Ex. No. : 03 **Date :**

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Graphical Primitives

Aim

Develop an android application to draw the circle, ellipse, rectangle and some text using Android Graphical primitives.

Procedure:

Step 1 : File → New Project

Provide the application name (e.g.,"GraphicalPrimitives") and click “Next”.

Step 2 : Select the target Android devices

Select the minimum SDK to run the application. Click “Next”.

Step 3 : Choose the activity for the application

By default, choose “Blank Activity”. Click “Next”.

Step 4 : Enter activity name and click “Finish”.

Step 5 : Edit the program

Design Shapes and graphical elements in activity_main.xml or

use Canvas API in kotlin code MainActivity.kt.

Step 6 : Run the application

Two ways to run the application:

1. Running through emulator
2. Running through mobile device

AndroidManifest.xml

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
   package="com.example.graphical primitives">

   <application
       android:allowBackup="true"
       android:icon="@mipmap/ic_launcher"
       android:label="@string/app_name"
       android:roundIcon="@mipmap/ic_launcher_round"
       android:supportsRtl="true"
       android:theme="@style/Theme.GraphicalPrimitives">
       <activity
           android:name=".MainActivity"
           android:exported="true">
           <intent-filter>
               <action android:name="android.intent.action.MAIN" />
               <category android:name="android.intent.category.LAUNCHER" />
           </intent-filter>
       </activity>
   </application>

</manifest>
```

Activity_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
   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="match_parent"
       android:layout_height="wrap_content"
       android:background="#673AB7"
       android:padding="16dp"
       android:text="Graphical Primitives"
       android:textColor="#FFFFFF"
       android:textSize="18sp"
       android:textStyle="bold" />

   <com.example.graphicalprimitives.ShapesView
       android:layout_width="match_parent"
       android:layout_height="match_parent"
       android:background="#FFFF00" />

</LinearLayout>
```

MainActivity.kt

```
package com.example.graphical primitives



import android.os.Bundle
import android.appcompat.app.AppCompatActivity

class MainActivity : AppCompatActivity() {
   override fun onCreate(savedInstanceState: Bundle?) {
       super.onCreate(savedInstanceState)
       setContentView(R.layout.activity_main)

   }
}
```

ShapesView.kt

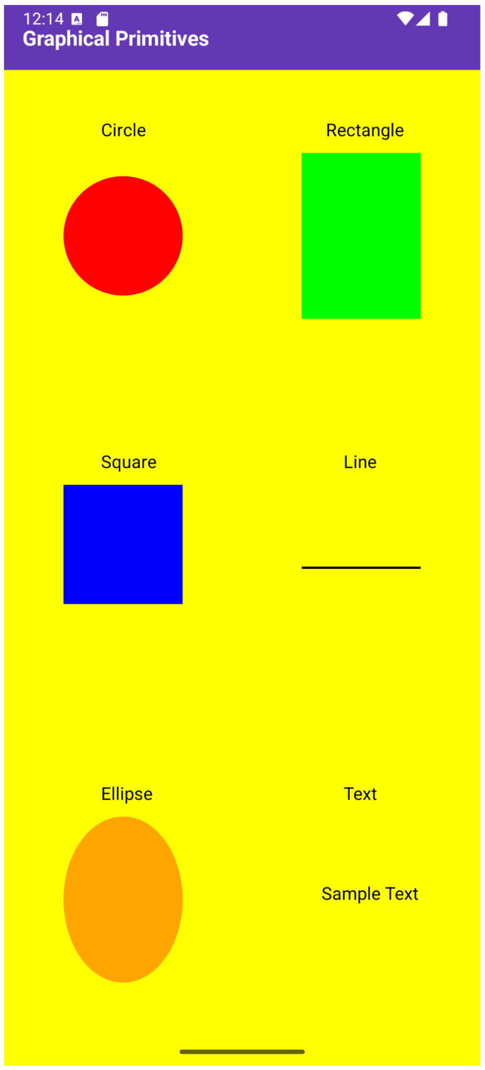
```
package com.example.graphical primitives
import android.content.Context
import android.graphics.Canvas
import android.graphics.Color
import android.graphics.Paint
import android.graphics.RectF
import android.util.AttributeSet
import android.view.View

class ShapesView @JvmOverloads constructor(
   context: Context,
   attrs: AttributeSet? = null,
```

```kotlin
    defStyleAttr: Int = 0
) : View(context, attrs, defStyleAttr) {

    // Paints for different shapes
    private val circlePaint = Paint().apply {
        color = Color.RED
        style = Paint.Style.FILL
        isAntiAlias = true
    }

    private val rectanglePaint = Paint().apply {
        color = Color.GREEN
        style = Paint.Style.FILL
        isAntiAlias = true
    }

    private val squarePaint = Paint().apply {
        color = Color.BLUE
        style = Paint.Style.FILL
        isAntiAlias = true
    }

    private val linePaint = Paint().apply {
        color = Color.BLACK
        style = Paint.Style.STROKE
        strokeWidth = 5f
        isAntiAlias = true
    }

    private val ellipsePaint = Paint().apply {
        color = Color.rgb(255, 165, 0)  // Orange
        style = Paint.Style.FILL
        isAntiAlias = true
    }

    private val textPaint = Paint().apply {
        color = Color.BLACK
        textSize = 40f
        isAntiAlias = true
    }

    override fun onDraw(canvas: Canvas) {
        super.onDraw(canvas)

        val width = width.toFloat()
        val height = height.toFloat()

        // Calculate grid dimensions
        val cellWidth = width / 2
        val cellHeight = height / 3

        // Draw Circle (top-left cell)
        val circleRadius = cellWidth / 4
        canvas.drawCircle(
            cellWidth / 2,  // x-coordinate of center
            cellHeight / 2,  // y-coordinate of center
            circleRadius,  // radius
            circlePaint
        )

        // Draw label for Circle
        canvas.drawText(
            "Circle",
            cellWidth / 2 - 50f,
            cellHeight / 5,
            textPaint
        )

        // Draw Rectangle (top-right cell)
        val rectLeft = cellWidth + cellWidth / 4
        val rectTop = cellHeight / 4
        val rectRight = cellWidth + 3 * cellWidth / 4
        val rectBottom = 3 * cellHeight / 4
        canvas.drawRect(
            rectLeft,
            rectTop,
            rectRight,
            rectBottom,
            rectanglePaint
        )

        // Draw label for Rectangle
        canvas.drawText(
            "Rectangle",
            cellWidth + cellWidth / 2 - 80f,
            cellHeight / 5,
            textPaint
        )

        // Draw Square (middle-left cell)
        val squareSize = cellWidth / 2
        val squareLeft = cellWidth / 4
        val squareTop = cellHeight + cellHeight / 4
```

```
canvas.drawRect(
    squareLeft,
    squareTop,
    squareLeft + squareSize,
    squareTop + squareSize,
    squarePaint
)

// Draw label for Square
canvas.drawText(
    "Square",
    cellWidth / 2 - 50f,
    cellHeight + cellHeight / 5,
    textPaint
)

// Draw Line (middle-right cell)
val lineStartX = cellWidth + cellWidth / 4
val lineStartY = cellHeight + cellHeight / 2
val lineEndX = cellWidth + 3 * cellWidth / 4
val lineEndY = cellHeight + cellHeight / 2
canvas.drawLine(
    lineStartX,
    lineStartY,
    lineEndX,
    lineEndY,
    linePaint
)

// Draw label for Line
canvas.drawText(
    "Line",
    cellWidth + cellWidth / 2 - 40f,
    cellHeight + cellHeight / 5,
    textPaint
)

// Draw Ellipse (bottom-left cell)
val ellipseRect = RectF(
    cellWidth / 4,
    2 * cellHeight + cellHeight / 4,
    3 * cellWidth / 4,
    2 * cellHeight + 3 * cellHeight / 4
)
canvas.drawOval(ellipseRect, ellipsePaint)

// Draw label for Ellipse
canvas.drawText(
    "Ellipse",
    cellWidth / 2 - 50f,
    2 * cellHeight + cellHeight / 5,
    textPaint
)

// Draw Text demo (bottom-right cell)
canvas.drawText(
    "Sample Text",
    cellWidth + cellWidth / 2 - 90f,
    2 * cellHeight + cellHeight / 2,
    textPaint
)
```

```
        // Draw label for Text
        canvas.drawText(
            "Text",
            cellWidth + cellWidth / 2 - 40f,
            2 * cellHeight + cellHeight / 5,
            textPaint
        )
    }
}
```

Output



Result:

The Graphical Primitives application successfully displays shapes and graphical elements using Kotlin's drawing functions when run on an emulator or mobile device.