ANDROID PROGRAMMING
LESSON 4

Version 1.0

Agenda

- Manually Creating an XML Layout
- Managing Constraints using Constraint Sets
- An Overview and Example of Android Event Handling (01)
- Event Handler (02)
- TimePicker, DatePicker (03)
- ListView (04,05)
- ListView, Spinner (06)
- AutoCompleteTextView, MultiAutocompleteTextView (07)
- Menu (08)
- RecyclerView and CardView (09)

Manually Creating an XML Layout

```
<?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">
```

Manually Creating an XML Layout

```
<Button
    android:id="@+id/b1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:textColor="#1eb729"
    android:text="B1 - HEAD"
    app:layout_constraintBottom_toTopOf="@id/b5"
    app:layout_constraintHorizontal_chainStyle="spread"
    app:layout_constraintRight_toLeftOf="@id/b2"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toBottomOf="@id/b4" />
```

Manually Creating an XML Layout

```
<Button
    android:id="@+id/b2"
    android:text="B2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginBottom="8dp"
    android:layout_marginTop="8dp"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintLeft_toRightOf="@id/b1"
    app:layout_constraintRight_toLeftOf="@id/b3"
    app:layout_constraintTop_toTopOf="parent" />
……….
```

Manually Creating an XML Layout

- **in** – Inches
- **mm** – Millimeters
- **pt** – Points (1/72 of an inch)
- **dp** – Density-independent pixels. An abstract unit of measurement based on the physical density of the device display relative to a 160dpi display baseline.
- **sp** – Scale-independent pixels. Similar to dp but scaled based on the user's font preference.
- **px** – Actual screen pixels. Use is not recommended since different displays will have different pixels per inch. Use *dp* in preference to this unit.

Manually Creating an XML Layout

- **Manual XML vs. Visual Layout Design**

Design mode	XML mode
Quick	Slow
Easy	Complex

Design mode is more advantage but in case the view not is common view, design mode is useless.

Managing Constraints using Constraint Sets

- **Java Code vs. XML Layout Files**

```
Button button = new Button(this);
button.setId(View.generateViewId());
ConstraintLayout myLayout = findViewById(R.id.myLayout);
button.setText("Click here");
myLayout.addView(button);
```

Managing Constraints using Constraint Sets

- **Constraint Sets**

  constraint sets are used to control how a view appears relative to its parent view and other sibling views

```
ConstraintSet constraintSet = new ConstraintSet();
constraintSet.connect(button.getId(),ConstraintSet.RIGHT,
        ConstraintSet.PARENT_ID,ConstraintSet.RIGHT);
constraintSet.connect(button.getId(),ConstraintSet.LEFT,
        ConstraintSet.PARENT_ID,ConstraintSet.LEFT);
constraintSet.connect(button.getId(),ConstraintSet.TOP,
        ConstraintSet.PARENT_ID,ConstraintSet.TOP);
constraintSet.connect(button.getId(),ConstraintSet.BOTTOM,
        ConstraintSet.PARENT_ID,ConstraintSet.BOTTOM);
constraintSet.applyTo(myLayout);
```

Managing Constraints using Constraint Sets

- Set Width and Heigh

```
constraintSet.constrainWidth(button.getId(),
ConstraintSet.WRAP_CONTENT);
constraintSet.constrainHeight(button.getId(),
ConstraintSet.WRAP_CONTENT);
```

Managing Constraints using Constraint Sets

- Set margin

```
constraintSet.connect(button.getId(), ConstraintSet.LEFT,
        ConstraintSet.PARENT_ID, ConstraintSet.LEFT, 200);
constraintSet.connect(button.getId(), ConstraintSet.TOP,
        ConstraintSet.PARENT_ID, ConstraintSet.TOP, 200);
```

- Bias constraint

```
constraintSet.setHorizontalBias(button.getId(), 0.25f);
constraintSet.setVerticalBias(button.getId(), 0.25f);
```

An Overview and Example of Android Event Handling

- **Understanding Android Events**
  - Generated in response to an external action
  - Android framework maintains an ***event queue*** into which events are placed as they occur
  - In order to handle the event, the view must have in place an ***event listener***

An Overview and Example of Android Event Handling

- **Using callback declaration**

```
button.setOnClickListener(new Button.OnClickListener() {
    public void onClick(View v) {
        //--------------------TO DO ------------------------

    }

});
```

An Overview and Example of Android Event Handling

- **Using the *android:onClick* Resource**

```
<Button
    android:id="@+id/button1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:onClick="buttonClick"
    android:text="Click me" />
```

An Overview and Example of Android Event Handling

- **Event Listeners and Callback Methods**
  - `onClickListener()`
  - `onLongClickListener()`
  - `onTouchListener()`
  - `onFocusChangeListener()`
  - `onKeyListener()`

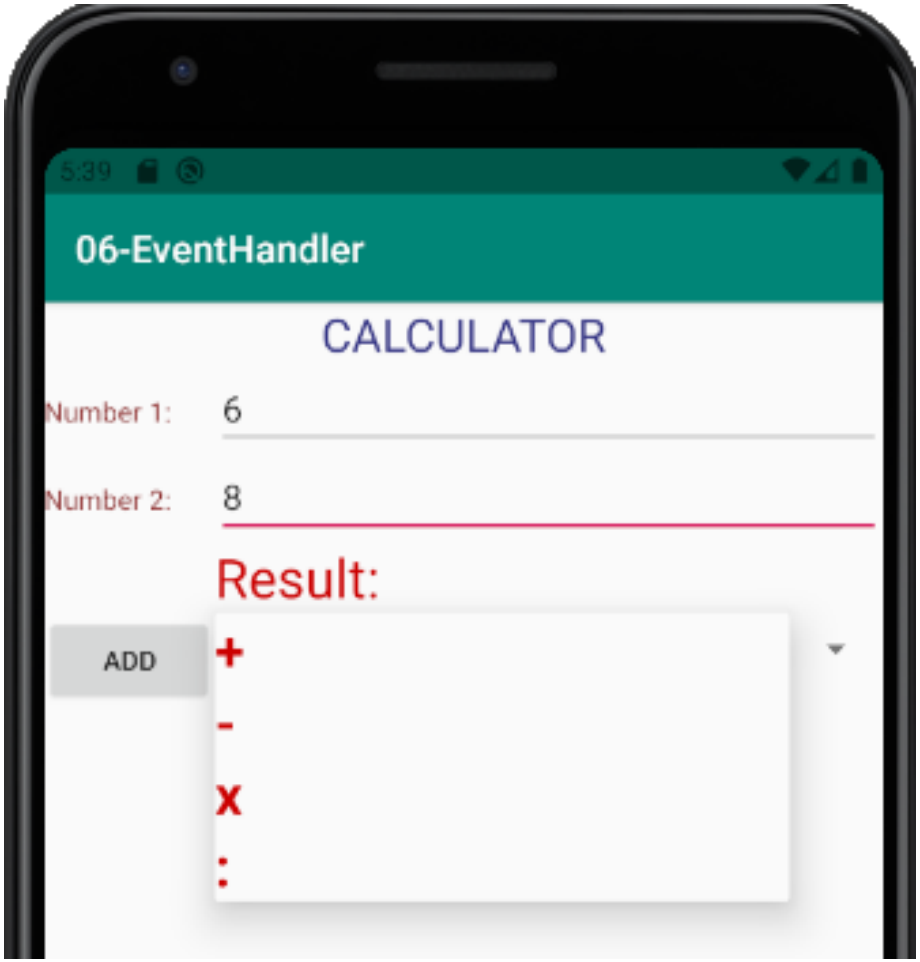
An Overview and Example of Android Event Handling

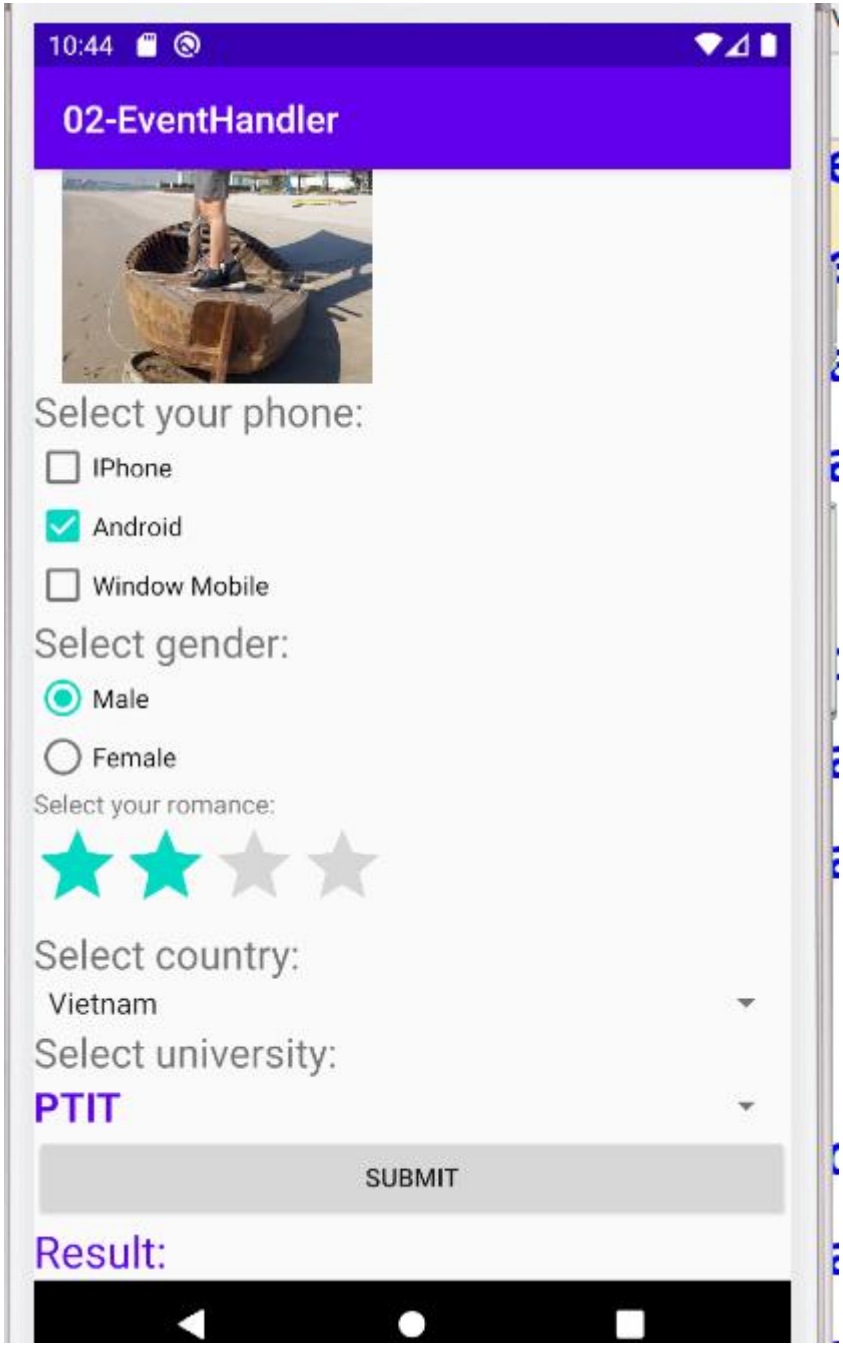
- **Consuming Events**

  How android system manage if one view

```
button.setOnClickListener(new Button.OnClickListener() {
    public void onClick(View v) {
        TextView editText = findViewById(R.id.editText);
        TextView text = findViewById(R.id.textView);
        text.setText("Hello " + editText.getText());
        Toast.makeText(MainActivity.this, "Hello " + editText.getText(),
Toast.LENGTH_LONG).show();
    }
});
button.setOnLongClickListener(
        new Button.OnLongClickListener() {
            public boolean onLongClick(View v) {
                TextView statusText =
                        (TextView)findViewById(R.id.editText);
                statusText.setText("Long button click");
                return true;
            }
        }
);
```

An Overview and Example of Android Event Handling (01)





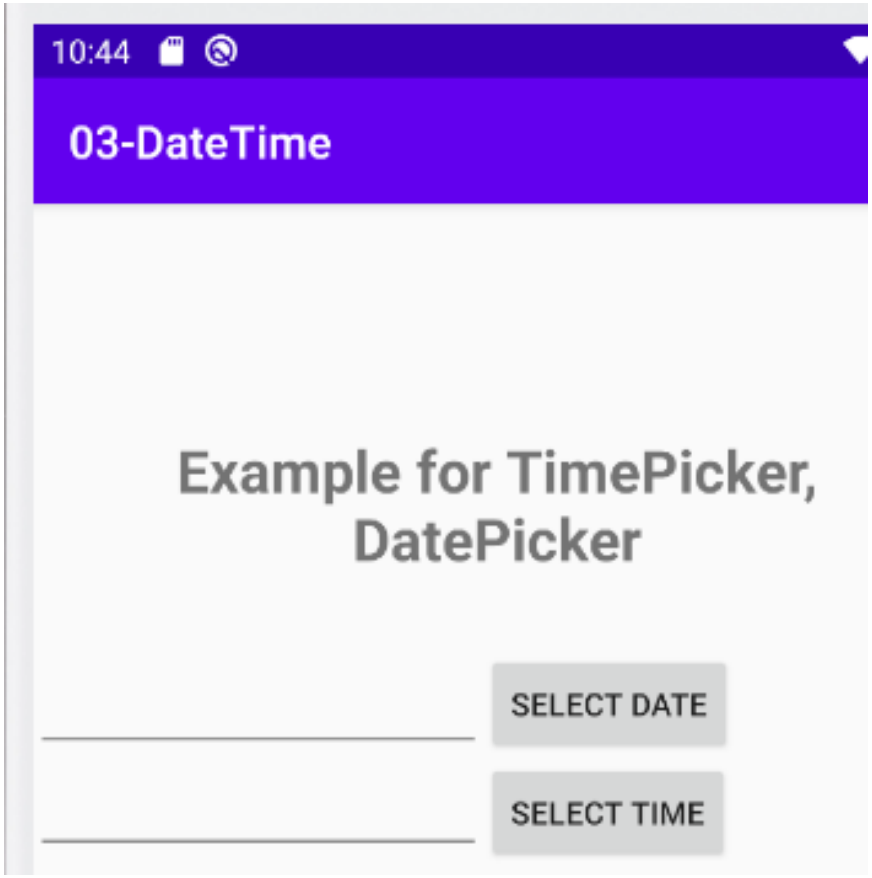
Event Handler (02)

An Overview and Example of Android Event Handling

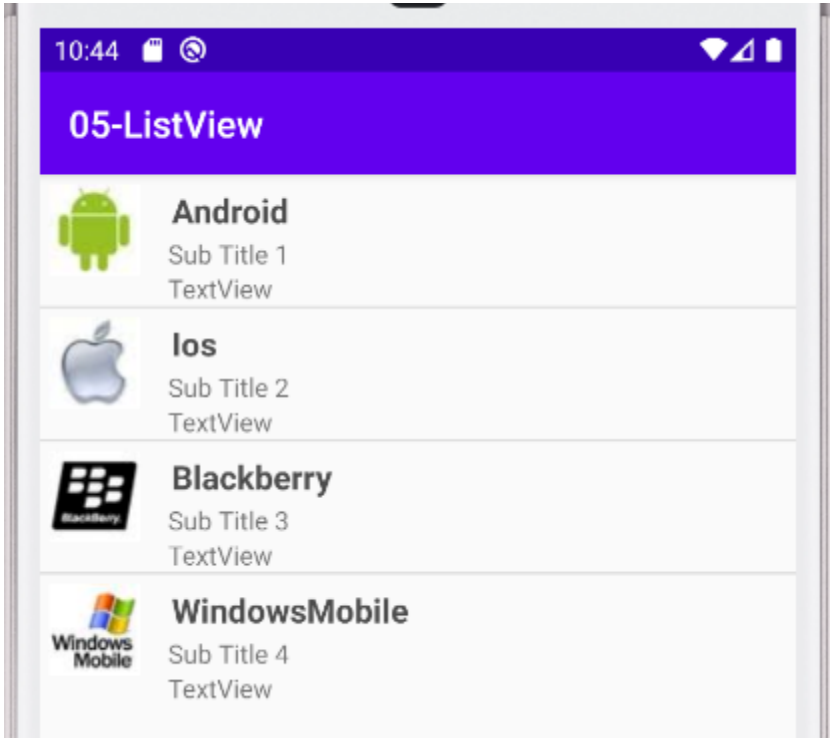
- onFocusChangeListener()

```
final EditText editText = findViewById(R.id.editText);
editText.setOnFocusChangeListener(new View.OnFocusChangeListener() {
    @Override
    public void onFocusChange(View v, boolean hasFocus) {
        if(hasFocus){
            if(((EditText) v).getText().toString().equals("Name")){
                ((EditText) v).setTextColor(Color.argb(255,0,0,0));
                ((EditText) v).setText("");
            }
        }else {
            if(((EditText) v).getText().toString().isEmpty()){
                ((EditText) v).setText("Name");
                ((EditText) v).setTextColor(Color.argb(255,200,200,200));
            }
        }
    }
});
```

TimePicker, DatePicker (03)

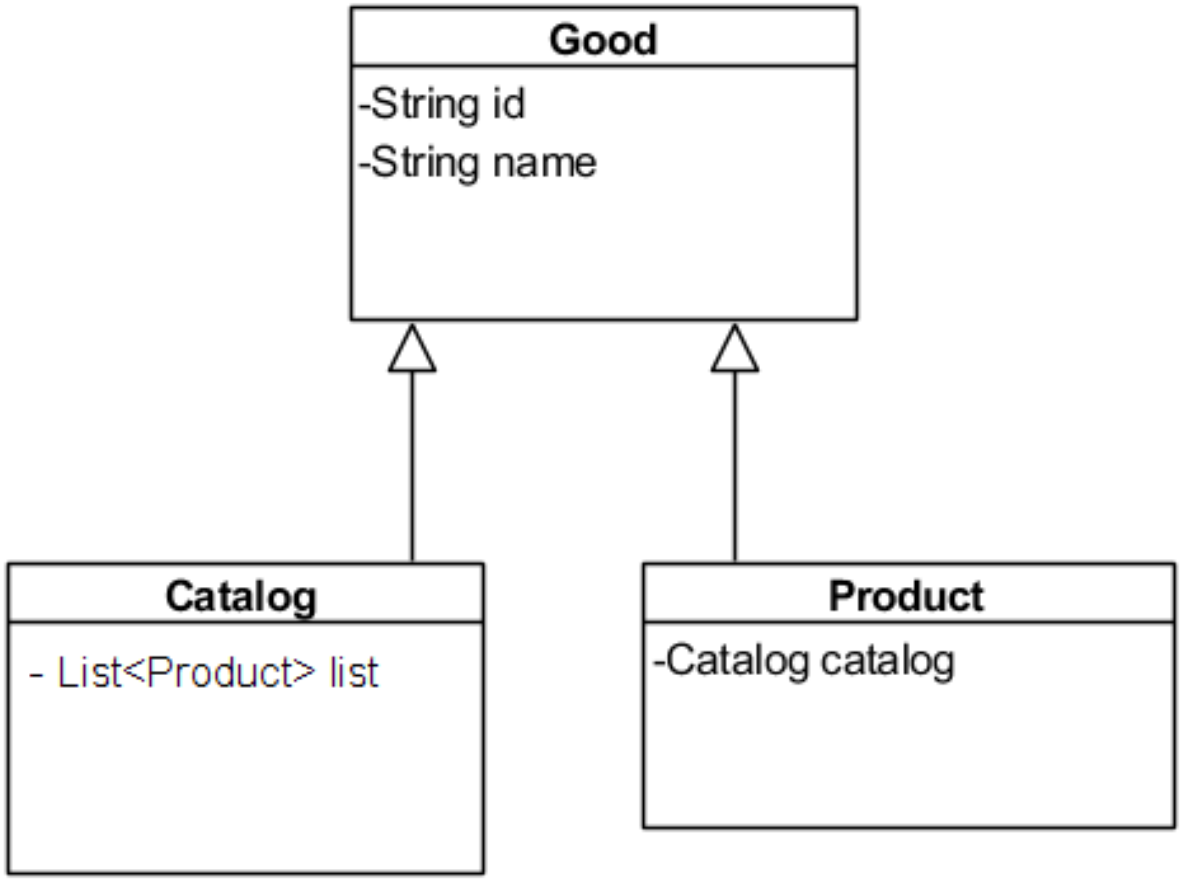


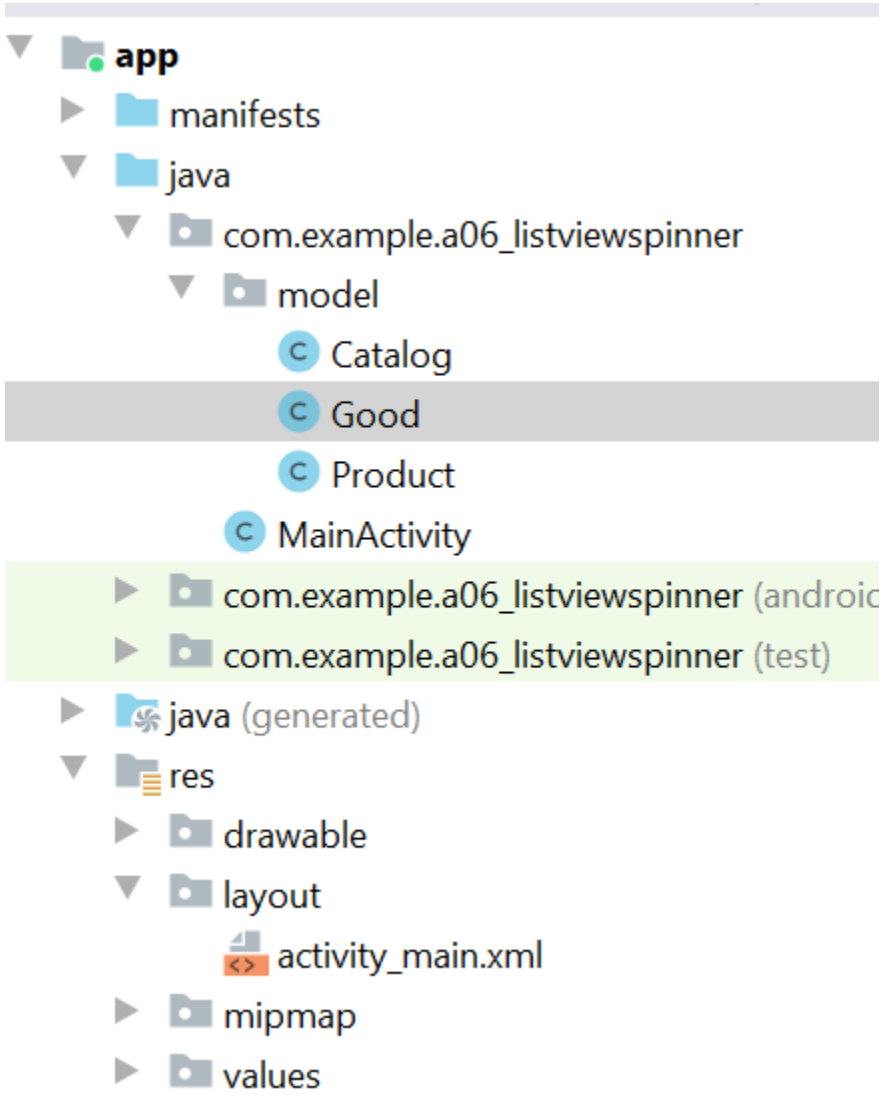
ListView (04,05)

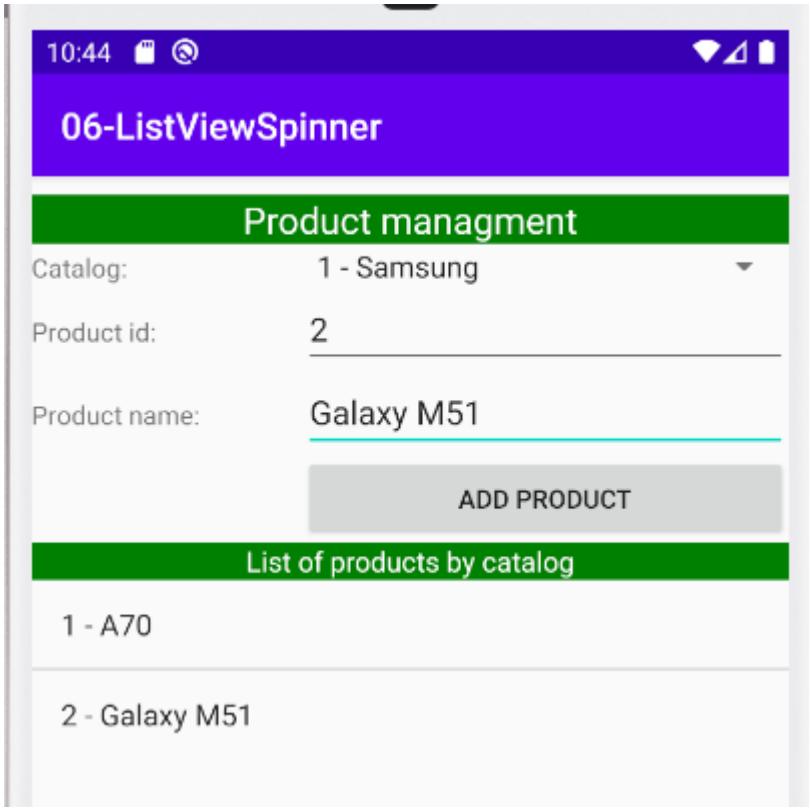


ListView, Spinner (06)

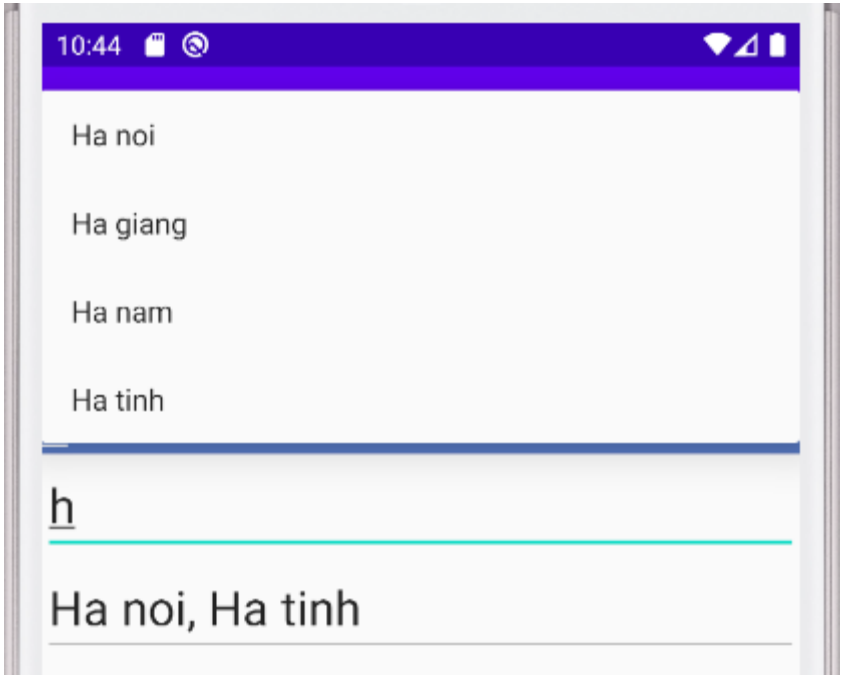
Exercise 1

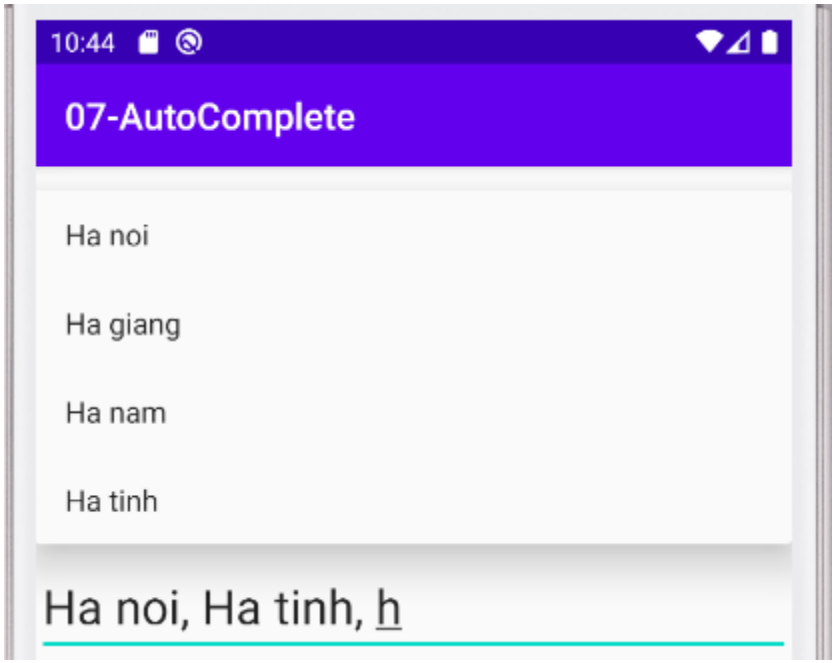



app
manifests
java
com.example.a06_listviewspinner
model
Catalog
Good
Product
MainActivity
com.example.a06_listviewspinner (androic
com.example.a06_listviewspinner (test)
java (generated)
res
drawable
layout
activity_main.xml
mipmap
values


10:44
06-ListViewSpinner
Product managment
Catalog:
1 - Samsung
Product id:
2
Product name:
Galaxy M51
ADD PRODUCT
List of products by catalog
1 - A70
2 - Galaxy M51

AutoCompleteTextView, MultiAutocompleteTextView (07)



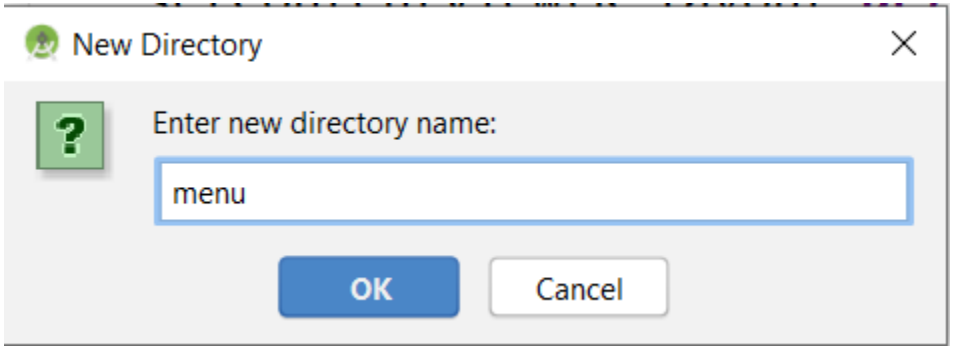


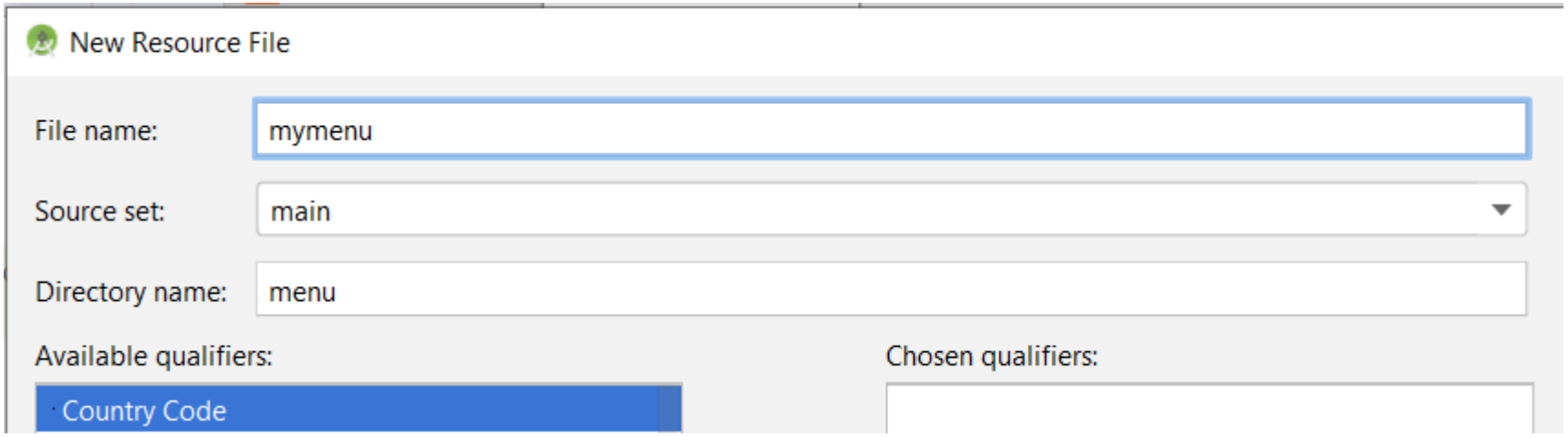
```
<AutoCompleteTextView
    android:id="@+id/oneauto"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:completionThreshold="1"
    android:textSize="26dp" >
    <requestFocus />
</AutoCompleteTextView>
<MultiAutoCompleteTextView
    android:id="@+id/multiAuto"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:completionThreshold="1"
    android:textSize="26dp" />
```

android:completionThreshold="1“:
Mục đích là thiết lập số ký tự bắt đầu lọc trong AutoComplete

Menu (08)

- Create : a menu directory
  - res/new/Directory
- Create: xml file
  - menu/New/Menu resource file



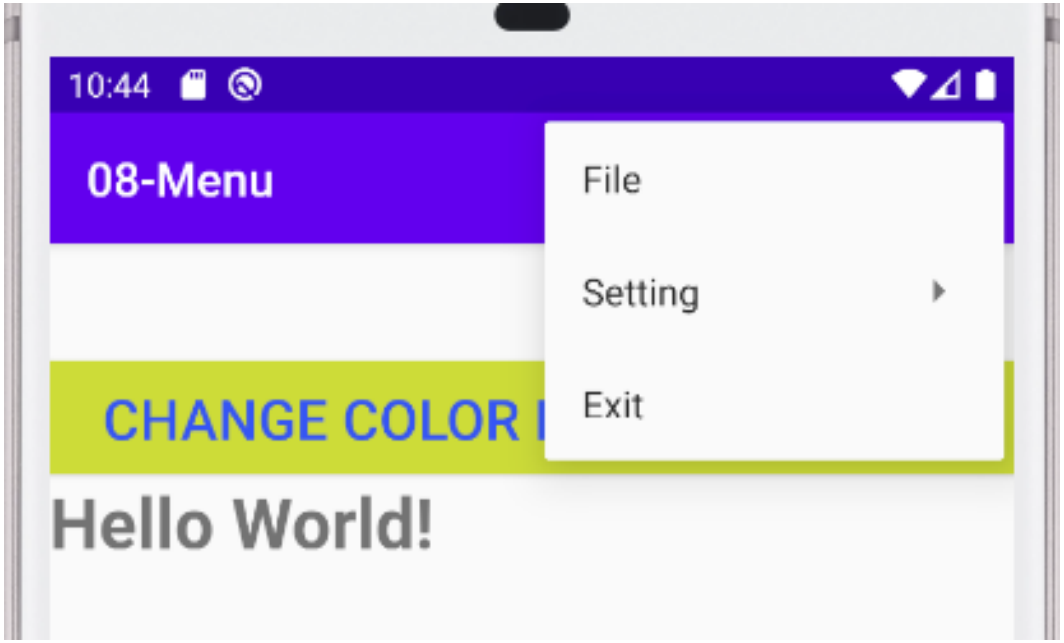


mymenu.xml

```
<?xml version="1.0" encoding="utf-8"?>
<menu xmlns:android="http://schemas.android.com/
        apk/res/android">
    <item android:title="File"
        android:id="@+id/mFile"/>
    <item android:title="Contact"
        android:id="@+id/mContact">
        <menu>
            <item android:title="Email"
                android:id="@+id/mEmail"/>
            <item android:title="Phone"
                android:id="@+id/mPhone"/>
        </menu>
    </item>
    <item android:title="Exit"
        android:id="@+id/mExit"/>
</menu>
```

MainActivity.java

```
@Override
public boolean onCreateOptionsMenu(Menu menu) {
    getMenuInflater().inflate(R.menu.mymenu,menu);
    return super.onCreateOptionsMenu(menu);
}
```

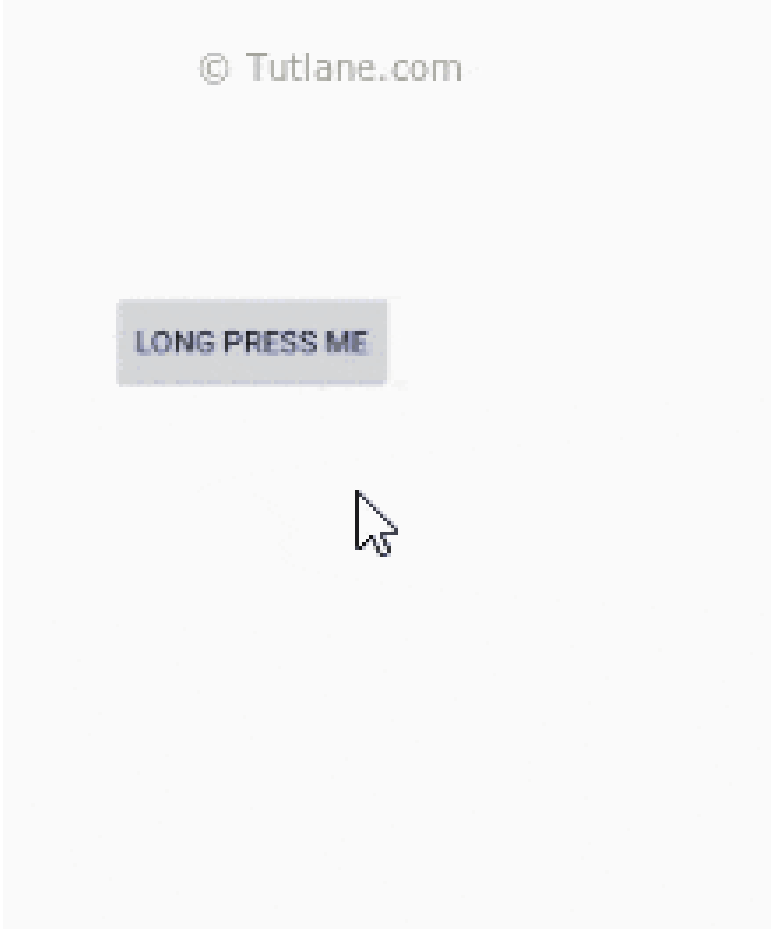


Select MenuItem

```
@Override
public boolean onOptionsItemSelected(@NonNull MenuItem item) {
    switch(item.getItemId()){
        case R.id.mFile:
            Toast.makeText(this,"Selected File",
                    Toast.LENGTH_LONG).show();
            break;
        case R.id.mExit:
            System.exit(0);
            break;
        case R.id.mEmail:
            Toast.makeText(this,"Seelected Email",
                        Toast.LENGTH_LONG).show();
            break;
        case R.id.mPhone:
            Toast.makeText(this,"Selected phone",
                    Toast.LENGTH_LONG).show();
            break;
    }
    return super.onOptionsItemSelected(item);
}
```

Context Menu

- The android **Context Menu** is more like the menu which displayed on right click in Windows or Linux.
- like a floating menu and that appears when the user performs a long press or click on an element



- Create Context Menu: mycontextmenu.xml

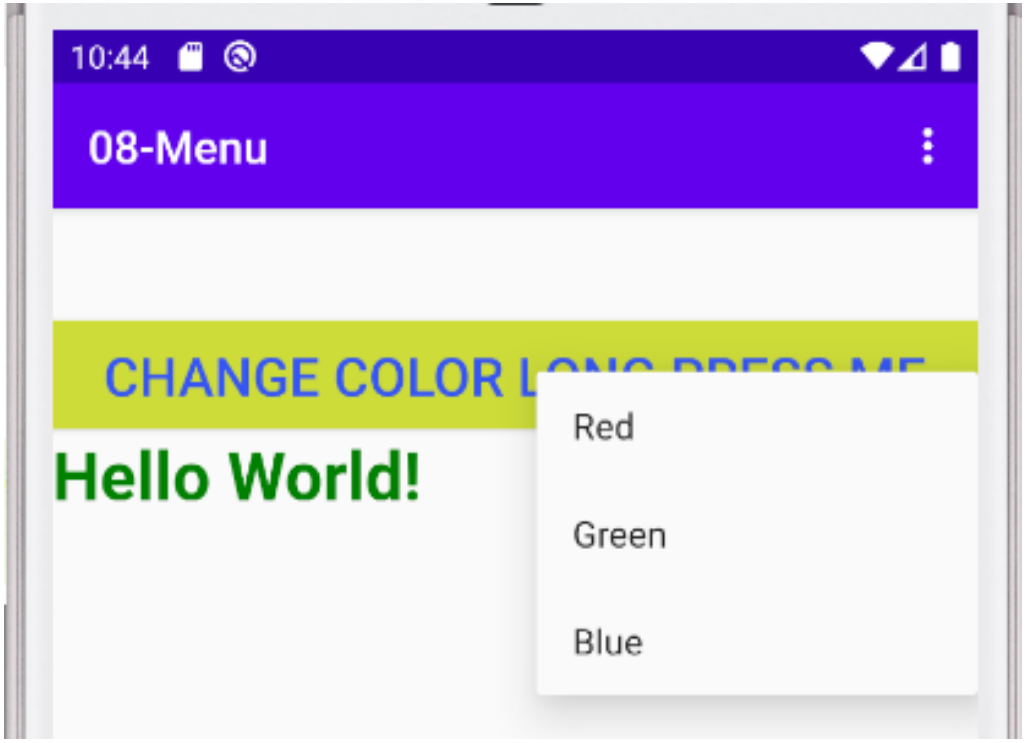
```
<?xml version="1.0" encoding="utf-8"?>
<menu
xmlns:android="http://schemas.android.com/apk/res/an
droid">
    <item android:title="Red"
        android:id="@+id/mRed"/>
     <item android:title="Green"
         android:id="@+id/mGreen"/>
     <item android:title="Blue"
         android:id="@+id/mBlue"/>
</menu>
```

Add more colors.xml file

- <color name="cRed">#FF0000</color>
- <color name="cGreen">#008000</color>
- <color name="cBlue">#000080</color>

```
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);
    initView();
    registerForContextMenu(bt);
}

private void initView() {
    tv=findViewById(R.id.tv);
    bt=findViewById(R.id.bt);
}
```

```
@Override
   public void onCreateContextMenu(ContextMenu menu, View v,
ContextMenu.ContextMenuInfo menuInfo) {
      super.onCreateContextMenu(menu, v, menuInfo);
      getMenuInflater().inflate(R.menu.mycontextmenu,menu);
   }
   @Override
   public boolean onContextItemSelected(@NonNull MenuItem item) {
      switch(item.getItemId()){
         case R.id.mRed:
            tv.setTextColor(getResources().getColor(R.color.cRed));
            break;
         case R.id.mGreen:
            tv.setTextColor(getResources().getColor(R.color.cGreen));
            break;
         case R.id.mBlue:
            tv.setTextColor(getResources().getColor(R.color.cBlue));
            break;
      }
      return super.onContextItemSelected(item);
   }
```


10:44
08-Menu
CHANGE COLOR L
Hello World!
Red
Green
Blue

RecyclerView and CardView (09)

- https://developer.android.com/jetpack/androidx/releases/recyclerview
- implementation "androidx.recyclerview:recyclerview:1.1.0“
- https://developer.android.com/jetpack/androidx/releases/cardview
- implementation "androidx.cardview:cardview:1.0.0“
- https://github.com/hdodenhof/CircleImageView
- implementation 'de.hdodenhof:circleimageview:3.1.0'

main_activity.xml

```
<RelativeLayout android:layout_width="match_parent"
    android:layout_height="match_parent"
    xmlns:android="http://schemas.android.com/apk/res
     /android">
    <androidx.recyclerview.widget.RecyclerView
        android:id="@+id/rev"
        android:layout_marginStart="10dp"
        android:layout_marginEnd="10dp"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        />
</RelativeLayout>
```

item_cat.xml

```
<androidx.cardview.widget.CardView xmlns:
android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    xmlns:app="http://schemas.android.com/apk/res-
auto"
    android:layout_margin="10dp"
    app:cardCornerRadius="10dp">
    <LinearLayout
        android:orientation="vertical"
        android:layout_width="match_parent"
        android:layout_height="wrap_content">
```

```
<ImageView
            android:id="@+id/img"
            android:layout_width="match_parent"
            android:layout_height="130dp"
            android:src="@drawable/cat1"
            android:scaleType="centerCrop"
            />
        <TextView
            android:id="@+id/tv_name"
            android:text="Meo de thuong"
            android:padding="10dp"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:textSize="16dp"

android:textColor="@color/colorPrimaryDark"/>
    </LinearLayout>
</androidx.cardview.widget.CardView>
```

CardAdapter.java

```
public class CatViewHolder extends
RecyclerView.ViewHolder{
    private ImageView imgCat;
    private TextView tvName;
    public CatViewHolder(@NonNull View view) {
        super(view);
        imgCat=view.findViewById(R.id.img);
        tvName=view.findViewById(R.id.tv_name);

    }
}
```

RecyclerView.Adapter<CatAdapter.CatViewHolder>

- public CatViewHolder onCreateViewHolder(@NonNull ViewGroup parent,int viewType)
- public void onBindViewHolder(@NonNull CatViewHolder holder, int position)
- public int getItemCount()

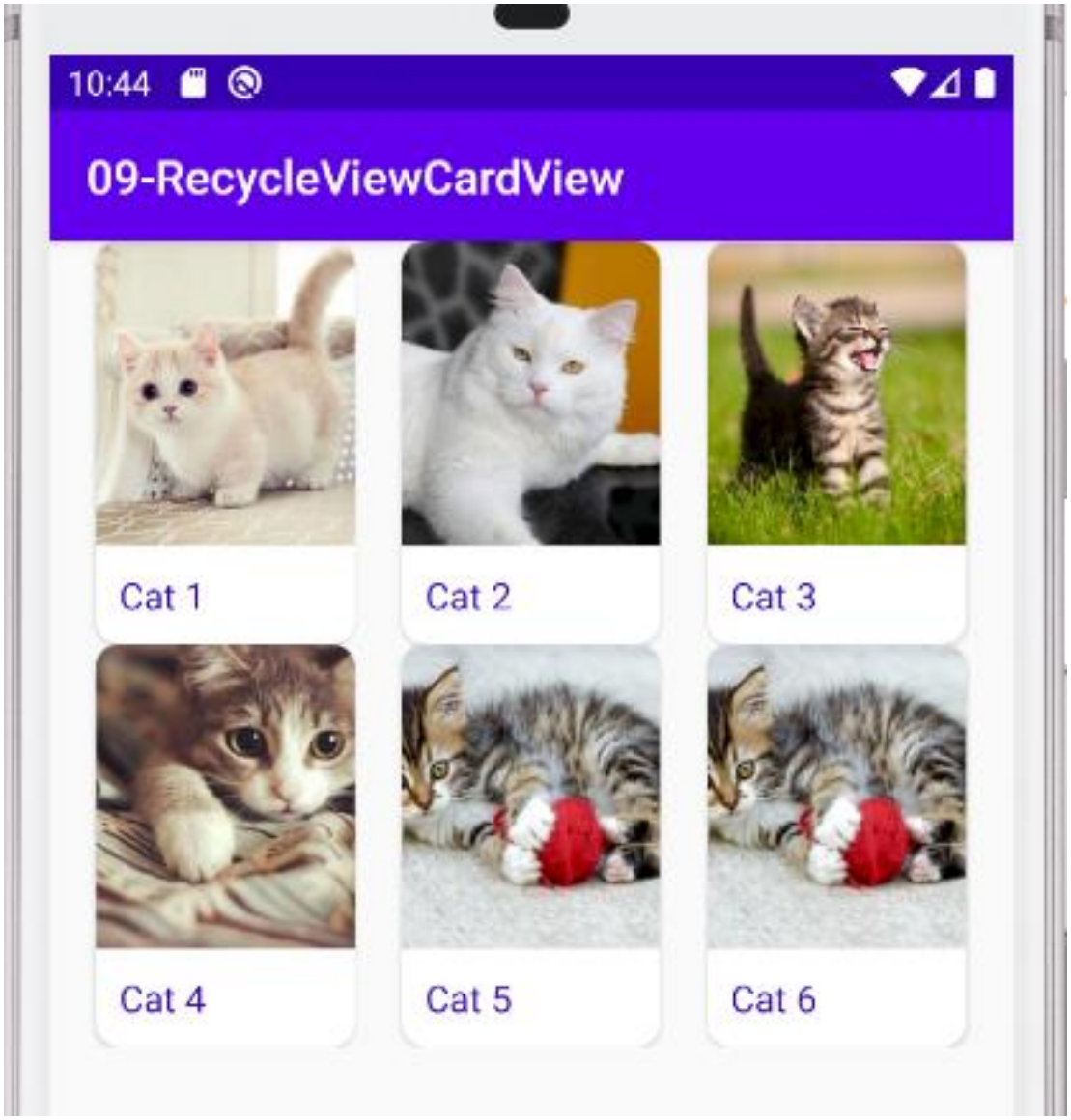
```
public class CatAdapter extends
        RecyclerView.Adapter<CatAdapter.CatViewHolder> {
    private Context mContext;
    private List<Cat> mlist;
    public CatAdapter(Context mContext) {
        this.mContext = mContext;
    }
    public void setData(List<Cat> list){
        this.mlist=list;
        notifyDataSetChanged();
    }
    @NonNull
    @Override
    public CatViewHolder onCreateViewHolder(@NonNull
ViewGroup parent, int viewType) {
    View view= LayoutInflater.from(parent.getContext()).
     inflate(R.layout.item_cat, parent,false);
        return new CatViewHolder(view);
    }
```

```
@Override
public void onBindViewHolder(@NonNull CatViewHolder
holder,
                             int position) {
        Cat cat=mlist.get(position);
        if(cat==null)
            return;

holder.imgCat.setImageResource(cat.getSourceImage());
        holder.tvName.setText(cat.getName());
}
@Override
public int getItemCount() {
    if(mlist!=null){
        return mlist.size();
    }
    return 0;
}
```

Main_Activity.java

```
public class MainActivity extends AppCompatActivity {
    private RecyclerView revCat;
    private CatAdapter adapter;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        revCat=findViewById(R.id.rev);
        adapter=new CatAdapter(this);
        GridLayoutManager manager=new GridLayoutManager(this,3);
        revCat.setLayoutManager(manager);
        adapter.setData(getListCat());
        revCat.setAdapter(adapter);
    }
```

```
private List<Cat> getListCat() {
        List<Cat> list=new ArrayList<>();
        list.add(new Cat(R.drawable.cat1,"Cat 1"));
        list.add(new Cat(R.drawable.cat2,"Cat 2"));
        list.add(new Cat(R.drawable.cat3,"Cat 3"));
        list.add(new Cat(R.drawable.cat4,"Cat 4"));
        list.add(new Cat(R.drawable.cat5,"Cat 5"));
        list.add(new Cat(R.drawable.cat6,"Cat 6"));

        return list;
    }
}
```


10:44
09-RecycleViewCardView
Cat 1
Cat 2
Cat 3
Cat 4
Cat 5
Cat 6

CircleImageView

```
<de.hdodenhof.circleimageview.CircleImageView
    android:layout_width="80dp"
    android:layout_height="80dp"
    android:id="@+id/img"
    android:src="@drawable/cat1"/>
```

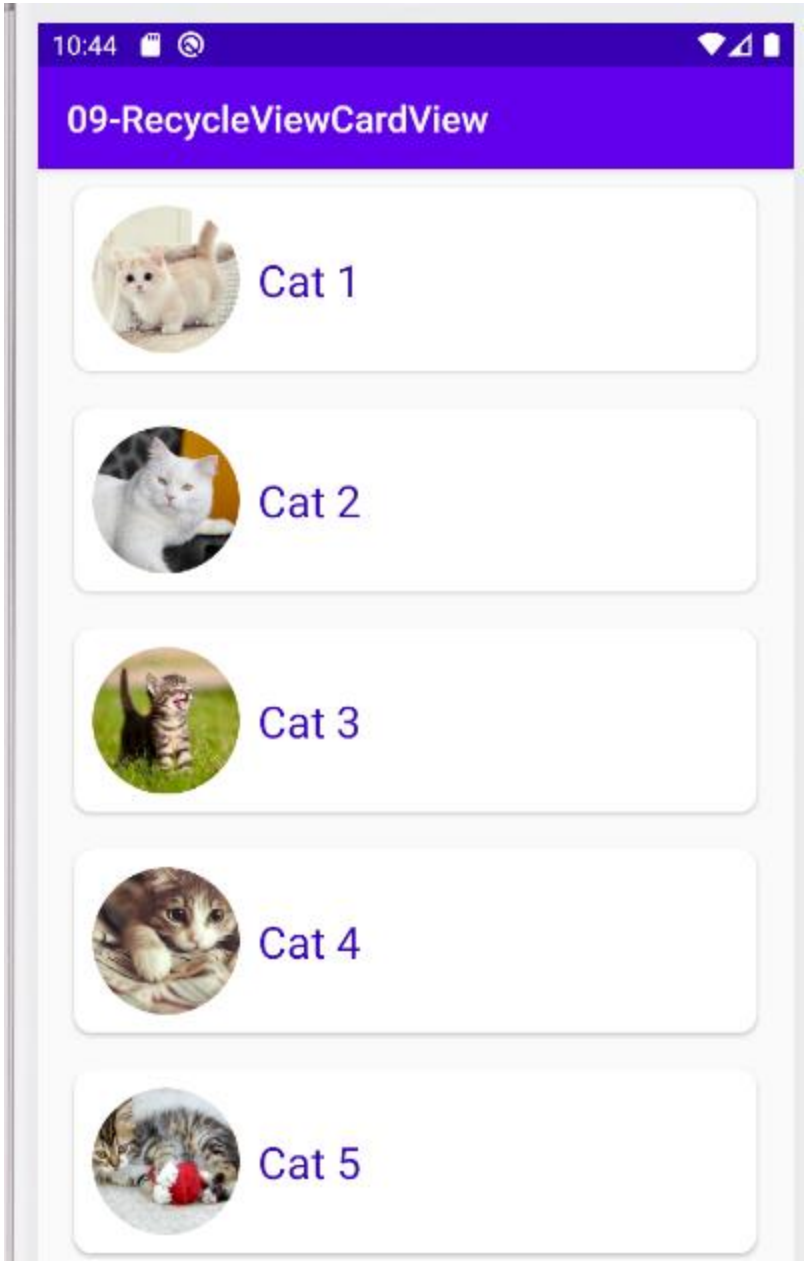
```
LinearLayoutManager manager=new LinearLayoutManager(this,
        RecyclerView.VERTICAL,false);
```

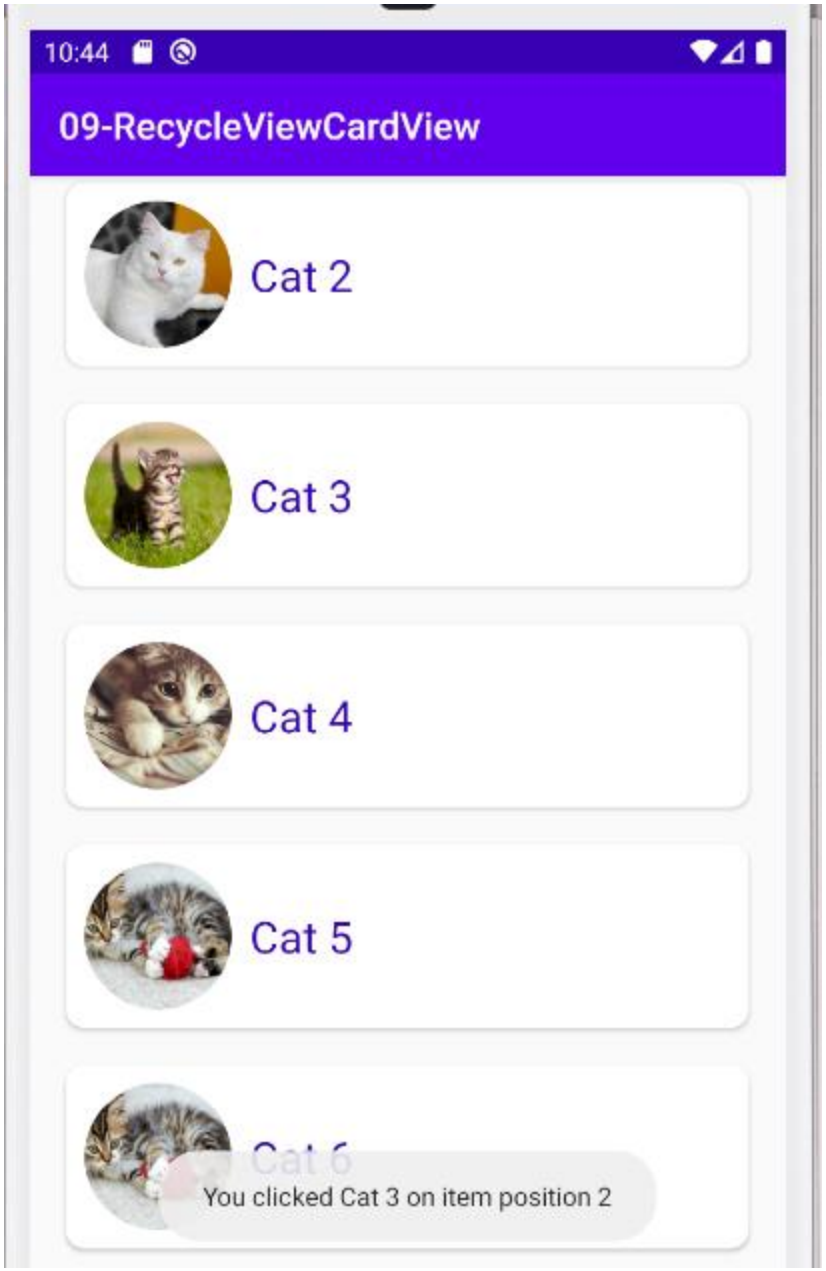
Event handle for card item

```
1.public interface ItemClickListener {
    void onItemClick(View view, int position);
}
2.private ItemClickListener mClickListener;
3. public void setClickListener(ItemClickListener itemClickListener) {
    this.mClickListener = itemClickListener;
}
4.public class CatViewHolder2 extends RecyclerView.ViewHolder
     implements View.OnClickListener
public CatViewHolder2(@NonNull View view) {
    super(view);
    imgCat=view.findViewById(R.id.img);
    tvName=view.findViewById(R.id.tv_name);
    view.setOnClickListener(this);
}@Override
5.public void onClick(View v) {
    if (mClickListener != null)
        mClickListener.onItemClick(v, getAdapterPosition());
}
```

Main_Activity.java

```
1.public class Main2Activity extends AppCompatActivity
     implements CatAdapter2.ItemClickListener

2.adapter.setClickListener(this);

3.@Override
public void onItemClick(View view, int position) {
    Toast.makeText(this, "You clicked " +
            adapter.getItem(position) + " " +
            "on item position " + position,
Toast.LENGTH_SHORT).show();
}
```

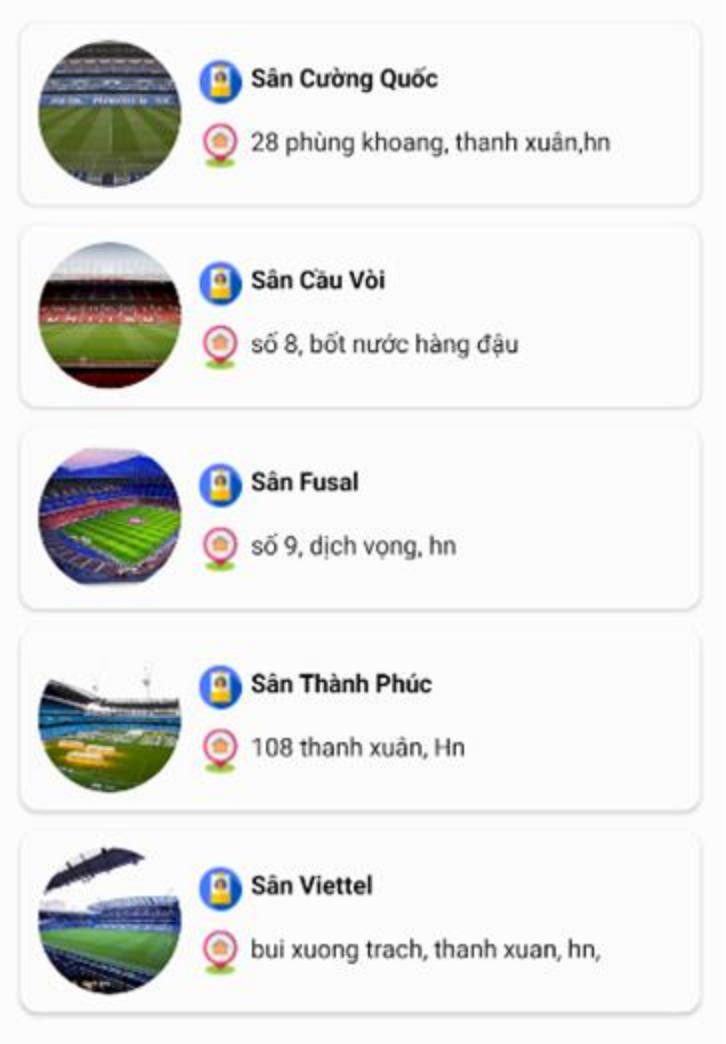

10:44
09-RecycleViewCardView
Cat 1
Cat 2
Cat 3
Cat 4
Cat 5


10:44
09-RecycleViewCardView
Cat 2
Cat 3
Cat 4
Cat 5
You clicked Cat 3 on item position 2

Exercise 2


5554:avd17tes
4:41
Vidu_CustomLayout_ListView
Quản lý nhân viên
Mã NV:
Tên NV:
Giới tính:
Nữ
Nam
Nhập NV
Danh sách nhân viên:
ma1-Quach Tinh
ma2-Hoang Dung
ma3-Hong That Cong
ma4-Hoang Duoc su
ma5-Thanh Co

Exercise 3



- input event listeners for card items

- End of Lesson 4

Thank you!