

Engineering Design w/Embedded Systems

Lecture 25: Android Friday: Data Storage

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Storing Data

Four+ options:

- Shared Preferences
- Files: Internal and External Storage
- SQLite
- on the Internet

Shared Preferences

Key-value pairs (just like `onSaveInstanceState()`).

Persists across user sessions, even if app gets killed.

Can be private to your application or shared across applications.

Files: Internal Storage

Android phones have internal storage (small) and external storage (larger).

Internal storage: private to your application; uninstalled when your application is uninstalled.

Files: External Storage

Our Lab 4 mapper code loads files from external storage in `MapLoader.java`.

You can use DDMS to put files into external storage, as well as using USB Mass Storage.

Files in external storage are world-accessible.

Warning: these files may go away anytime.

Files: Checking External Storage Availability

Sometimes the media is not there, or not writable.

```
String state = Environment.getExternalStorageState();  
  
if (Environment.MEDIA_MOUNTED.equals(state)) {  
    // We can read and write the media  
} else if (Environment.MEDIA_MOUNTED_READ_ONLY.equals(state)) {  
    // We can only read the media  
} else {  
    // Something else is wrong.  
    // It may be one of many other states, but all we need  
    // to know is we can neither read nor write  
}
```

Files: How MapLoader Works

It actually delegates to an XML parsing library.
Recall that you call:

```
NavigationMap map =  
    MapLoader.loadMap( getExternalFilesDir( null ),  
                      "Lab-room-peninsula.svg" );  
mapView.setMap( map );
```

The `MapLoader` contains this line:

```
File map = new File( dir , filename );
```

and then it builds a parser using the library call:

```
doc = docBuilder.parse( map );
```

which does all the I/O.

Files: about `getExternalFilesDir()`

Android provides a number of shared directories:

- `DIRECTORY_MUSIC`
- `DIRECTORY_PICTURES`
- `DIRECTORY_RINGTONES`

which all apps on the system can access.

SQLite

SQL: Structured Query Language,
allows access to databases.

What's a database?

| id | front | frontFileName | back |
|----|---------|---------------|------|
| 17 | "one" | "one.png" | "1" |
| 42 | "two" | "two.png" | "2" |
| 99 | "three" | "three.png" | "3" |

Basic interface: **queries** on the database.