Intro to Android Development

INSERT DATE HERE
acmucr.org/checkin

Hello!
I’m Emma.

Contact Me:

Facebook LinkedIn

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Install Android Studio!

https://developer.android.com/studio/

What are we doing?

Movie application

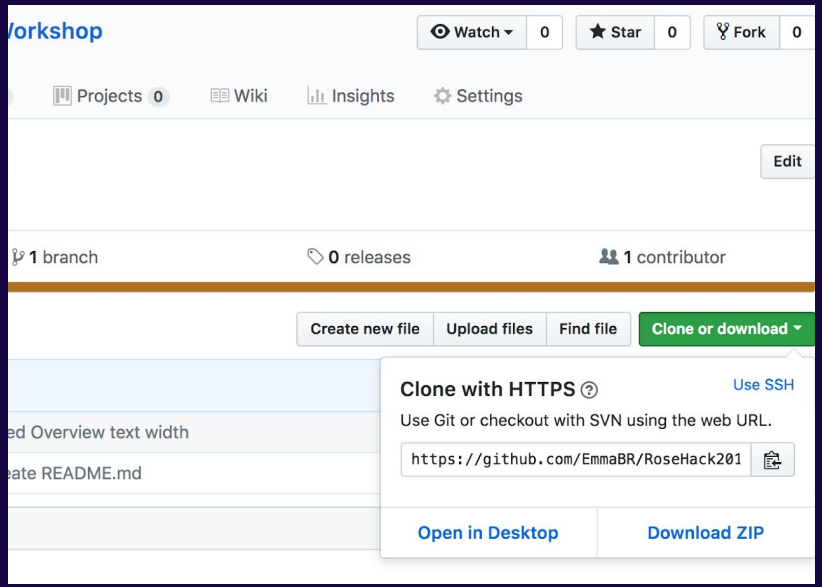
Allows users to browse current movies and view their descriptions utilizing the movie database API.

Setting up the API

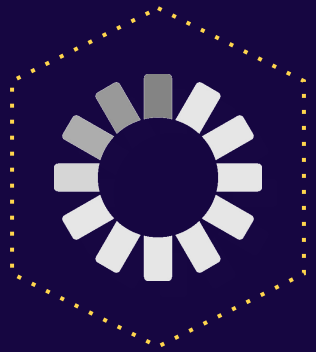
- Create an account at TheMovieDB.org
- Click on your profile (top right)
- In the drop down click “settings”
- In the far left column click “API”
- At the bottom of the page hit “click here” to generate a new API key
- Click “developer”
- Agree to terms and conditions
- Fill out remaining information*
- Documentation for the API

*mark as “mobile application” in the dropdown

Clone the Repository



- Go to: https://github.com/EmmaBR/ACM2019-AndroidWorkshop
- Clone the Repo or download the zip file.
- Open Android Studio.
- Click open a project and navigate to StartMovieApp and open it.



Wait...

Your project is building!

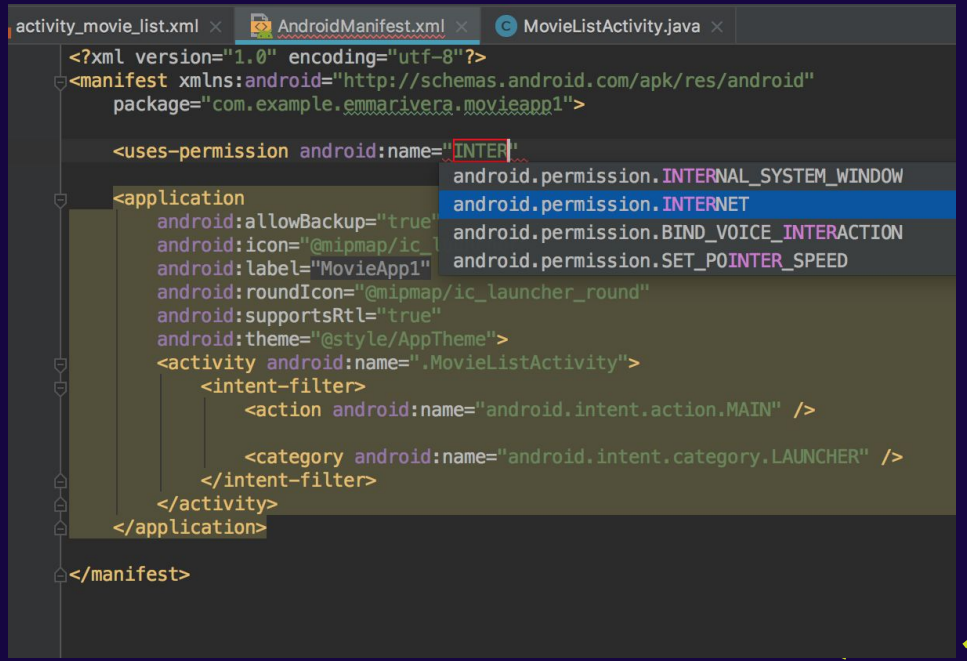
Before we start...

- Android Studio > Preferences > Editor > General > Auto Import : Make sure all the boxes are checked.
- Build, Execution, Deployment > Instant Run : Disable Instant Run by unchecking the first box

Add internet to your application

- AndroidManifest.xml
- Outside of application tags type uses permission tags*
- Type internet* (all caps)

*will populate on it's own



Hiding Your API Key

Step 1

Under res find values.

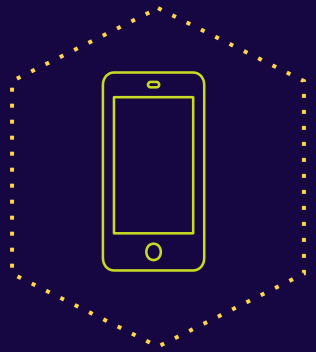
Right click on values. In the pop up select “new” then “values resource file”. Name it: secrets.xml.

Step 2

In secrets.xml create a string with a name “api_key” and cut and paste the key as the value of the string. Now when referencing the string in the java file use getString(R.string.api_string).

Step 3

Add this file (secrets.xml) to your gitignore.



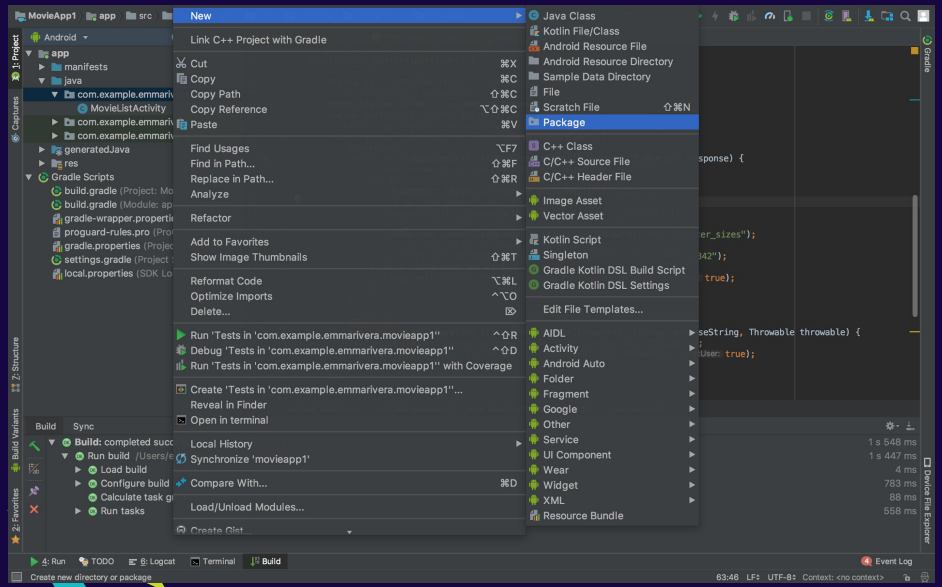
Emulator

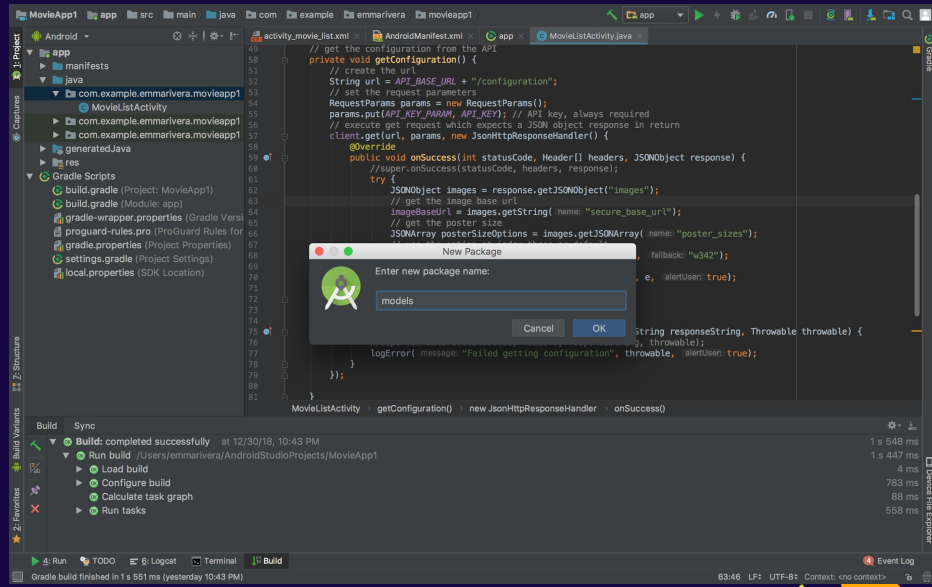
RUn the Emulator to test to make sure your project builds and works correctly!!

Let’s add some files!

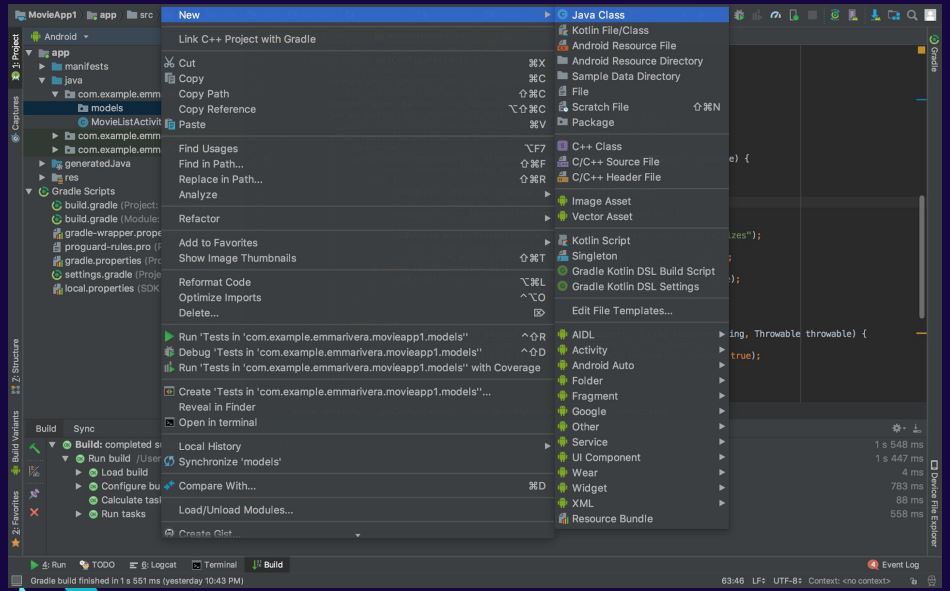
Creating a Model

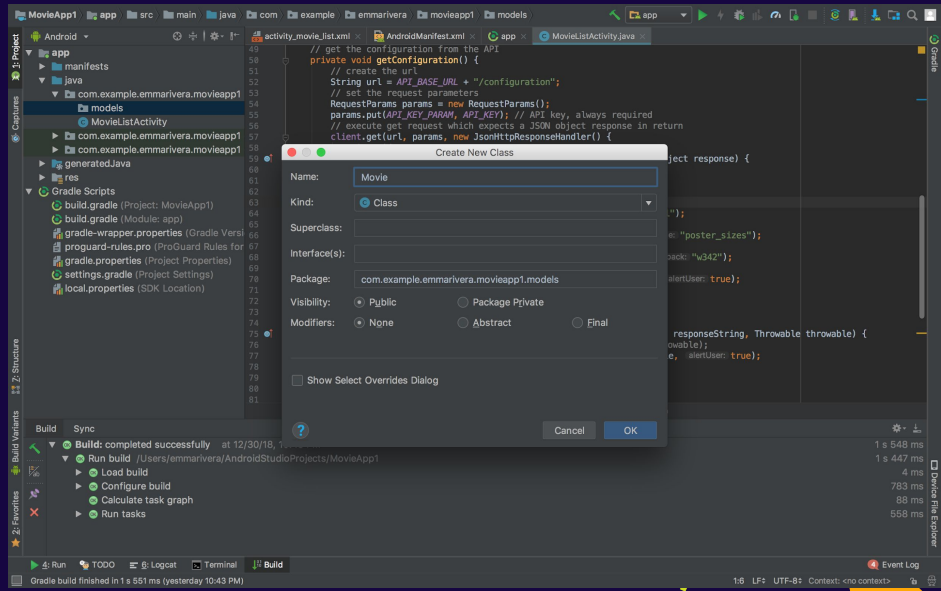
Create the Model Package





Create the Model Class



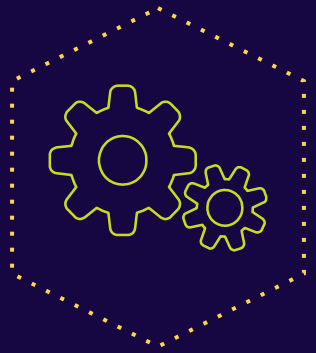


Setting up the Movie Class

- Create variables for the data you want to receive
- Create a custom Movie constructor and initialize variables inside.
- Generate getters to allow the data to be accessed in the Activity class

Show JSON*

```
ublic class Movie {

    // values from the API
    private String title;
    private String overview;
    private String posterPath; // only the path

    // initialize from JSON data
    public Movie(JSONObject object) throws JSONException {
        title = object.getString( name: "title"); // remember key's have t
        overview = object.getString( name: "overview");
        posterPath = object.getString( name: "poster_path");
    }

    /** NOTE: because these variables were declared private we
     *  need to create getters to expose this data to expose this data
     *  to the activity
     **/

    public String getTitle() {
        return title;
    }

    public String getOverview() {
        return overview;
    }

    public String getPosterPath() {
        return posterPath;
    }
```



Accessing our data in the Activity Class

Traversing the JSON

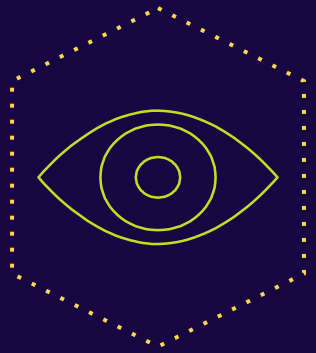
Getting Now Playing Movies

- Create variables for the data you want to receive (ArrayList)
- Write the getNowPlaying function to retrieve the data
- Call get now playing function in the onSuccess of getConfiguration(); (must execute after get configuration)
- Call getConfiguration(); in the onCreate

```
/ get the list of currently playing movies from the API
rivate void getNowPlaying() {
   // create the url
   String url = API_BASE_URL + "/movie/now_playing";
   // set the request parameters
   RequestParams params = new RequestParams();
   params.put(API_KEY_PARAM, API_KEY); // API key, always required
   // execute get request which expects a JSON object response in return
   client.get(url, params, new JsonHttpResponseHandler() {
       @Override
       public void onSuccess(int statusCode, Header[] headers, JSONObject response) {
           // load results into the movie list
           try {
               JSONArray results = response.getJSONArray( name: "results");
               // iterate through the result and create movie objects
               for (int i = 0; i < results.length(); i++) {
                   Movie movie = new Movie(results.getJSONObject(i));
                   movies.add(movie);
               }
               Log.i(TAG, String.format("Loaded %s movies", results.length()));
           } catch (JSONException e) {
               logError( message: "Failed to parse now playing movies", e,  alertUser: true);
           }

       }

       @Override
       public void onFailure(int statusCode, Header[] headers, String responseString, Throwable throwabl
           logError( message: "Failed to get now playing movies", throwable,  alertUser: true);
       }
   });



/ get the configuration from the API
rivate void getConfiguration() {
   // create the url
```

ListActivity › getConfiguration() › new JsonHttpResponseHandler › onSuccess()

```java
// get the list of currently playing movies from the API
private void getNowPlaying() {
    // create the url
    String url = API_BASE_URL + "/movie/now_playing";
    // set the request parameters
    RequestParams params = new RequestParams();
    params.put(API_KEY_PARAM, API_KEY); // API key, always required
    // execute get request which expects a JSON object response in return
    client.get(url, params, new JsonHttpResponseHandler() {
        @Override
        public void onSuccess(int statusCode, Header[] headers, JSONObject response) {
            // load results into the movie list
            try {
                JSONArray results = response.getJSONArray( name: "results");
                // iterate through the result and create movie objects
                for (int i = 0; i < results.length(); i++) {
                    Movie movie = new Movie(results.getJSONObject(i));
                    movies.add(movie);
                }
                Log.i(TAG, String.format("Loaded %s movies", results.length()));
            } catch (JSONException e) {
                logError( message: "Failed to parse now playing movies", e,  alertUser: true);
            }

        }

        @Override
        public void onFailure(int statusCode, Header[] headers, String responseString, Throwable throwabl
            logError( message: "Failed to get now playing movies", throwable,  alertUser: true);
        }
```

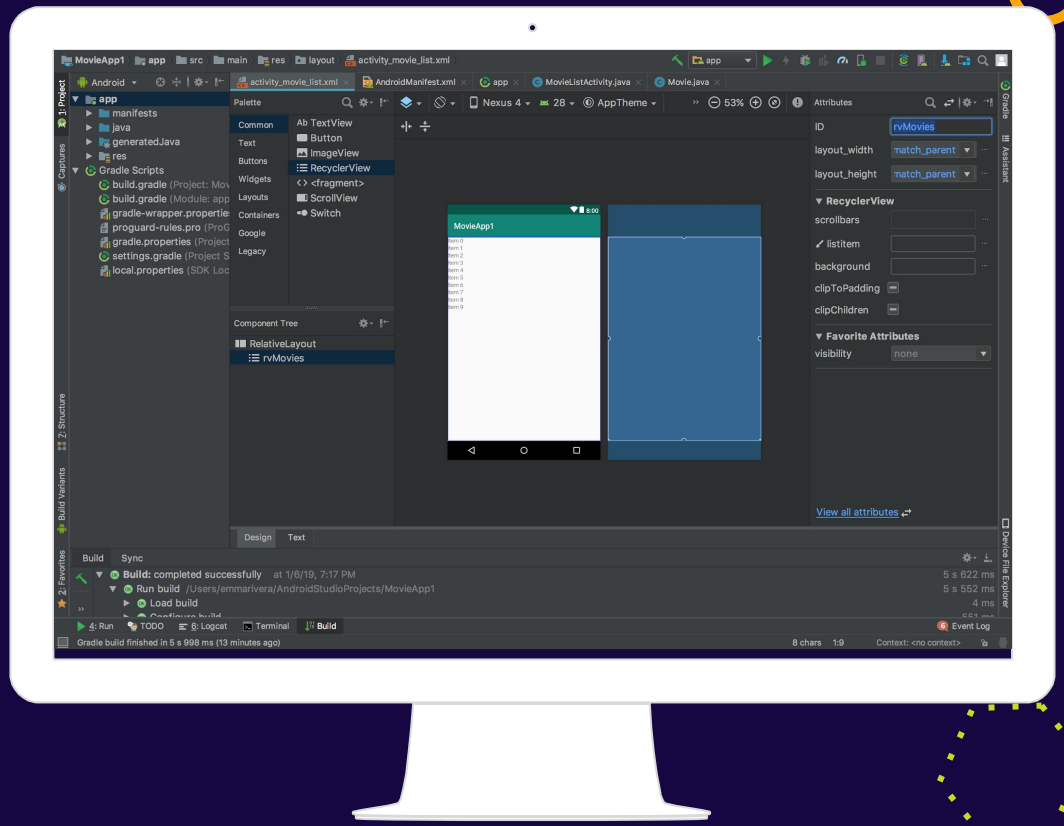


Making the Data Visible to the User

XML files and UI/UX

Adding a Recyclerview

- Delete “Hello World” textView
- click recyclerview and add dependency
- Drag and drop recycler to top left (it will expand)
- Set ID to “rvMovies”



Adding Items to the Recyclerview

Create Resource File

Res -> layout

Right Click Layout

New -> Layout Resource File

Name the File

Name the file “item_movies”

Make sure to set the Root Element to Relativelayout

Click “ok”

Add Images to Items

Drag in an ImageView

Choose the image to be a black background (select android > black)

Change the width to 90dp and height to 135dp

Set ID to ivPosterImage

Add Textviews to Items

Drag and drop the text view to the right of the image.

Change ID to “tvTitle”

Change text appearance to large

Drag to align with right

Add another Text View

This one will be for the overview/synopsis of the movie

Make sure to give it a unique ID

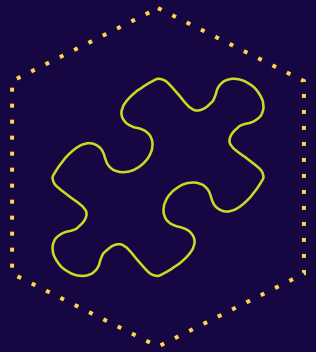
We’re Done!

(for now)

A few more things...

- Change the layout height to wrap content
- Add a margin between items (5dp)
- Add a margin right to the poster image ImageView (5dp)
- Remove the line that aligns the overview to the end of the poster image
- Make the overview textView height wrap content

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_margin="5dp"
    android:layout_width="match_parent" android:layout_height="wrap_content">

    <ImageView
        android:id="@+id/ivPosterImage"
        android:layout_width="90dp"
        android:layout_height="135dp"
        android:layout_alignParentLeft="true"
        android:layout_alignParentTop="true"
        app:srcCompat="@android:color/black"
        android:layout_marginRight="5dp"/>

    <TextView
        android:id="@+id/tvTitle"
        android:layout_width="294dp"
        android:layout_height="wrap_content"
        android:layout_alignParentTop="true"
        android:layout_marginTop="0dp"
        android:layout_toRightOf="@+id/ivPosterImage"
        android:text="Movie Title "
        android:textAppearance="@android:style/TextAppearance.Large" />

    <TextView
        android:id="@+id/tvOverview"
        android:layout_width="294dp"
        android:layout_height="105dp"
        android:layout_below="@+id/tvTitle"
        android:layout_toEndOf="@+id/ivPosterImage"
        android:text="TextView" />
</RelativeLayout>
```



Creating the Adapter

Connects the XML to Java file

Setting up the Adapter

Create MovieAdapter.java

Create an array of movies.

Auto generate constructor.

Initialize with list by generating the constructor.

Create a view holder class as a static inner class

public static ViewHolder extends RecyclerView.ViewHolder { }

Click on red light bulb to solve issue.

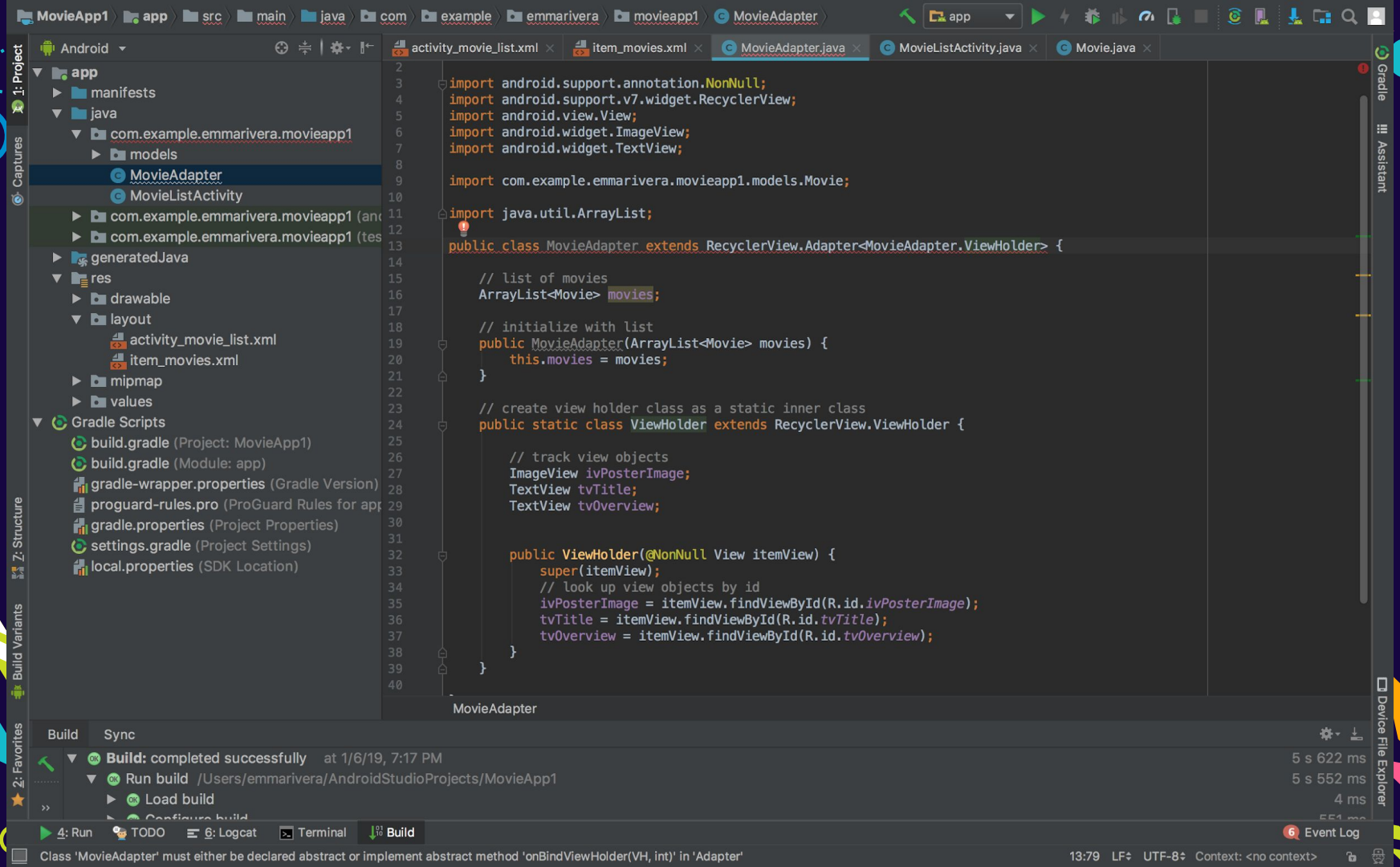
Add variables to track view objects.

Look up the items by id in public ViewHolder(View itemView) {

// here

}

Extend MovieAdapter with RecyclerView.Adapter<MovieAdapter.ViewHolder>


MovieApp1 app src main java com example emmarivera movieapp1 MovieAdapter
app
Android
activity_movie_list.xml
item_movies.xml
MovieAdapter.java
MovieListActivity.java
Movie.java
app
manifests
java
com.example.emmarivera.movieapp1
models
MovieAdapter
MovieListActivity
com.example.emmarivera.movieapp1 (and
com.example.emmarivera.movieapp1 (tes
generatedJava
res
drawable
layout
activity_movie_list.xml
item_movies.xml
mipmap
values
Gradle Scripts
build.gradle (Project: MovieApp1)
build.gradle (Module: app)
gradle-wrapper.properties (Gradle Version)
proguard-rules.pro (ProGuard Rules for app
gradle.properties (Project Properties)
settings.gradle (Project Settings)
local.properties (SDK Location)
import android.support.annotation.NonNull;
import android.support.v7.widget.RecyclerView;
import android.view.View;
import android.widget.ImageView;
import android.widget.TextView;
import com.example.emmarivera.movieapp1.models.Movie;
import java.util.ArrayList;
public class MovieAdapter extends RecyclerView.Adapter<MovieAdapter.ViewHolder> {
// list of movies
ArrayList<Movie> movies;
// initialize with list
public MovieAdapter(ArrayList<Movie> movies) {
this.movies = movies;
}
// create view holder class as a static inner class
public static class ViewHolder extends RecyclerView.ViewHolder {
// track view objects
ImageView ivPosterImage;
TextView tvTitle;
TextView tvOverview;
public ViewHolder(@NonNull View itemView) {
super(itemView);
// look up view objects by id
ivPosterImage = itemView.findViewById(R.id.ivPosterImage);
tvTitle = itemView.findViewById(R.id.tvTitle);
tvOverview = itemView.findViewById(R.id.tvOverview);
}
}
MovieAdapter
Build
Sync
Build: completed successfully at 1/6/19, 7:17 PM
5 s 622 ms
Run build /Users/emmarivera/AndroidStudioProjects/MovieApp1
5 s 552 ms
Load build
4 ms
4: Run
TODO
6: Logcat
Terminal
Build
6 Event Log
Class 'MovieAdapter' must either be declared abstract or implement abstract method 'onBindViewHolder(VH, int)' in 'Adapter'
13:79
LF
UTF-8
Context: <no context>
1: Project
Captures
Z: Structure
Build Variants
2: Favorites
Gradle
Assistant
Device File Explorer

Resolving the Error

Generate Methods

Click the Red Light bulb.

Implement Methods.

Make sure “Copy JavaDoc” is unchecked.

Click ok. (There should be three)

Implement Functions

getItemCount: return the size of the array.

onCreateViewHolder

Get context & create inflater. Create the view using item_movies layout. Return the item wrapped by a ViewHolder*

Implement Functions cont.

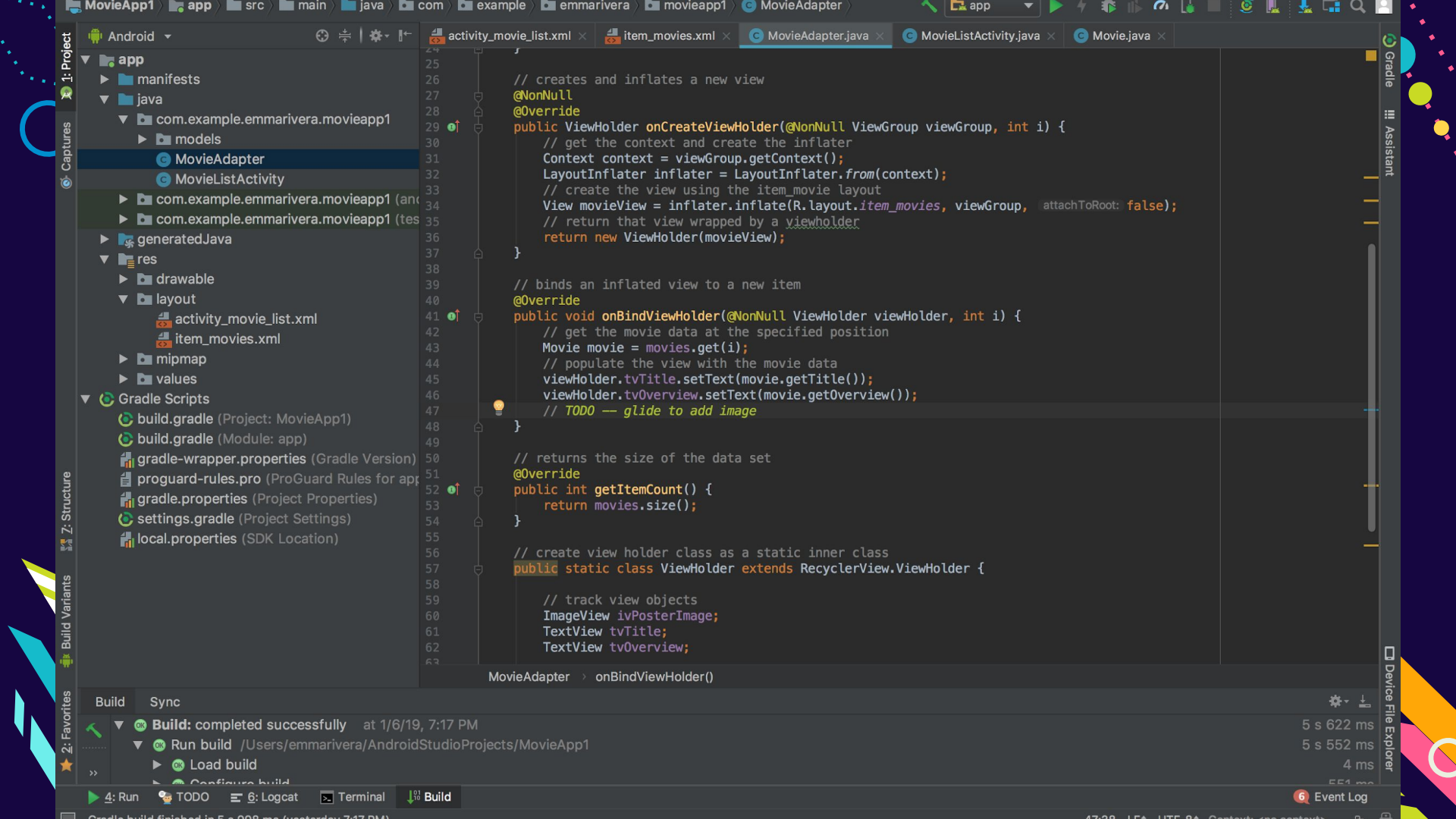
onBindViewHolder:

Get the data at the specified position

Load the viewHolder with the data at that point.

// we will come back to adding images later

*don't forget to add “new” before


MovieApp1 app src main java com example emmarivera movieapp1 MovieAdapter
app
Android
app
manifests
java
com.example.emmarivera.movieapp1
models
MovieAdapter
MovieListActivity
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com.example.emmarivera.movieapp1 (tes
generatedJava
res
drawable
layout
activity_movie_list.xml
item_movies.xml
mipmap
values
Gradle Scripts
build.gradle (Project: MovieApp1)
build.gradle (Module: app)
gradle-wrapper.properties (Gradle Version)
proguard-rules.pro (ProGuard Rules for app
gradle.properties (Project Properties)
settings.gradle (Project Settings)
local.properties (SDK Location)
activity_movie_list.xml
item_movies.xml
MovieAdapter.java
MovieListActivity.java
Movie.java
// creates and inflates a new view
@NonNull
@Override
public ViewHolder onCreateViewHolder(@NonNull ViewGroup viewGroup, int i) {
// get the context and create the inflater
Context context = viewGroup.getContext();
LayoutInflater inflater = LayoutInflater.from(context);
// create the view using the item_movie layout
View movieView = inflater.inflate(R.layout.item_movies, viewGroup, attachToRoot: false);
// return that view wrapped by a viewholder
return new ViewHolder(movieView);
}
// binds an inflated view to a new item
@Override
public void onBindViewHolder(@NonNull ViewHolder viewHolder, int i) {
// get the movie data at the specified position
Movie movie = movies.get(i);
// populate the view with the movie data
viewHolder.tvTitle.setText(movie.getTitle());
viewHolder.tvOverview.setText(movie.getOverview());
// TODO — glide to add image
}
// returns the size of the data set
@Override
public int getItemCount() {
return movies.size();
}
// create view holder class as a static inner class
public static class ViewHolder extends RecyclerView.ViewHolder {
// track view objects
ImageView ivPosterImage;
TextView tvTitle;
TextView tvOverview;
MovieAdapter › onBindViewHolder()
Build
Sync
Build: completed successfully at 1/6/19, 7:17 PM
5 s 622 ms
Run build /Users/emmarivera/AndroidStudioProjects/MovieApp1
5 s 552 ms
Load build
4 ms
4: Run
TODO
6: Logcat
Terminal
Build
6 Event Log
1: Project
Captures
Z: Structure
Build Variants
2: Favorites
Gradle
Assistant
Device File Explorer

Connect Recycler in MovieListActivity

- Create the RecyclerView and MovieAdapter variables.
- Instantiate the variables after the initialization of the movie array.

```
// instantiate fields
AsyncHttpClient client;
// base url for loading images
String imageBaseUrl;
// the poster size to use when fetching the images
String posterSize;
// list of currently playing movies
ArrayList<Movie> movies;
// the recycler view
RecyclerView rvMovies;
// the adapter wired to the recycler view
MovieAdapter adapter;

@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_movie_list);

    //initialize the client
    client = new AsyncHttpClient();
    // initialize the list of movies
    movies = new ArrayList<>();
    // initialize the adapter -- movies adapter cannot be reinitialized after this po
    adapter = new MovieAdapter(movies);

    // resolve the recycler view and connect layout manager
    rvMovies = findViewById(R.id.rvMovies);
    rvMovies.setLayoutManager(new LinearLayoutManager( context: this));
    rvMovies.setAdapter(adapter);


    // get configuration on creation
    getConfiguration();
}
```

Notify the Adapter the Dataset Changed

```
// get the list of currently playing movies from the API
private void getNowPlaying() {
    // create the url
    String url = API_BASE_URL + "/movie/now_playing";
    // set the request parameters
    RequestParams params = new RequestParams();
    params.put(API_KEY_PARAM, API_KEY); // API key, always required
    // execute get request which expects a JSON object response in return
    client.get(url, params, new JsonHttpResponseHandler() {
        @Override
        public void onSuccess(int statusCode, Header[] headers, JSONObject response) {
            // load results into the movie list
            try {
                JSONArray results = response.getJSONArray( name: "results");
                // iterate through the result and create movie objects
                for (int i = 0; i < results.length(); i++) {
                    Movie movie = new Movie(results.getJSONObject(i));
                    movies.add(movie);
                    // notify the adapter that a row was added
                    adapter.notifyItemInserted( position: movies.size() - 1);
                }
                Log.i(TAG, String.format("Loaded %s movies", results.length()));
            } catch (JSONException e) {
                logError( message: "Failed to parse now playing movies", e,  alertUser: true);
            }

        }

        @Override
        public void onFailure(int statusCode, Header[] headers, String responseString, Throwable throwable) {
            logError( message: "Failed to get now playing movies", throwable,  alertUser: true);
        }
    });
```

MovieListActivity › getNowPlaying() › new JsonHttpResponseHandler › onSuccess()

Adding Images Using Glide

Glide

Create a new model class called Config

- Cut the imageBaseUrl and posterSize out of MovieListActivity.java and past into Config.java.
- Create a constructor
- Cut and paste the logic for parsing the data into the constructor of Config.java
- Solve error w/exception

```java
package com.example.emmarivera.movieapp1.models;

import org.json.JSONArray;
import org.json.JSONException;
import org.json.JSONObject;

public class Config {

    // base url for loading images
    String imageBaseUrl;
    // the poster size to use when fetching the images
    String posterSize;

    public Config(JSONObject object) throws JSONException {
        JSONObject images = object.getJSONObject("images");
        // get the image base url
        imageBaseUrl = images.getString( name: "secure_base_url");
        // get the poster size
        JSONArray posterSizeOptions = images.getJSONArray( name: "poster_sizes");
        // use the option at index three or default
        posterSize = posterSizeOptions.optString( index: 3, fallback: "w342");
    }
```

Generate Getters

```
package com.example.emmarivera.movieapp1.models;

import org.json.JSONArray;
import org.json.JSONException;
import org.json.JSONObject;

public class Config {

    // base url for loading images
    String imageBaseUrl;
    // the poster size to use when fetching the images
    String posterSize;

    public Config(JSONObject object) throws JSONException {
        JSONObject images = object.getJSONObject("images");
        // get the image base url
        imageBaseUrl = images.getString( name: "secure_base_url");
        // get the poster size
        JSONArray posterSizeOptions = images.getJSONArray( name: "poster_sizes");
        // use the option at index three or default
        posterSize = posterSizeOptions.optString( index: 3,  fallback: "w342");
    }

    public String getImageBaseUrl() {
        return imageBaseUrl;
    }

    public String getPosterSize() {
        return posterSize;
    }
}
```

Create Helper Functions for URLs

```
import org.json.JSONObject;

public class Config {

    // base url for loading images
    String imageBaseUrl;
    // the poster size to use when fetching the images
    String posterSize;

    public Config(JSONObject object) throws JSONException {
        JSONObject images = object.getJSONObject("images");
        // get the image base url
        imageBaseUrl = images.getString( name: "secure_base_url");
        // get the poster size
        JSONArray posterSizeOptions = images.getJSONArray( name: "poster_sizes");
        // use the option at index three or default
        posterSize = posterSizeOptions.optString( index: 3,  fallback: "w342");
    }

    // helper function to create urls
    public String getImageUrl(String size, String path) {
        return String.format("%s%s%s", imageBaseUrl, size, path); // concatenate all three urls
    }

    public String getImageBaseUrl() {
        return imageBaseUrl;
    }

    public String getPosterSize() {
        return posterSize;
    }
}
```

Method 'getImageBaseUrl()' is never used

Fixing what we “broke”

- Go to MovieListActivity.java and create a Config variable.
- Instantiate config in the try {} of getConfiguration (config = new Config(response))
- Fix Log statement by using the getters.

```
try {
    config = new Config(response);
    Log.i(TAG, String.format("Loaded configuration with imageBaseUrl %s and posterSize %s",
            config.getImageBaseUrl(),
            config.getPosterSize()));
    // pass config to the adapter
```

- In MovieAdapter.java add the config
- Generate config setter

```
public class MovieAdapter extends RecyclerView.Adapter<MovieAdapter.ViewHolder> {

    // list of movies
    ArrayList<Movie> movies;
    // config needed for image urls
    Config config;

    // initialize with list
    public MovieAdapter(ArrayList<Movie> movies) {
        this.movies = movies;
    }

    public void setConfig(Config config) {
        this.config = config;
    }
```

Fixing what we “broke” cont..

- Go back to MovieListActivity.java
- Pass the config to the adapter

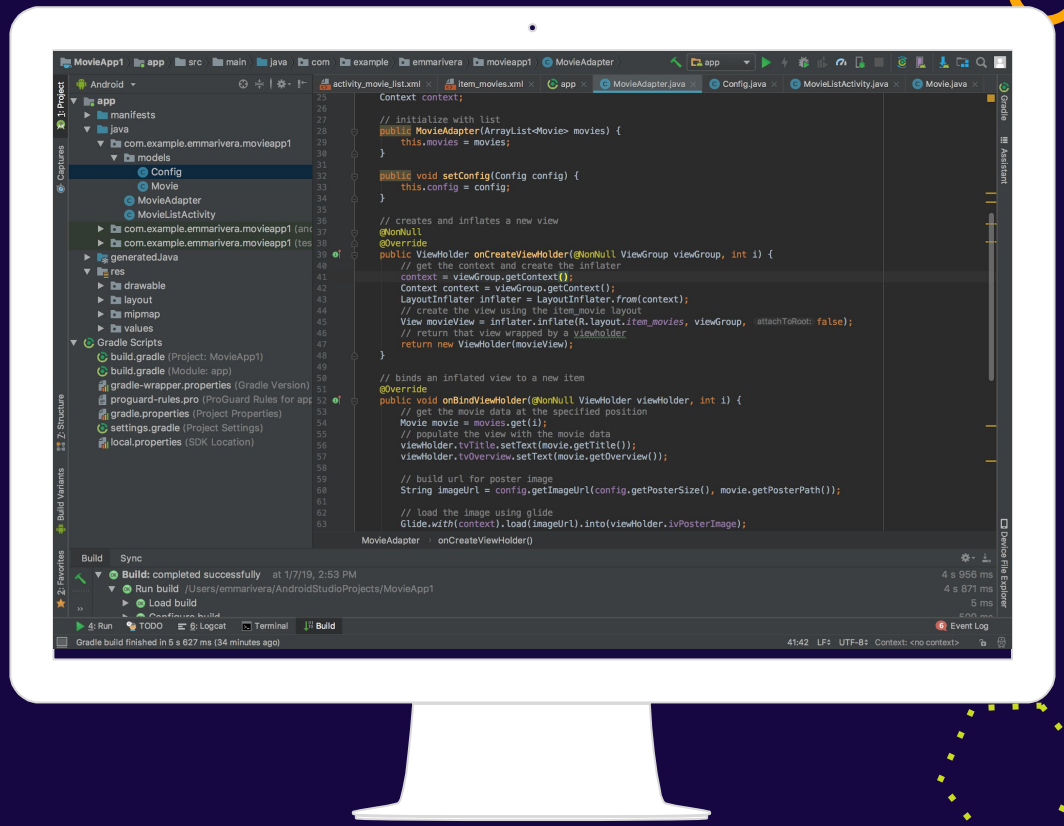
```
try {
    config = new Config(response);
    Log.i(TAG, String.format("Loaded configuration with imageBaseUrl %s and posterSize %s",
            config.getImageBaseUrl(),
            config.getPosterSize()));
    // pass config to the adapter
    adapter.setConfig(config);
    // get the now playing movies
    getNowPlaying();
} catch (JSONException e) {
    logError( message: "Failed Parsing configuration", e,  alertUser: true);
}
```

Movie Adapter TODO

Create Context variable.

Build URL for poster image

Load image with Glide



Thanks! 👋

Any questions?

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