyImageViewF" android:src="@drawable/wheel" >

/RelativeLayout>

<RelativeLayout

android:id="@+id/carGroupB"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_margin="12dp">

*- Car Body >*

<ImageView

android:id="@+id/carBodyImageViewB"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_centerInParent="true"

android:src="@drawable/car\_body" >

*- Left Wheel >*

<ImageView

android:id="@+id/leftWheelImageViewB"

android:layout\_width="24dp"

android:layout\_height="24dp"

android:layout\_below="@id/carBodyImageViewB"

android:layout\_marginEnd="-24dp"

android:layout\_toStartOf="@id/carBodyImageViewB" android:src="@drawable/wheel" >

*- Right Wheel >*

<ImageView

android:id="@+id/rightWheelImageViewB"

android:layout\_width="24dp"

android:layout\_height="24dp"

android:layout\_below="@id/carBodyImageViewB"

android:layout\_marginStart="-24dp"

android:layout\_toEndOf="@id/carBodyImageViewB" android:src="@drawable/wheel" >

/RelativeLayout>

/RelativeLayout>

<RelativeLayout

android:id="@+id/ButtonGrp"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_alignParentBottom="true">

<Button

android:id="@+id/changeDirectionButton"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_marginTop="186dp"

android:text="Change Direction" >

<Button

android:id="@+id/accelerateButton"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_marginTop="140dp"

android:text="Move" >

/RelativeLayout>

/RelativeLayout>

MainActivity.java

package *com.example.a3*;

import *android.animation.AnimatorInflater*;

import *android.animation.AnimatorSet*;

import *android.animation.ObjectAnimator*;

import *android.animation.PropertyValuesHolder*;

import *android.animation.ValueAnimator*;

import *android.support.v7.app.AppCompatActivity*;

import *android.os.Bundle*;

import *android.util.DisplayMetrics*;

import *android.view.View*;

import *android.widget.Button*;

public class *MainActivity* extends *AppCompatActivity* { private int direction;

private boolean isFront;

private boolean isZoomed;

public *MainActivity*() {

this.direction = 1;

this.isFront = true;

this.isZoomed = false;

}

*@Override*

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

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

*View* carGroup = *findViewById*(*R*.*id*.carGroup);

*Button* accelerateBtn = *findViewById*(*R*.*id*.accelerateButton);

*Button* changeDirBtn = *findViewById*(*R*.*id*.changeDirectionButton);

carGroup.*setOnClickListener*((*e*) > {

if (isZoomed) *zoomOutCar*(carGroup);

else *zoomInCar*(carGroup);

isZoomed = !isZoomed;

});

*DisplayMetrics* displayMetrics = *getResources*().*getDisplayMetrics*(); float scale = displayMetrics.density;

*View* front = *findViewById*(*R*.*id*.carGroupF);

*View* back = *findViewById*(*R*.*id*.carGroupB);

*/ Set camera distance for front and back*

front.*setCameraDistance*(8000 \* scale);

back.*setCameraDistance*(8000 \* scale);

*/ Load front and back animations*

*AnimatorSet* front\_animation = (*AnimatorSet*)

*AnimatorInflater*.*loadAnimator*(this, *R*.*animator*.flip\_front); *AnimatorSet* back\_animation = (*AnimatorSet*)

*AnimatorInflater*.*loadAnimator*(this, *R*.*animator*.flip\_back);

changeDirBtn.*setOnClickListener*(*e* > {

this.direction \*= -1;

if (isFront) {

front\_animation.*setTarget*(front);

back\_animation.*setTarget*(back);

front\_animation.*start*();

back\_animation.*start*();

isFront = false;

} else {

front\_animation.*setTarget*(back);

back\_animation.*setTarget*(front);

back\_animation.*start*();

front\_animation.*start*();

isFront = true;

}

});

accelerateBtn.*setOnClickListener*(*e* > {

float currentTranslationX = carGroup.*getTranslationX*();

float targetTranslationX = currentTranslationX + this.direction \* 50f;

int screenWidth = *getResources*().*getDisplayMetrics*().widthPixels;

if (targetTranslationX > screenWidth) {

targetTranslationX = 0;

}

*ValueAnimator* animator = *ValueAnimator*.*ofFloat*(currentTranslationX, targetTranslationX);

animator.*setDuration*(500); */ Set the animation duration in milliseconds*

animator.*addUpdateListener*(*animation* > {

float animatedValue = (float) *animation*.*getAnimatedValue*(); carGroup.*setTranslationX*(animatedValue);

});

animator.*start*();

});

}

private void *zoomInCar*(*View view*) {

*PropertyValuesHolder* scaleX =

*PropertyValuesHolder*.*ofFloat*(*View*.SCALE\_X, 1.5f);

*PropertyValuesHolder* scaleY =

*PropertyValuesHolder*.*ofFloat*(*View*.SCALE\_Y, 1.5f);

*ObjectAnimator* animator = *ObjectAnimator*.*ofPropertyValuesHolder*(*view*, scaleX, scaleY);

animator.*setDuration*(500); */ Adjust the duration as needed* animator.*start*();

}

private void *zoomOutCar*(*View view*) {

*PropertyValuesHolder* scaleX =

*PropertyValuesHolder*.*ofFloat*(*View*.SCALE\_X, 1f);

*PropertyValuesHolder* scaleY =

*PropertyValuesHolder*.*ofFloat*(*View*.SCALE\_Y, 1f);

*ObjectAnimator* animator = *ObjectAnimator*.*ofPropertyValuesHolder*(*view*, scaleX, scaleY);

animator.*setDuration*(500); */ Adjust the duration as needed*

animator.*start*();

}

}

res/drawable/car\_body.xml

*- car\_body.xml >*

<shape xmlns:android="http: /schemas.android.com/apk/res/android"> <solid android:color="#FF1100" >

<size android:width="128dp" android:height="60dp" > <corners android:radius="10dp" >

/shape>

res/drawable/wheel.xml

*- wheel.xml >*

<shape xmlns:android="http: /schemas.android.com/apk/res/android"> <solid android:color="#000000" >

<size android:width="40dp" android:height="40dp" > <corners android:radius="20dp" >

/shape>

res/animatior/flip\_front.xml

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

<set xmlns:android="http: /schemas.android.com/apk/res/android"> <objectAnimator

android:valueFrom="0"

android:valueTo="180"

android:propertyName="rotationY"

android:duration="1000"

>

<objectAnimator

android:valueFrom="1.0"

android:valueTo="0.0"

android:propertyName="alpha"

android:startOffset="500"

android:duration="1"

>

/set>

res/animatior/flip\_back.xml

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

<set xmlns:android="http: /schemas.android.com/apk/res/android"> <objectAnimator

android:valueFrom="1.0"

android:valueTo="0.0"

android:propertyName="alpha"

android:duration="0"

>

<objectAnimator

android:valueFrom="180"

android:valueTo="0"

android:propertyName="rotationY"

android:repeatMode="reverse"

android:duration="1000"

>

<objectAnimator

android:valueFrom="0.0"

android:valueTo="1.0"

android:propertyName="alpha"

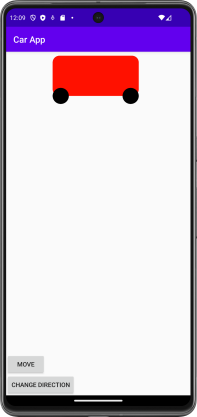
android:startOffset="500"

android:duration="0"

>

/set>

**Output**

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**Learning outcomes**

Animating movements

Using drawables