Volley Library and JSON parsing

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- Volley Library
- Web data collection

APIs

- There are tons of **APIs (Application Programming Interfaces)** that various components and applications to interact.
- **Web APIs or Network APIs** are interfaces that allow data to be accessed (downloaded) from an exposed Web server (typically) or other network server
    - Often the data is in XML or JSON format, but could be in text, csv, html, etc.
- Once we obtain the data, we can parse it and put it in a format that our application can consume (utilize)
- We could write our own libraries and classes to help us, but a lot of libraries are available to us to simplify our workflow

Working with Volley and a Web API

- Basics
    - The Google Volley library makes networking easy and fast
    - It is under the Apache 2.0 license (commercial apps are totally fine!)
    - https://github.com/google/volley
    - https://developer.android.com/training/volley

Create a **new empty Android Studio project, and then:**

Before starting, make sure that you add the INTERNET permissions to the Android manifest:

```
<uses-permission
android:name="android.permission.INTERNET"></uses-permission>
```

1. Add Volley to the Project

- Add the dependency to Gradle (build.grade (Module: app)) in the dependencies object

```
implementation 'com.android.volley:volley:1.1.1'
```

- You'll get a warning "Grade files have changed…"

- Click the "**Sync" option**
- Now you're able to use Volley! Start typing "Volley" somewhere in the MainActivity, and you'll see the intelligent auto-sensing show options for it

2. Get an API to consume

- Let's get an API that returns JSON data
  - Great place (an online REST API): https://jsonplaceholder.typicode.com/
  - Check out the "Try it" example and see the returned JSON
  - Use the TODO link they show: https://jsonplaceholder.typicode.com/todos/1
  - Look at the documentation for the Standard Request with Volley: https://developer.android.com/training/volley/request
    - Note you can get Object or Array
  - **Note** if you take the 1 off the TODO link above, you get an ARRAY, but if you have the 1, it returns a single object

Inside of onCreate, add code for the JsonObjectRequest:

```
//create object request
JsonObjectRequest jsonObjectRequest =
        new JsonObjectRequest(
                Request.Method.GET,     //the request method
                "https://jsonplaceholder.typicode.com/todos/1",  //the URL
                null,
                new Response.Listener<JSONObject>() {
                    @Override
                    public void onResponse(JSONObject response) {

                    }
                },
                new Response.ErrorListener(){

                    @Override
                    public void onErrorResponse(VolleyError error) {

                    }
                }
        );
```

Note that the Listeners (Response.Listener and ErrorListener) are interfaces, but this is using the auto-implementation feature – it creates an anonymous class in Java automatically – we **are not** "instantiating" an interface (since you can't actually do that.) You could write these classes separately and then instantiate them here.

The **response** has to be captured inside the onResponse listener.

3. Create a Request Queue

As a field, declare

private RequestQueue requestQueue;

Now, before the JSON object creation, create the queue.

```
requestQueue = Volley.newRequestQueue(this);
```

This gives the queue its context and obtains the new instance (this).

4. Add the request to the Queue

After the jsonObjectRequest is create, put the code for the enqueueing.

```
requestQueue.add(jsonObjectRequest);
```

Total code:

```
public class MainActivity extends AppCompatActivity {


    //https://jsonplaceholder.typicode.com/todos/1

    private RequestQueue requestQueue;

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

        //instantiate the request queue
        requestQueue = Volley.newRequestQueue(this);

        //create object request
        JsonObjectRequest jsonObjectRequest =
                new JsonObjectRequest(
                        Request.Method.GET,    //the request method
                        "https://jsonplaceholder.typicode.com/todos/1",  //the URL
                        null,
                        new Response.Listener<JSONObject>() {
                            @Override
                            public void onResponse(JSONObject response) {
                                Log.i("JSON response", response.toString());
                            }
                        },
                        new Response.ErrorListener(){
                            @Override
                            public void onErrorResponse(VolleyError error) {
                                Log.e("Volley Error", error.toString());
                            }
                        }
                );

            //add request to the queue
            requestQueue.add(jsonObjectRequest);
```

```
    }//end onCreate
}
```

Array request

Code:

```
       JsonArrayRequest jsonArrayRequest = new JsonArrayRequest(Request.Method.GET,
                "https://jsonplaceholder.typicode.com/todos",
(JSONArray) null,
new Response.Listener<JSONArray>() {
            @Override
            public void onResponse(JSONArray response) {


                for (int i = 0; i < response.length(); i++) {
                    try {
                        JSONObject jsonObject = response.getJSONObject(i);
                        Log.d("JSonArray", "onResponse: "
                                + jsonObject.getString("id") +
                                " "+jsonObject.getString("title"));
                        boolean d = jsonObject.getBoolean("completed");

                    } catch (JSONException e) {
                        e.printStackTrace();
                    }

                }

            }
        },
new Response.ErrorListener() {
            @Override
            public void onErrorResponse(VolleyError error) {

            }
        });
        queue.add(jsonArrayRequest);
```