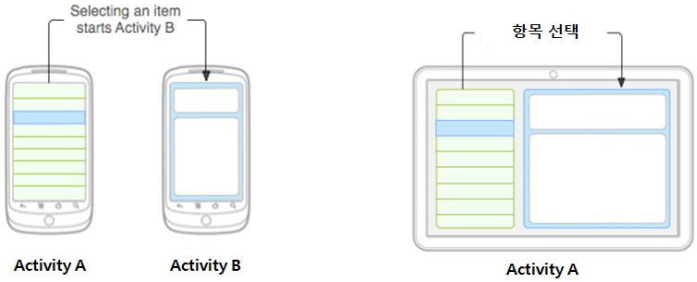
17장. Support 라이브러리 활용

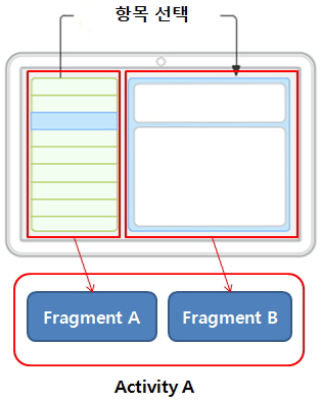
17.1 Fragment

17.1.1. Fragment 이해

- Fragment는 API Level 11(Android 3.0)에서 추가된 뷰



- 액티비티처럼 이용할 수 있는 뷰
- 태블릿 PC용 앱의 화면을 작성할 때 액티비티가 복잡하게 작성되는 문제를 해결하는 목적으로 Fragment를 제공



17.1 Fragment

17.1.2. Fragment 작성법

- Fragment의 화면을 위한 레이아웃 XML 파일

```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
   android:layout_width="match_parent"
   android:layout_height="match_parent"
   android:orientation="vertical">
   <TextView
      android:layout_width="match_parent"
      android:layout_height="match_parent"
      android:text="One Fragment!!"
      android:textStyle="bold"
      android:textSize="30dp"
      android:gravity="center"
      />
</LinearLayout>
```

- Fragment 클래스

```
public class OneFragment extends Fragment {
   public View onCreateView(LayoutInflater inflater, ViewGroup container,
                            Bundle savedInstanceState) {
      return inflater.inflate(R.layout.fragment_one, container, false);
   }
}
```

17.1 Fragment

- 액티비티의 레이아웃 XML 파일에서 Fragment는 <fragment> 태그로 등록

```
<fragment
   android:id="@+id/fragment_one"
   android:layout_width="match_parent"
   android:layout_height="wrap_content"
   android:layout_weight="1"
   class="com.example.test6_17.OneFragment"
   />
```

- 자바 코드에서 동적으로 액티비티 화면에 Fragment를 출력
- Fragment를 포함할 LinearLayout을 준비

```
<LinearLayout
   android:id="@+id/main_container"
   android:layout_width="match_parent"
   android:layout_height="match_parent"
   android:orientation="vertical">

</LinearLayout>
```

17.1 Fragment

- FragmentManager 클래스로 FragmentTransaction 클래스를 획득

```
oneFragment=new OneFragment();

FragmentTransaction ft=manager.beginTransaction();
ft.add(R.id.main_container, oneFragment);
ft.commit();
```

- add(int containerViewId, Fragment fragment): 새로운 Fragment를 화면에 추가. id 영역에 추가
- add(int containerViewId, Fragment fragment, String tag): id 영역에 Fragment 추가하며 추가한 Fragment의 구분자를 태그명으로 설정
- replace(int containerViewId, Fragment fragment): id 영역에 추가된 Fragment를 대체
- replace(int containerViewId, Fragment fragment, String tag): id 영역에 추가된 Fragment를 대체하면서 tag 이름 설정
- remove(Fragment fragment): 추가된 Fragment 제거
- commit(): 화면 적용

17.1 Fragment

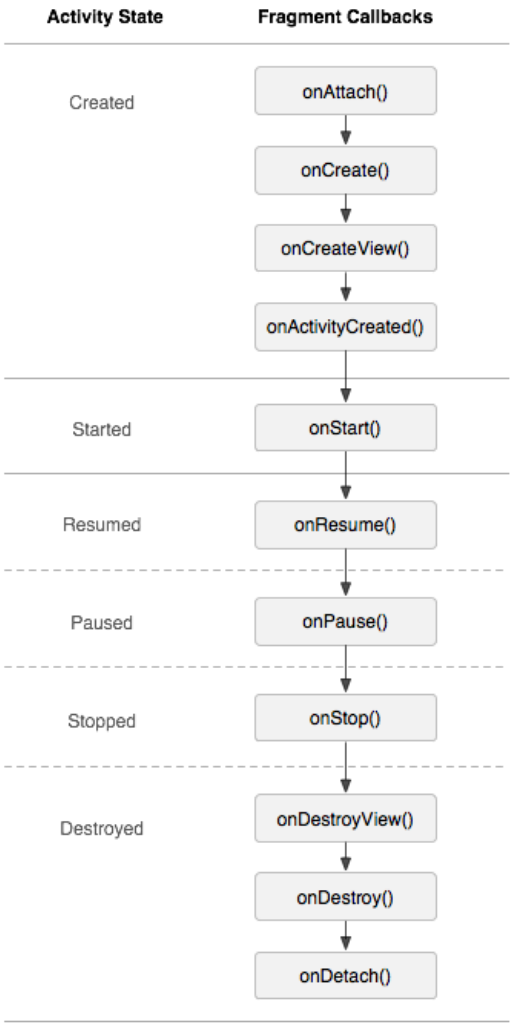
17.1.3. Fragment 생명주기

- Fragment의 생명주기는 액티비티 생명주기와 동일하며 Fragment만을 위한 생명주기 함수가 더 추가된 구조

- BackStack은 Fragment가 화면에 안 보이게 되는 순간 제거하지 않고 저장했다가 다시 이용
- Fragment를 BackStack에 추가

```
ft.addToBackStack(null);
```

17.1 Fragment

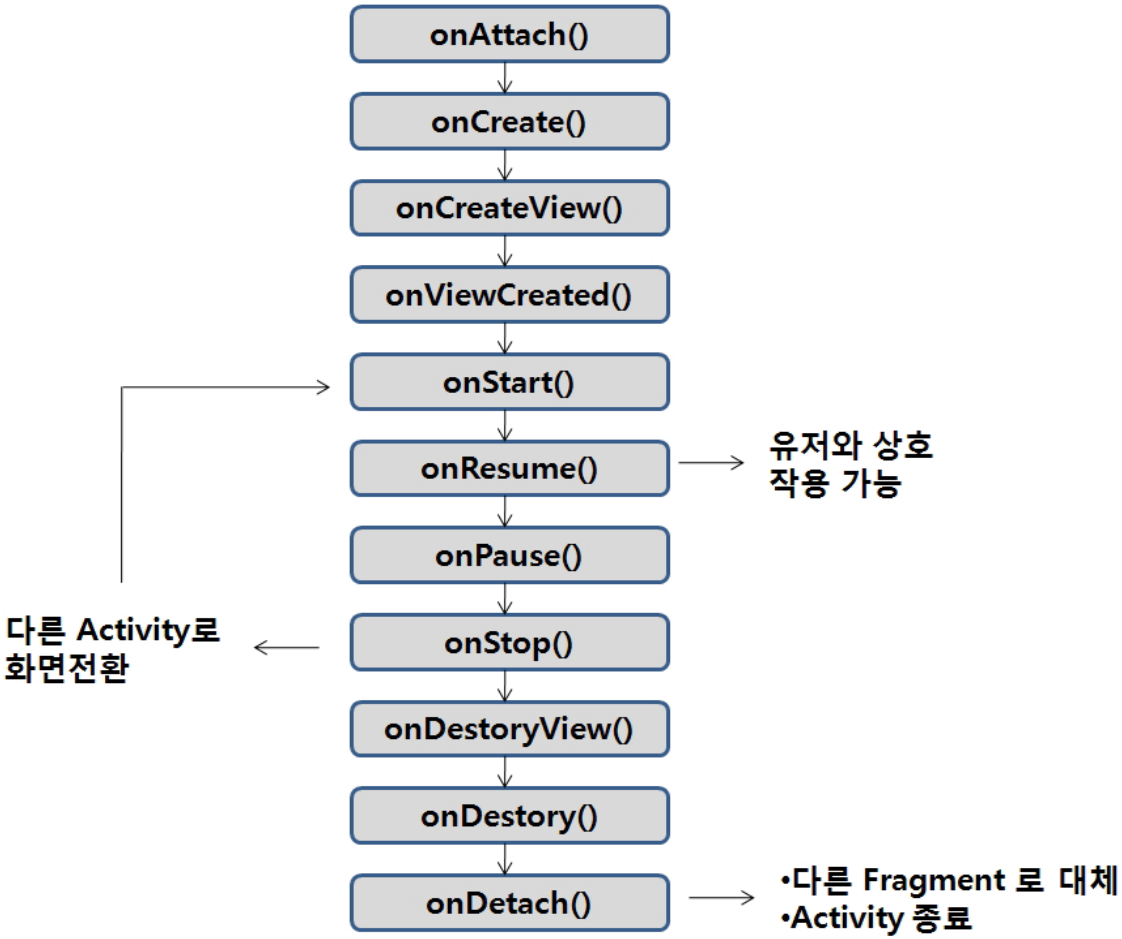


17.1 Fragment

- onAttach(Activity activity): Fragment가 액티비티에 포함되는 순간 호출
- onCreate(Bundle savedInstanceState): 액티비티의 onCreate() 함수와 동일
- onCreateView(LayoutInflater inflater, ViewGroup container, Bundle savedInstanceState): Fragment의 UI 구성을 위해 호출. 이곳에서 반환하는 뷰가 Fragment 화면에 출력
- onActivityCreated(Bundle savedInstanceState): Fragment의 액티비티 생성이 완료된 순간 호출
- onStart(): 액티비티의 onStart() 함수와 동일
- onResume(): 액티비티의 onResume() 함수와 동일. 사용자 화면에 출력되면서 사용자와 상호작용이 가능한 상태
- onPause(): 액티비티의 onPause() 함수와 동일
- onStop(): 액티비티의 onStop() 함수와 동일
- onDestroyView(): Fragment가 화면에서 사라진 후 BackStack에 추가된 후 호출
- onDestroy(): 액티비티의 onDestory() 함수와 동일
- onDetach(): Fragment가 액티비티에서 제거될 때 호출

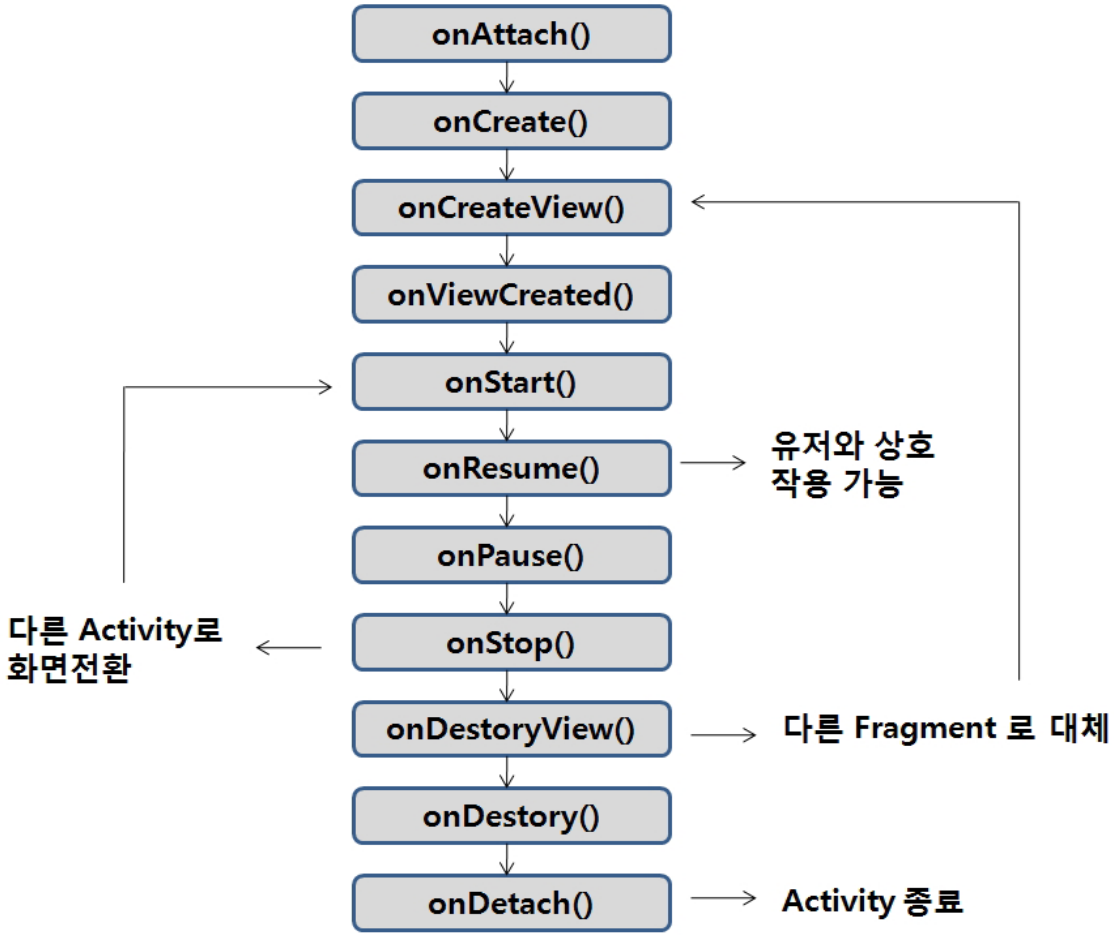
17.1 Fragment

- BackStack을 사용하지 않 을 때 Fragment의 생명주기



17.1 Fragment

- BackStack을 사용할 때

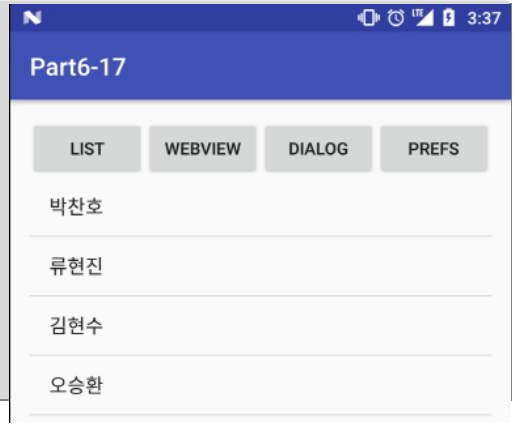


17.1 Fragment

17.1.4. 다양한 Fragment

- ListFragment
- ListFragment는 ListView로 화면을 구성할 때 ListView와 관련된 내용만 액티비티에서 분리 해서 Fragment로 구현할 수 있게 만든 클래스

```
public class OneFragment extends ListFragment {
    @Override
    public void onViewCreated(View view, Bundle savedInstanceState) {
        super.onViewCreated(view, savedInstanceState);
        String[] datas={"박찬호","류현진","김현수","오승환"};
        ArrayAdapter<String> aa=new ArrayAdapter<String>(getActivity(),
                android.R.layout.simple_list_item_1,datas);
        setListAdapter(aa);
    }
}
```



- 항목 선택 이벤트

```
public void onListItemClick(ListView l, View v, int position, long id) {
    super.onListItemClick(l, v, position, id);
    //...
}
```

17.1 Fragment

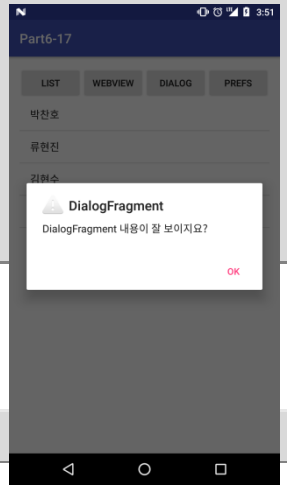
- WebViewFragment
- WebView를 내장하고 있는 Fragment 서브 클래스

```
public class TwoFragment extends WebViewFragment {
    @Override
    public void onViewCreated(View view, Bundle savedInstanceState) {
        super.onViewCreated(view, savedInstanceState);
        WebView webView=getWebView();
        WebSettings settings=webView.getSettings();
        settings.setJavaScriptEnabled(true);
        webView.setWebViewClient(new WebViewClient());
        webView.loadUrl("http://www.google.com");
    }
}
```

17.1 Fragment

- DialogFragment

```
public class ThreeFragment extends DialogFragment {
    @Override
    public Dialog onCreateDialog(Bundle savedInstanceState) {
        AlertDialog.Builder builder=new AlertDialog.Builder(getActivity());
        builder.setIcon(android.R.drawable.ic_dialog_alert);
        builder.setTitle("DialogFragment");
        builder.setMessage("DialogFragment 내용이 잘 보이지요?");
        builder.setPositiveButton("OK", null);
        AlertDialog dialog=builder.create();
        return dialog;
    }
}
```

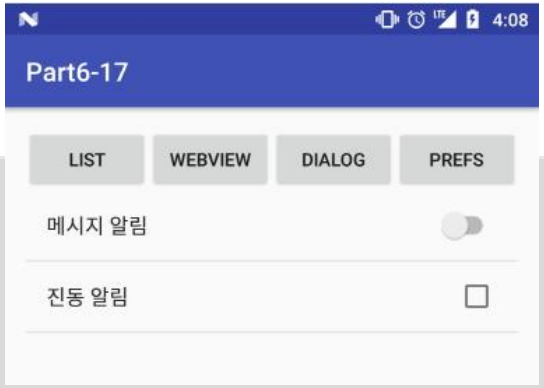


- DialogFragment 클래스의 show( ) 함수를 이용하여 출력

```
threeFragment.show(manager, null);
```

17.1 Fragment

- PreferenceFragment



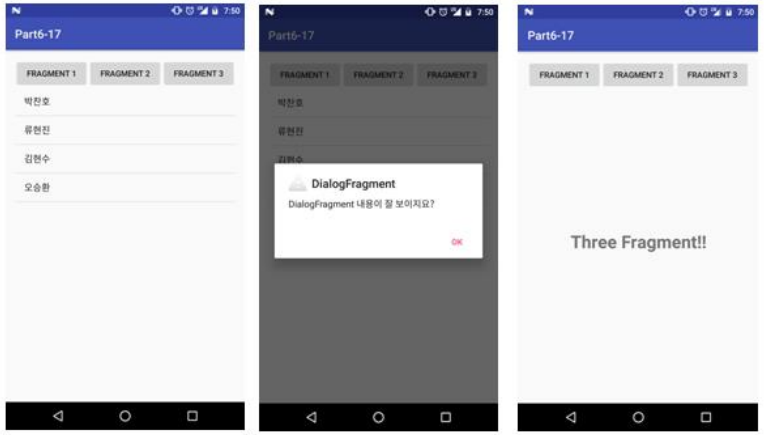

```
public class FourFragment extends PreferenceFragment {
    @Override
    public void onViewCreated(View view, Bundle savedInstanceState) {
        super.onViewCreated(view, savedInstanceState);
        addPreferencesFromResource(R.xml.settings_preference);
    }
}
```

Step by Step 17-1 - Fragment

Fragment를 테스트

•3개의 Fragment를 작성
•Activity에서는 버튼을 제공하여 버튼 클릭시 각 Fragment가 화면에 출력

1. Module 생성
2. 파일 복사
3. OneFragment 작성
4. TwoFragment 작성
5. ThreeFragment 작성
6. MainActivity 작성
7. 실행



16.2 ViewPager

- 사용자 손가락을 따라가며 순서대로 좌우 화면이 슬라이드되어 나타나는 구성
- support v4에서 제공

- XML 파일에 등록

```
<android.support.v4.view.ViewPager
    android:id="@+id/pager"
    android:layout_width="match_parent"
    android:layout_height="match_parent" />
```

- Adapter를 만들어 적용

16.2 ViewPager

- PagerAdapter와 항목(화면)을 Fragment로 개발하기 위한 FragmentPagerAdapter, 두 개가 제공

```
class MyPagerAdapter extends PagerAdapter {
    @Override
    public int getCount() {}
    @Override
    public boolean isViewFromObject(View arg0, Object arg1) {}
    @Override
    public Object instantiateItem(ViewGroup container, int position) {
        if(position==0){

            TextView tv=new TextView(Lab2Activity.this);
            //...           container.addView(tv,position);
            return tv;
        }           //...               return null;
    }
    @Override
    public void destroyItem(ViewGroup container,                    int position, Object object) {
        container.removeView((View)object);
    }
}
```

- getCount(): 항목 개수 결정
- instantiateItem(ViewGroup container, int position): 항목 구성
- isViewFromObject(View arg0, Object arg1): 항목을 위한 뷰 결정
- destroyItem(ViewGroup container, int position, Object object): 뷰 소멸

16.2 ViewPager

- FragmentPagerAdapter를 상속받아 작성

```
class MyPagerAdapter extends FragmentPagerAdapter {
    ArrayList<Fragment> fragments;
    public MyPagerAdapter(FragmentManager manager){
        super(manager);
        //...    }
    @Override
    public int getCount() {        //...    }
    @Override
    public Fragment getItem(int position) {
        //...
    }
}
```

- Adapter를 ViewPager에 적용

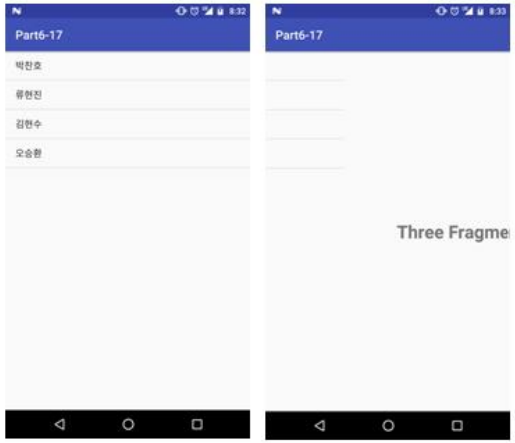
```
MyPagerAdapter pagerAdapter=new MyPagerAdapter(getSupportFragmentManager());
pager.setAdapter(pagerAdapter);
```

Step by Step 17-2 - ViewPager

ViewPager 테스트

•[Step by Step 실습 17-1] 에서 작성하였던 OneFragment와 ThreeFragment를 그대로 이용하여 ViewPager의 항목으로 출력

1. Activity 생성
2. activity_lab17_2.xml 작성
3. Lab17_2Activity 작성
4. Lab17_2Activity.java 실행



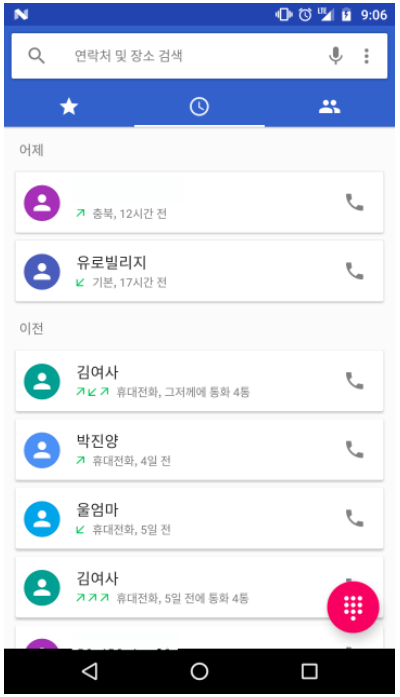
16.3 RecyclerView

17.3.1. RecyclerView 소개

- RecyclerView는 API Level 21(Android 5.0)이 나오면서 support:recyclerView-v7 라이브러리로 제공된 클래스

```
implementation 'com.android.support:recyclerview-v7:26.0.1'
```


- RecyclerView는 API Level 21(Android 5.0)이 나오면서 support:recyclerView-v7 라이브러리로 제공된 클래스



16.3 RecyclerView

- Adapter: RecyclerView 항목 구성
- ViewHolder: 각 항목 구성 뷰의 재활용을 목적으로 View Holder 역할
- LayoutManager : 항목의 배치
- ItemDecoration: 항목 꾸미기
- ItemAnimation: 아이템이 추가, 제거, 정렬될 때의 애니메이션 처리

17.3.2. Adapter, ViewHolder

- RecyclerView를 하나 준비

```
<android.support.v7.widget.RecyclerView
    xmlns:android="http://schemas.android.com/apk/res/android"
    android:id="@+id/lab3_recycler"
    android:layout_width="match_parent"
    android:layout_height="match_parent"/>
```

16.3 RecyclerView

- ViewHolder 클래스

```
private class MyViewHolder extends RecyclerView.ViewHolder {
    public TextView title;
    public MyViewHolder(View itemView) {
        super(itemView);
        title = (TextView) itemView.findViewById(android.R.id.text1);
    }
}
```

- Adapter

```
private class MyAdapter extends RecyclerView.Adapter<MyViewHolder> {
    private List<String> list;
    public MyAdapter(List<String> list) {
        this.list = list;
    }
    public MyViewHolder onCreateViewHolder(ViewGroup viewGroup, int i) {
        View view = LayoutInflater.from(viewGroup.getContext())
                .inflate(android.R.layout.simple_list_item_1, viewGroup, false);
        return new MyViewHolder(view);
    }
    public void onBindViewHolder(MyViewHolder viewHolder, int position) {
        String text = list.get(position);
        viewHolder.title.setText(text);
    }
    public int getItemCount() {
        return list.size();
    }
}
```

16.3 RecyclerView

```
private class MyAdapter extends RecyclerView.Adapter<MyViewHolder> {
    //.....
    public MyViewHolder onCreateViewHolder(ViewGroup viewGroup, int i) {
        View view = LayoutInflater.from(viewGroup.getContext())
          .inflate(android.R.layout.simple_list_item_1, viewGroup, false);
        return new MyViewHolder(view);
    }
    @Override
    public void onBindViewHolder(MyViewHolder viewHolder, int position) {
        String text = list.get(position);
        viewHolder.title.setText(text);
    }
}
private class MyViewHolder extends RecyclerView.ViewHolder {
    public TextView title;
    public MyViewHolder(View itemView) {
        super(itemView);
        title = (TextView) itemView.findViewById(android.R.id.text1);
    }
}
```

layout inflate ①

ViewHolder 리턴 ④

항목 구성 ⑤

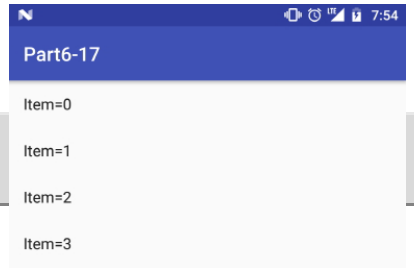
⑥ 전달된 ViewHolder 이용

② Layout 초기화후 ViewHolder 생성

③ 필요 View findViewById

16.3 RecyclerView

- Adapter를 RecyclerView에 적용




```
recyclerView.setLayoutManager(new LinearLayoutManager(this));
recyclerView.setAdapter(new MyAdapter(list));
```

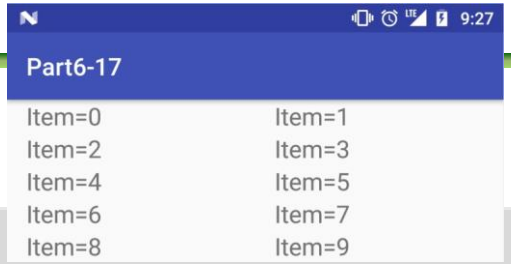
17.3.3. LayoutManager

- 항목을 어떻게 배치
- LinearLayoutManager: 수평, 수직으로 배치
- GridLayoutManager: 그리드 화면으로 배치
- StaggeredGridLayoutManager: 높이가 불규칙한 그리드 화면으로 배치

- LinearLayoutManager

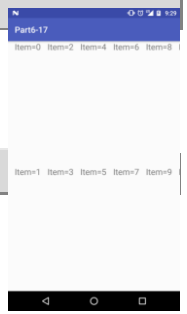
```
LinearLayoutManager linearManager = new LinearLayoutManager(this);
linearManager.setOrientation(LinearLayoutManager.HORIZONTAL);
recyclerView.setLayoutManager(linearManager);
```

16.3 RecyclerView



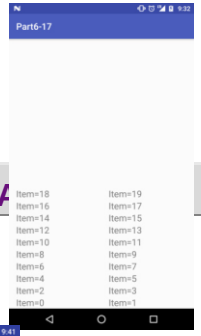
- GridLayoutManager

```
GridLayoutManager gridManager=new GridLayoutManager(this, 2);
recyclerView.setLayoutManager(gridManager);
```



- 방향 지정

```
GridLayoutManager gridManager=new GridLayoutManager(this, 2, GridLayoutManager.HORIZONTAL, false);
```

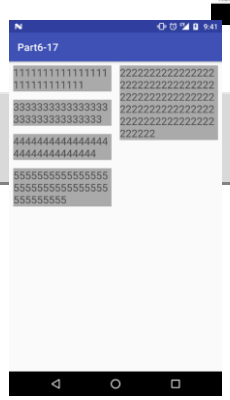


- 아래부터 나열

```
GridLayoutManager gridManager=new GridLayoutManager(this, 2, GridLayoutManager.VERTICA
```

- StaggeredGridLayoutManager

```
StaggeredGridLayoutManager sgManager=new StaggeredGridLayoutManager(2,
StaggeredGridLayoutManager.VERTICAL);
```



16.3 RecyclerView

17.3.4. ItemDecoration

각 항목을 다양하 게 꾸미기

- onDraw: 항목을 배치하기 전에 호출
- onDrawOver: 모든 항목이 배치된 후에 호출
- getItemOffsets: 각 항목을 배치할 때 호출

```
class MyItemDecoration extends RecyclerView.ItemDecoration {

    @Override
    public void getItemOffsets(Rect outRect, View view, RecyclerView parent,
                               RecyclerView.State state) {
        super.getItemOffsets(outRect, view, parent, state);
        //항목의 index 값 획득
        int index=parent.getChildAdapterPosition(view)+1;

        if(index % 3 == 0)
            //left, top, right, bottom
            outRect.set(20, 20, 20, 60 );
        else
            outRect.set(20, 20, 20, 20 );

        view.setBackgroundColor(0xFFECE9E9);
        ViewCompat.setElevation(view, 20.0f);
    }
}
```

16.3 RecyclerView

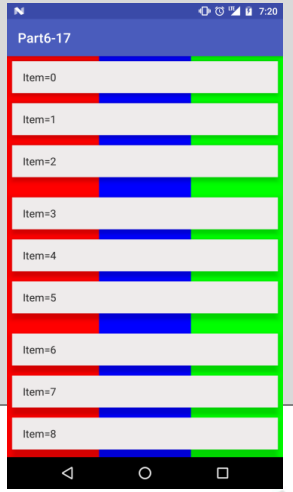
- ItemDecoration을 RecyclerView에 적용

```
recyclerView.addItemDecoration(new MyItemDecoration());
```

- onDraw( ) 함수

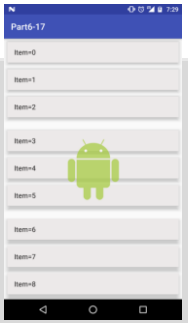
```
public void onDraw(Canvas c, RecyclerView parent, RecyclerView.State state) {
    super.onDraw(c, parent, state);
    //RecyclerView의 사이즈 계산
    int width=parent.getWidth();
    int height=parent.getHeight();

    Paint paint=new Paint();
    paint.setColor(Color.RED);
    c.drawRect(0, 0, width/3, height, paint );
    paint.setColor(Color.BLUE);
    c.drawRect(width/3, 0, width/3*2, height, paint);
    paint.setColor(Color.GREEN);
    c.drawRect(width/3*2, 0, width, height, paint);
}
```



16.3 RecyclerView

- onDrawOver( )




```
public void onDrawOver(Canvas c, RecyclerView parent, RecyclerView.State state) {
    super.onDrawOver(c, parent, state);
    //RecyclerView의 사이즈 계산
    int width=parent.getWidth();
    int height=parent.getHeight();
    //이미지 사이즈 계산
    Drawable dr= ResourcesCompat.getDrawable(getResources(),          R.drawable.android, null);
    int drWidth=dr.getIntrinsicWidth();
    int drHeight=dr.getIntrinsicHeight();

    int left=width/2 - drWidth/2;
    int top=height/2 - drHeight/2;
    c.drawBitmap(BitmapFactory.decodeResource(getResources(),          R.drawable.android), left,top,null);
}
```

Step by Step 17-3 - RecyclerView

RecyclerView 테스트

1. Activity 생성
2. 파일 복사
3. support 라이브러리 dependency 추가
4. activity_lab17_3.xml 작성
5. Lab17_3Activity 작성
6. Lab17_3Activity.java 실행