Simple Android News App – Three Fragment Case Study

In this case study, we'll create a simple **News App** using three fragments to showcase different categories of news such as **Latest News**, **Sports News**, and **Technology News**. We'll use **ViewPager2** and **TabLayout** for fragment navigation. This example will focus on fragment management, RecyclerView usage, and passing data between fragments.

Features:

1. **Three Tabs**: Latest, Sports, and Technology news.
2. Each tab contains a **RecyclerView** displaying a list of news articles.
3. Each news item can be clicked to view details.

Tech Stack:

- **Language**: JAVA
- **Android Version**: Android 5.0 (Lollipop) or higher
- **Libraries**: ViewPager2, TabLayout, RecyclerView

1. App Architecture:

- **MainActivity**: Hosts the ViewPager2 and TabLayout.
- **Fragments**: Three fragments for Latest News, Sports News, and Technology News.
- **Adapter**: A RecyclerView adapter to display news in each fragment.
- **Model**: A News data model.

2. Dependencies

Add the following dependencies in your `build.gradle`:

gradle
Copy code
```
dependencies {
    implementation "androidx.recyclerview:recyclerview:1.2.1"
    implementation "androidx.viewpager2:viewpager2:1.0.0"
    implementation "com.google.android.material:material:1.4.0"
}
```

3. Layout for MainActivity (XML)

We'll use `TabLayout` and `ViewPager2` to switch between the three fragments.

xml
Copy code
```
<!-- res/layout/activity_main.xml --><LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

    <com.google.android.material.tabs.TabLayout
        android:id="@+id/tabLayout"
```

```
        android:layout_width="match_parent"
        android:layout_height="wrap_content"/>

    <androidx.viewpager2.widget.ViewPager2
        android:id="@+id/viewPager"
        android:layout_width="match_parent"
        android:layout_height="match_parent"/>
</LinearLayout>
```

4. MainActivity (Kotlin)

In the `MainActivity`, we'll set up `TabLayout` and `ViewPager2` with a FragmentPagerAdapter.

```kotlin
Copy code
package com.example.newsapp
import android.os.Bundleimport androidx.appcompat.app.AppCompatActivityimport
com.google.android.material.tabs.TabLayoutimport
com.google.android.material.tabs.TabLayoutMediatorimport
androidx.viewpager2.widget.ViewPager2
class MainActivity : AppCompatActivity() {

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

        val tabLayout = findViewById<TabLayout>(R.id.tabLayout)
        val viewPager = findViewById<ViewPager2>(R.id.viewPager)

        val adapter = NewsPagerAdapter(this)
        viewPager.adapter = adapter

        TabLayoutMediator(tabLayout, viewPager) { tab, position ->
            when (position) {
                0 -> tab.text = "Latest"
                1 -> tab.text = "Sports"
                2 -> tab.text = "Technology"
            }
        }.attach()
    }
}
```

5. FragmentPagerAdapter (Kotlin)

We'll create a FragmentPagerAdapter that returns the appropriate fragment based on the selected tab.

```kotlin
Copy code
package com.example.newsapp
```

```kotlin
import androidx.fragment.app.Fragmentimport
androidx.fragment.app.FragmentActivityimport
androidx.viewpager2.adapter.FragmentStateAdapter
class NewsPagerAdapter(fragmentActivity: FragmentActivity) :
FragmentStateAdapter(fragmentActivity) {

    override fun getItemCount(): Int = 3

    override fun createFragment(position: Int): Fragment {
        return when (position) {
            0 -> LatestNewsFragment()
            1 -> SportsNewsFragment()
            2 -> TechnologyNewsFragment()
            else -> LatestNewsFragment()
        }
    }
}
```

6. News Model (Kotlin)

Create a simple data class to represent news items.

```kotlin
Copy code
package com.example.newsapp
data class NewsItem(val title: String, val description: String)
```

7. RecyclerView Adapter (Kotlin)

This adapter will bind the news items to the RecyclerView in each fragment.

```kotlin
Copy code
package com.example.newsapp
import android.view.LayoutInflaterimport android.view.Viewimport
android.view.ViewGroupimport android.widget.TextViewimport
androidx.recyclerview.widget.RecyclerView
class NewsAdapter(private val newsList: List<NewsItem>, private val onItemClick:
(NewsItem) -> Unit) :
    RecyclerView.Adapter<NewsAdapter.NewsViewHolder>() {

    class NewsViewHolder(itemView: View) : RecyclerView.ViewHolder(itemView) {
        val titleTextView: TextView = itemView.findViewById(R.id.news_title)
        val descriptionTextView: TextView = itemView.findViewById(R.id.news_description)
    }

    override fun onCreateViewHolder(parent: ViewGroup, viewType: Int): NewsViewHolder {
        val view = LayoutInflater.from(parent.context).inflate(R.layout.news_item,
parent, false)
        return NewsViewHolder(view)
```

```
    }

    override fun onBindViewHolder(holder: NewsViewHolder, position: Int) {
        val newsItem = newsList[position]
        holder.titleTextView.text = newsItem.title
        holder.descriptionTextView.text = newsItem.description
        holder.itemView.setOnClickListener { onItemClick(newsItem) }
    }

    override fun getItemCount(): Int = newsList.size
}
```

8. Fragment Layout (XML)

Each fragment will use a `RecyclerView` to display the news.

```xml
Copy code
<!-- res/layout/fragment_news.xml --><LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

    <androidx.recyclerview.widget.RecyclerView
        android:id="@+id/newsRecyclerView"
        android:layout_width="match_parent"
        android:layout_height="match_parent"/></LinearLayout>
```

9. News Item Layout (XML)

Each news item will have a title and a description.

```xml
Copy code
<!-- res/layout/news_item.xml --><LinearLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:orientation="vertical"
    android:padding="16dp">

    <TextView
        android:id="@+id/news_title"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:textStyle="bold"
        android:textSize="18sp"/>

    <TextView
```

```
        android:id="@+id/news_description"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:textSize="14sp"
        android:layout_marginTop="4dp"/>
</LinearLayout>
```

10. Fragment for Latest News (Kotlin)

Each fragment (Latest, Sports, Technology) will use a RecyclerView to show news. Here's how to implement the LatestNewsFragment:

```kotlin
Copy code
package com.example.newsapp
import android.os.Bundleimport android.view.LayoutInflaterimport
android.view.Viewimport android.view.ViewGroupimport android.widget.Toastimport
androidx.fragment.app.Fragmentimport
androidx.recyclerview.widget.LinearLayoutManagerimport
androidx.recyclerview.widget.RecyclerView
class LatestNewsFragment : Fragment() {

    override fun onCreateView(
        inflater: LayoutInflater, container: ViewGroup?,
        savedInstanceState: Bundle?
    ): View? {
        val view = inflater.inflate(R.layout.fragment_news, container, false)
        val newsRecyclerView = view.findViewById<RecyclerView>(R.id.newsRecyclerView)

        val newsList = listOf(
            NewsItem("Breaking: Major Event", "Description of the major event."),
            NewsItem("Latest Update on the Economy", "Economy news update."),
            // Add more news items
        )

        val adapter = NewsAdapter(newsList) { newsItem ->
            Toast.makeText(requireContext(), "Clicked: ${newsItem.title}",
Toast.LENGTH_SHORT).show()
        }

        newsRecyclerView.layoutManager = LinearLayoutManager(requireContext())
        newsRecyclerView.adapter = adapter

        return view
    }
}
```

Repeat similar code for **SportsNewsFragment** and **TechnologyNewsFragment** by changing the `newsList` with sports and technology news, respectively.

11. Running the App

When you run the app, you should see three tabs at the top of the screen: **Latest**, **Sports**, and **Technology**. Each tab will display different news articles, and when an article is clicked, a toast message will appear showing the title.

This case study covers:

- Using **Fragments** with **TabLayout** and **ViewPager2**.
- Using **RecyclerView** to display a list of items.
- Passing data between fragments and handling item clicks.