ITW202: Mobile Application

Unit IV: Developing for Android

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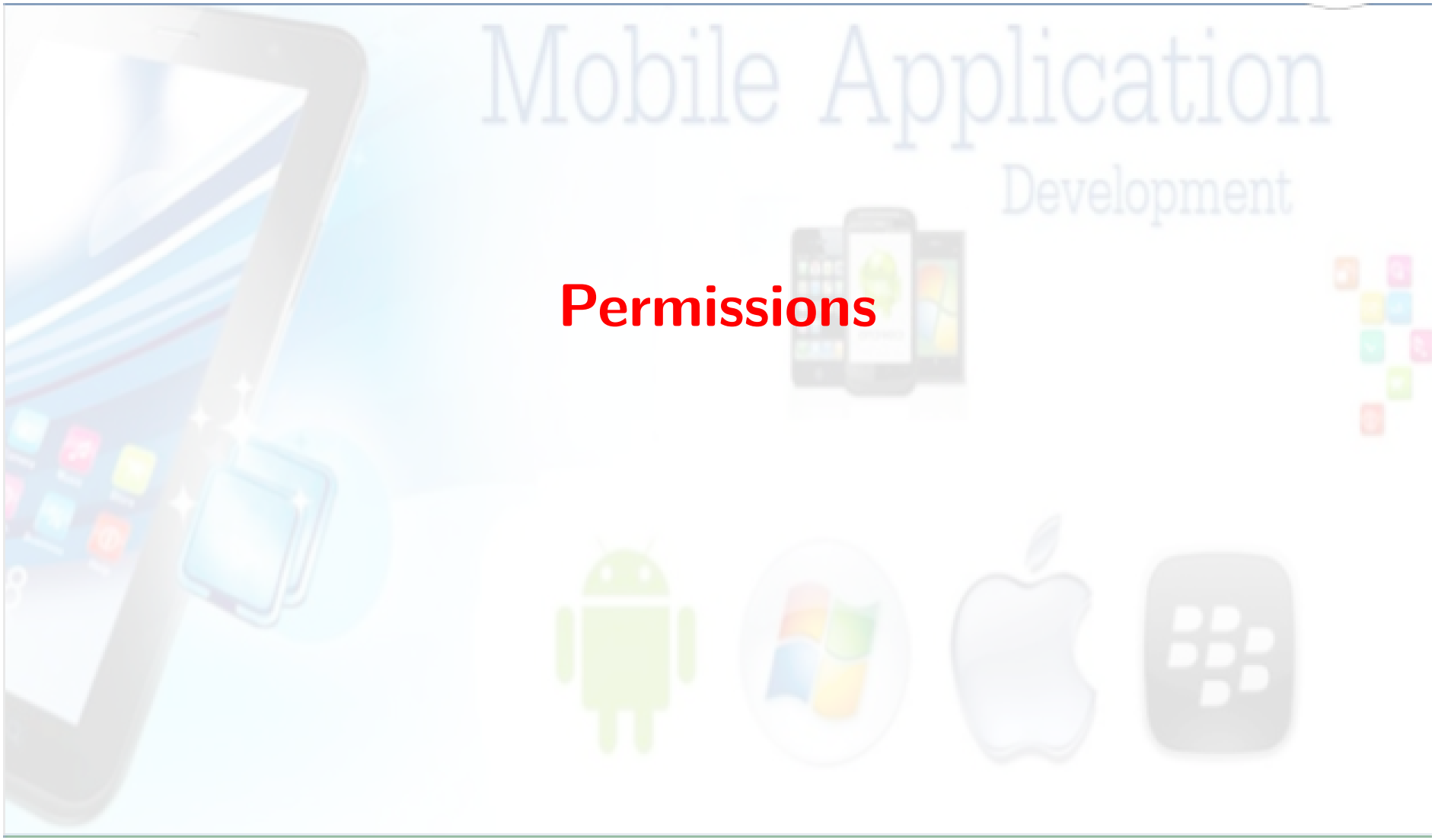
Internet connection

Steps to connect to the Internet

1. Add permissions to Android Manifest
2. Check Network Connection
3. Create Worker Thread
4. Implement background task
   - Create URI
   - Make HTTP Connection
   - Connect and GET Data
5. Process results
   - Parse Results



Permissions

Permissions in AndroidManifest

Internet

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

Check Network State

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

Manage Network Connection

Check if network is available

```
ConnectivityManager connMgr = (ConnectivityManager)
            getSystemService(Context.CONNECTIVITY_SERVICE);

NetworkInfo networkInfo = connMgr.getActiveNetworkInfo();

if (networkInfo != null && networkInfo.isConnected()) {
    // Create background thread to connect and get data
    new DownloadWebpageTask().execute(stringUrl);
} else {
    textView.setText("No network connection available.");
}
```

Worker Thread

Use Worker Thread

- AsyncTask—very short task, or no result returned to UI
- AsyncTaskLoader—for longer tasks, returns result to UI

Background work

In the background task (for example in doInBackground())

1. Create URI
2. Make HTTP Connection
3. Download Data

Create URI

URI = Uniform Resource Identifier

String that names or locates a particular resource

- file://
- http:// and https://
- content://

Sample URL for Google Books API

https://www.googleapis.com/books/v1/volumes?
q=pride+prejudice&maxResults=5&printType=books

Constants for Parameters

```
final String BASE_URL =
    "https://www.googleapis.com/books/v1/volumes?";
final String QUERY_PARAM = "q";
final String MAX_RESULTS = "maxResults";
final String PRINT_TYPE = "printType";
```

Build a URI for the request

```
Uri builtURI = Uri.parse(BOOK_BASE_URL).buildUpon()
        .appendQueryParameter(QUERY_PARAM, queryString)
        .appendQueryParameter(MAX_RESULTS, "10")
        .appendQueryParameter(PRINT_TYPE, "books")
        .build();
URL requestURL = new URL(builtURI.toString());
```

HTTP Client Connection

Make a connection from scratch

- Use HttpURLConnection
- Must be done on a separate thread
- Requires InputStreams and try/catch blocks

Note: If you run network operations on the main thread instead of on a worker thread, your code will throw a NetworkOnMainThreadException and your app will close.

Create a HttpURLConnection

```
HttpURLConnection conn = (HttpURLConnection)
requestURL.openConnection();
```

Connect and get response

```
InputStream inputStream =
urlConnection.getInputStream();
reader = new BufferedReader(new
InputStreamReader(inputStream));
```

Close connection and stream

```
} finally {
        conn.disconnect();
            if (is != null) {
                is.close();
            }
}
```

Convert Response to String

BufferedReader is more efficient

```
StringBuilder builder = new StringBuilder();
BufferedReader reader =
    new BufferedReader(new InputStreamReader(inputStream));
String line;
while ((line = reader.readLine()) != null) {
   builder.append(line + "\n");
}
if (builder.length() == 0) {
   return null;
}
resultString = builder.toString();
```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Parse Results

Parsing the results

- Implement method to receive and handle results (onPostExecute())
- Response is often JSON or XML
- Parse results using helper classes

  JSONObject, JSONArray,

  XMLPullParser—parses XML

Note: When you make web API queries, the results are often in JSON format.

JSON Example


```
{
  "kind": "books#volumes",
  "totalItems": 1589,
  "items": [
    {
      "kind": "books#volume",
      "id": "tQPECgAAQBAJ",
      "etag": "yq+HQmssIHs",
      "selfLink": "https://www.googleapis.com/books/v1/volumes/tQPECgAAQBAJ",
      "volumeInfo": {
        "title": "Classics Reimagined, Pride and Prejudice",
        "authors": [
          "Jane Austen"
        ],
        "publisher": "Classics Reimagined",
        "publishedDate": "2015-10",
        "description": "More amazing and inspiring than your tired, old bedtime story.
```


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THANK YOU