[2CEIT5PE5: MOBILE APPLICATION DEVELOPMENT]

Practical: 9

AIM: What is Difference between ListView and RecyclerView? Create SMS Android Application that can receive SMS by BroadcastReceiver and Interface, Send SMS and read & display all SMS of Inbox by using RecyclerView.

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RecyclerView	ListView
- The RecyclerView's adaptor forces us to use the ViewHolder pattern.	- The ListView doesn't give that kind of protection by default.
- Supported Vertical Scrolling and Horizontal Scrolling	- Supported Only Vertical Scrolling
- Use of less memory.	- More memory is used for a long list. Sometimes devices get hanged.
- Animations using ItemAnimator are easy and smooth. Animations like list appearance and disappearance, adding or removing particular views, and so on.	- It's complex to use Animation and hard to handle it.
- Dividers between items are not shown by default.	- Dividers between items are shown by default.
- Use ItemDecorations to add margins and draw on or under an item View.	- ItemDecorations require customization
- RecyclerView is a more flexible control for handling a "list of data"	- ListView is a less flexible control for handling a "list of data"

drawable folder:

shape.xml

```
<?xml version="1.0" encoding="utf-8"?>
<selector xmlns:android="http://schemas.android.com/apk/res/android">
    <item>
        <shape android:shape="oval">
            <size android:width="120dp" android:height="120dp" />
        </shape>
    </item>
</selector>
```

layout folder:

sms_item_view.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="horizontal"
    android:layout_marginHorizontal="10dp"
    android:padding="20dp">

    <ImageView
        android:id="@+id/icon"
        android:layout_width="40dp"
        android:layout_height="40dp"
        android:padding="5dp"
        android:background="@drawable/shape"
        android:src="@drawable/ic_baseline_person_24"
        />

    <LinearLayout
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:orientation="vertical">

        <TextView
            android:id="@+id/textViewPhoneNo"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Medium Text"
            android:textSize="14dp"
            android:textStyle="bold"
            android:textAppearance="?android:attr/textAppearanceMedium"
            android:layout_marginLeft="10dp"
            android:layout_marginTop="5dp"
            android:padding="2dp"
            android:textColor="#4d4d4d" />
        <TextView
            android:id="@+id/textViewMessage"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="TextView"
            android:layout_marginLeft="10dp"
            android:textSize="12dp"/>
    </LinearLayout>
</LinearLayout>
```

activity_main.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">
    <com.google.android.material.appbar.AppBarLayout
        android:id="@+id/app_bar"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        app:layout_constraintTop_toTopOf="parent">
        <androidx.appcompat.widget.Toolbar
            android:layout_width="match_parent"
            android:layout_height="match_parent"
            app:title="Message Application"
            app:titleTextColor="@color/white"/>
    </com.google.android.material.appbar.AppBarLayout>
    <com.google.android.material.card.MaterialCardView
        android:id="@+id/card"
        android:layout_width="0dp"
        android:layout_height="0dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintBottom_toTopOf="@id/l1"
        app:layout_constraintTop_toBottomOf="@id/app_bar"
        android:layout_margin="10dp"
        >
        <ListView
            android:id="@+id/listView"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:backgroundTint="@color/cardview_shadow_end_color"
            android:layout_margin="10dp"
            />
    </com.google.android.material.card.MaterialCardView>
    <LinearLayout
        android:id="@+id/l1"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:weightSum="100"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintBottom_toBottomOf="parent"
        android:orientation="horizontal"
    android:layout_margin="20dp">

    <LinearLayout
        android:layout_weight="90"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="vertical">
        <com.google.android.material.textfield.TextInputLayout
            android:id="@+id/phoneNoInput"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Mobile No"
            app:endIconMode="custom"
            app:endIconDrawable="@drawable/ic_baseline_phone_android_24"
            style="@style/Widget.MaterialComponents.TextInputLayout.OutlinedBox">

            <com.google.android.material.textfield.TextInputEditText
                android:id="@+id/phoneNo"
                android:layout_width="match_parent"
                android:layout_height="match_parent"
                android:inputType="phone"
                />

        </com.google.android.material.textfield.TextInputLayout>
        <com.google.android.material.textfield.TextInputLayout
            android:id="@+id/msgInput"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Message"
            app:endIconMode="custom"
            app:endIconDrawable="@drawable/ic_baseline_message_24"

            style="@style/Widget.MaterialComponents.TextInputLayout.OutlinedBox">

            <com.google.android.material.textfield.TextInputEditText
                android:id="@+id/msg"
                android:layout_width="match_parent"
                android:layout_height="match_parent"
                android:inputType="textLongMessage"
                />

        </com.google.android.material.textfield.TextInputLayout>
    </LinearLayout>

    <com.google.android.material.button.MaterialButton
        android:id="@+id/sendButton"
        app:fabSize="normal"
        android:layout_width="50dp"
        android:layout_height="50dp"
        android:layout_marginHorizontal="10dp"
        android:layout_marginTop="5dp"
        app:icon="@drawable/ic_baseline_send_24"
        app:iconSize="20dp"
        android:elevation="5dp"
        app:cornerRadius="15dp"
        />
    </LinearLayout>

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

coding files:

MainActivity.kt

```
package com.example.madpractical9_21012022021

import android.Manifest
import android.content.IntentFilter
import android.content.pm.PackageManager
import android.net.Uri
import androidx.appcompat.app.AppCompatActivity
import android.os.Bundle
import android.provider.Telephony
import android.telephony.SmsManager
import android.widget.ListView
import androidx.appcompat.app.AlertDialog
import androidx.core.app.ActivityCompat
import androidx.core.content.ContextCompat
import com.example.madpractical9_21012022022.databinding.ActivityMainBinding

class MainActivity : AppCompatActivity() {
    private lateinit var binding : ActivityMainBinding
    private val SMS_PERMISSION_CODE = 100
    private lateinit var lv: ListView
    private lateinit var al: ArrayList<SMSView>
    private lateinit var smsReceiver:SMSBroadcastReceiver
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        binding = ActivityMainBinding.inflate(layoutInflater)
        setContentView(binding.root)

        lv = binding.listView
        al = ArrayList()

        if(checkRequestPermission()){
            loadSMSInbox()
        }

        smsReceiver = SMSBroadcastReceiver()
        registerReceiver(smsReceiver, IntentFilter(
        Telephony.Sms.Intents.SMS_RECEIVED_ACTION))
        smsReceiver.setListner(ListenerImplement())
        binding.sendButton.setOnClickListener{
            val phone = binding.phoneNo.text.toString()
            val msg = binding.msg.text.toString()
            sendSms(phone,msg)

            val builder : AlertDialog.Builder = AlertDialog.Builder(this@MainActivity)
            builder.setTitle("Sent SMS")
        builder.setMessage("SMS is sent.\nPhone No : $phone \n\n Message : $msg")
        builder.setCancelable(true)
        builder.setPositiveButton("OK",null);
        builder.show()
    }

}

private fun sendSms(sPhoneNo: String?,sMsg: String?){
    if(!checkRequestPermission()){
        return
    }
    val smsmanager = SmsManager.getDefault()
    if(smsmanager != null){
        smsmanager.sendTextMessage(sPhoneNo,null,sMsg,null,null)
    }
}

inner class ListenerImplement:SMSBroadcastReceiver.Listner{
    override fun onTextReceived(sPhoneNo: String?, sMsg: String?) {
        val builder : AlertDialog.Builder = AlertDialog.Builder(this@MainActivity)
        builder.setTitle("New SMS Received")
        builder.setMessage("From : $sPhoneNo\n\n Message : $sMsg")
        builder.setCancelable(true)
        builder.setPositiveButton("OK",null);
        builder.show()
        loadSMSInbox()
    }
}

private val isSMSReadPermission: Boolean
    get() = ContextCompat.checkSelfPermission(this, Manifest.permission.READ_SMS) ==
    PackageManager.PERMISSION_GRANTED
private val isSMSWritePermission: Boolean
    get() = ContextCompat.checkSelfPermission(this, Manifest.permission.SEND_SMS) ==
    PackageManager.PERMISSION_GRANTED

private fun requestSMSPermission() {
    if (ActivityCompat.shouldShowRequestPermissionRationale
       (this, Manifest.permission.READ_SMS)) {
        // You may display a non-blocking explanation here,
        read more in the documentation:
        // https://developer.android.com/training/permissions/requesting.html
    }

    ActivityCompat.requestPermissions(this, arrayOf(Manifest.permission.READ_SMS,
        Manifest.permission.SEND_SMS,
        Manifest.permission.RECEIVE_SMS),
        SMS_PERMISSION_CODE)
}
private fun checkRequestPermission(): Boolean {
    return if (!isSMSReadPermission || !isSMSWritePermission) {
        requestSMSPermission()
        false
    } else true
    }

    private fun loadSMSInbox() {
        if (!checkRequestPermission()) return
        val uriSMS = Uri.parse("content://sms/inbox")
        val c = contentResolver.query(uriSMS, null, null, null, null)
        al.clear()
        while (c!!.moveToNext()) {
            al.add(SMSView(c.getString(2),c.getString(12)))
        }
        lv.adapter = SMSViewAdapter(this,al)

    }

    override fun onDestroy() {
        unregisterReceiver(smsReceiver)
        super.onDestroy()
    }
}
```

SMSBroadcastReceiver.kt

```
package com.example.madpractical9_21012022022

import android.content.BroadcastReceiver
import android.content.Context
import android.content.Intent
import android.os.Build
import android.provider.Telephony

class SMSBroadcastReceiver : BroadcastReceiver() {

    interface Listner {
        fun onTextReceived(sPhoneNo: String?, sMsg: String?)
    }
    private var listner: Listner? = null
    fun setListner(lis: Listner) {
        listner = lis
    }
    override fun onReceive(context: Context, intent: Intent) {
        if (intent.action == Telephony.Sms.Intents.SMS_RECEIVED_ACTION) {
            var sPhoneNo = ""
            var sSMSBody = ""
            if (Build.VERSION.SDK_INT >= Build.VERSION_CODES.M) {
                for (smsMessage in Telephony.Sms.Intents.getMessagesFromIntent(intent)) {
                    sPhoneNo = smsMessage.displayOriginatingAddress
                    sSMSBody += smsMessage.messageBody
                }
                if (listner != null) {
                    listner?.onTextReceived(sPhoneNo, sSMSBody)
                }
            }
        }
    }
}
```

SMSView.kt

```
package com.example.madpractical9_21012022021

class SMSView(val phoneNo:String,val msg:String) {
}
```

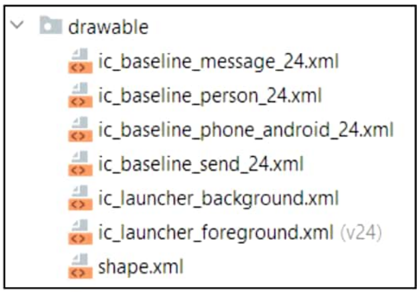
SMSViewAdapter.kt

```
package com.example.madpractical9_21012022022

import android.content.Context
import android.view.LayoutInflater
import android.view.View
import android.view.ViewGroup
import android.widget.ArrayAdapter
import com.example.madpractical9_21012022022.databinding.SmsItemViewBinding

class SMSViewAdapter(context: Context, private val array:ArrayList<SMSView>):
    ArrayAdapter<SMSView>(context,array.size,array) {
    override fun getView(position: Int, convertView: View?, parent: ViewGroup): View {
        //val currentItemView:View = LayoutInflater.from(context)
        .inflate(R.layout.sms_item_view, parent, false)
        // get the position of the view from the ArrayAdapter
        val currentSms: SMSView? = getItem(position)
        val binding = SmsItemViewBinding.inflate(LayoutInflater.from(context))
        binding.textViewPhoneNo.text = currentSms!!.phoneNo
        binding.textViewMessage.text = currentSms.msg
        return binding.root
        //return super.getView(position, convertView, parent)
    }
}
```

AndroidManifest.xml

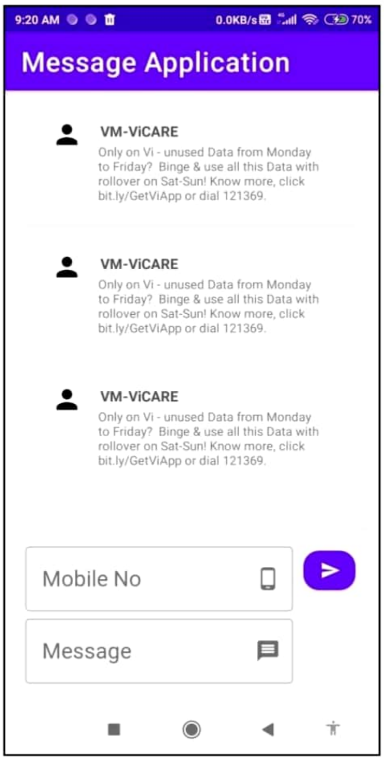
```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    package="com.example.madpractical9_21012022022" >

    <uses-permission android:name="android.permission.RECEIVE_SMS" />
    <uses-permission android:name="android.permission.READ_SMS" />
    <uses-permission android:name="android.permission.SEND_SMS" />

    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="Practical 9"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.MADPractical9_21012022022"
        tools:targetApi="31" >
        <receiver
            android:name=".SMSBroadcastReceiver"
            android:enabled="true"
            android:exported="true" >
        </receiver>

        <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>
```

Resources:



- drawable
  - ic_baseline_message_24.xml
  - ic_baseline_person_24.xml
  - ic_baseline_phone_android_24.xml
  - ic_baseline_send_24.xml
  - ic_launcher_background.xml
  - ic_launcher_foreground.xml (v24)
  - shape.xml

Output:



Message Application

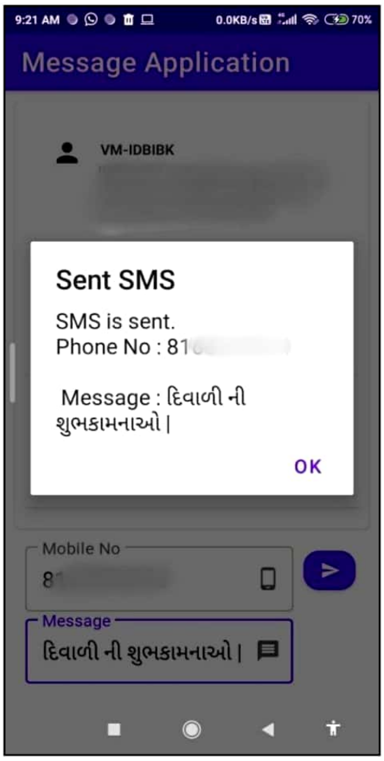
VM-ViCARE
Only on Vi - unused Data from Monday to Friday? Binge & use all this Data with rollover on Sat-Sun! Know more, click bit.ly/GetViApp or dial 121369.

VM-ViCARE
Only on Vi - unused Data from Monday to Friday? Binge & use all this Data with rollover on Sat-Sun! Know more, click bit.ly/GetViApp or dial 121369.

VM-ViCARE
Only on Vi - unused Data from Monday to Friday? Binge & use all this Data with rollover on Sat-Sun! Know more, click bit.ly/GetViApp or dial 121369.

Mobile No

Message



Message Application

VM-IDBIBK

Sent SMS

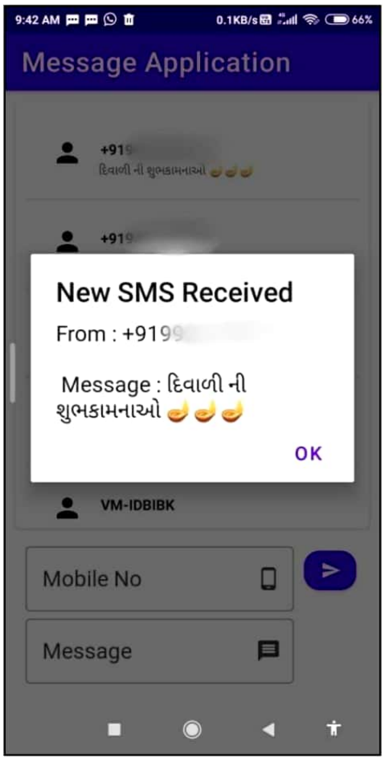
SMS is sent.
Phone No : 81

Message : દિવાળી ની શુભકામનાઓ |

OK

Mobile No: 8

Message: દિવાળી ની શુભકામનાઓ |



Message Application

+919
દિવાળી ની શુભકામનાઓ 🪔🪔🪔

+919

New SMS Received

From : +9199

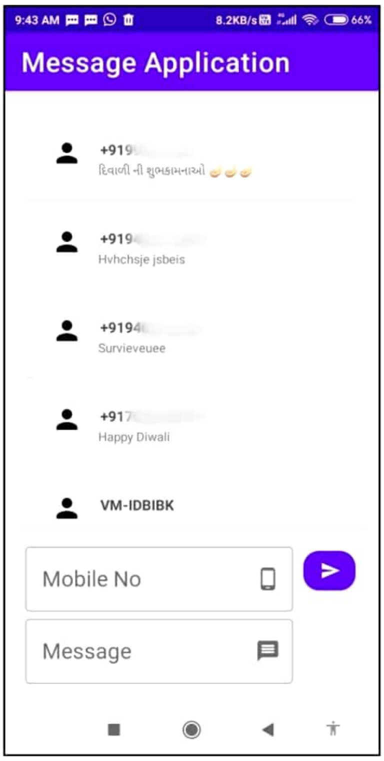
Message : દિવાળી ની શુભકામનાઓ 🪔🪔🪔

OK

VM-IDBIBK

Mobile No

Message



Message Application

+919
દિવાળી ની શુભકામનાઓ 🪔🪔🪔

+919
Hvhchsje jsbeis

+9194
Survieveuee

+917
Happy Diwali

VM-IDBIBK

Mobile No

Message