

CS 696 Emerging Web and Mobile Technologies
Spring Semester, 2011
Doc 27 Android Fonts, Web, & Battery
May 3, 2011

Copyright ©, All rights reserved. 2011 SDSU & Roger Whitney, 5500 Campanile Drive, San Diego, CA 92182-7700 USA. OpenContent (<http://www.opencontent.org/opl.shtml>) license defines the copyright on this document.

References

Coding for Lije - Battery Life, That is, Jeff Sharkey, May 27, 2009, <http://www.google.com/events/io/2009/sessions/CodingLifeBatteryLife.html>

Quick Tip: Customize Android Fonts, <http://mobile.tutsplus.com/tutorials/android/customize-android-fonts/>

Fonts - Droid

Typeface

sans (normal)

serif

monospace

Style

normal

bold

italic

bold|italic

Size

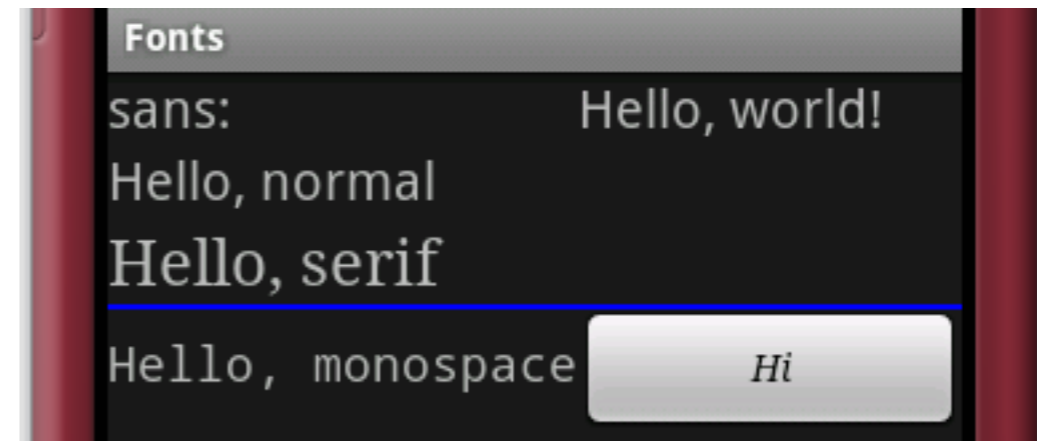
sp (scaled pixels)

px (pixels)

dp (density-independent pixels)

in (inches)

mm (millimeters)



```
<TextView
```

```
    android:text="Hello, serif"
```

```
    android:typeface="serif"
```

```
    android:textSize="24sp"
```

```
/>
```

```
<Button
```

```
    android:text="Hi"
```

```
    android:layout_width="wrap_content"
```

```
    android:layout_height="wrap_content"
```

```
    android:textStyle="italic"
```

```
    android:typeface="serif">
```

```
</Button>
```

Other Fonts

You have to install them in your project

Scrolling - Scroll View

<ScrollView

```
xmlns:android="http://schemas.android.com/apk/res/android"
```

```
android:layout_width="fill_parent"
```

```
android:layout_height="wrap_content">
```

```
<TableLayout
```

```
    android:layout_width="fill_parent"
```

```
    android:layout_height="fill_parent"
```

```
    android:stretchColumns="1">
```

```
        <TableRow
```

```
            android:layout_width="wrap_content"
```

```
            android:layout_height="wrap_content">
```

```
        </TableRow>
```

etc.

```
    </TableLayout>
```

```
</ScrollView>
```

What about horizontal

TableView

```
<TableView
```

```
    android:layout_width="fill_parent"  
    android:layout_height="fill_parent"  
    android:stretchColumns="1">
```

```
    <TableRow
```

```
        android:layout_width="wrap_content"
```

```
        android:layout_height="wrap_content">
```

```
            <TextView
```

```
                android:text="sans:"  
                android:layout_marginRight="4px"  
                android:textSize="20sp"
```

```
            />
```

```
            <TextView
```

```
                android:text="Hello, world!"  
                android:typeface="sans"  
                android:textSize="20sp"
```

```
            />
```

```
        </TableRow>
```

```
    </TableView>
```

Each item in a row starts
a new column

layout_span

```
<EditText  
  android:id="@+id/entry"  
  android:layout_span="3"/>
```

Number of columns a item spans

layout_column

```
<TableRow>  
  <Button  
    android:id="@+id/cancel"  
    android:layout_column="2"  
    android:text="Cancel" />  
  <Button android:id="@+id/ok" android:text="OK" />  
</TableRow>
```


Stretch & Shrink

```
android:stretchColumns="1"  
android:stretchColumns="0,3"
```

```
android:shrinkColumns="2"
```

WebView



Activity

```
import android.app.Activity;
import android.os.Bundle;
import android.webkit.WebView;

public class WebViewExample extends Activity {
    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.main);
        WebView browser = (WebView) findViewById(R.id.web);
        browser.loadUrl("http://www.eli.sdsu.edu/courses/fall09/cs696/index.html");
    }
}
```

main.xml

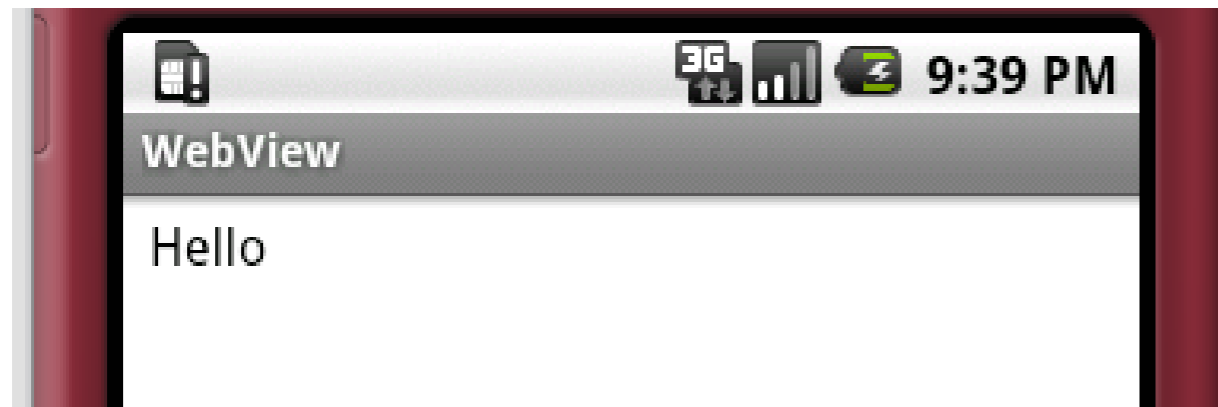
```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    >
    <WebView android:id="@+id/web"
        android:layout_width="fill_parent"
        android:layout_height="fill_parent"
        />
</LinearLayout>
```

Don't Forget INTERNET Permission

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="edu.sdsu.cs.whitney"
    android:versionCode="1"
    android:versionName="1.0">
    <application android:icon="@drawable/icon" android:label="@string/app_name">
        <activity android:name=".WebViewExample"
            android:label="@string/app_name">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>
    <uses-sdk android:minSdkVersion="3" />
    <uses-permission android:name="android.permission.INTERNET" />
</manifest>
```

Local Pages

```
browser.loadData("<html><body>Hello</body></html>", "text/html","UTF-8");
```



Navigation Methods WebView

reload()
goBack()
goForward()
canGoForward()
clearCache()
clearHistory()

JSON

JSON

<http://www.json.org/>

JavaScript Object Notation

data-interchange format

rfc 4627

Maps to/from strings

null

true, false

number

string

array

objects

Implementations in

C, C++, C#, D, E, Java, Objective C

Cold Fusion, Delphi, Erlang, Haskell

JavaScript, Lisp, LotusScript, Perl,

PHP, Pike, Prolog, Python, Ruby,

Scala, Smalltalk, Android


Examples

Java Structure

```
Vector array = new Vector();  
array.append(new Integer(12));  
array.append("Egypt");  
array.append(new Boolean(false));  
array.append(new Integer(-31));
```

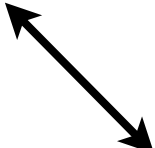
JSON Representation

```
[12,"Egypt",false,-31]
```



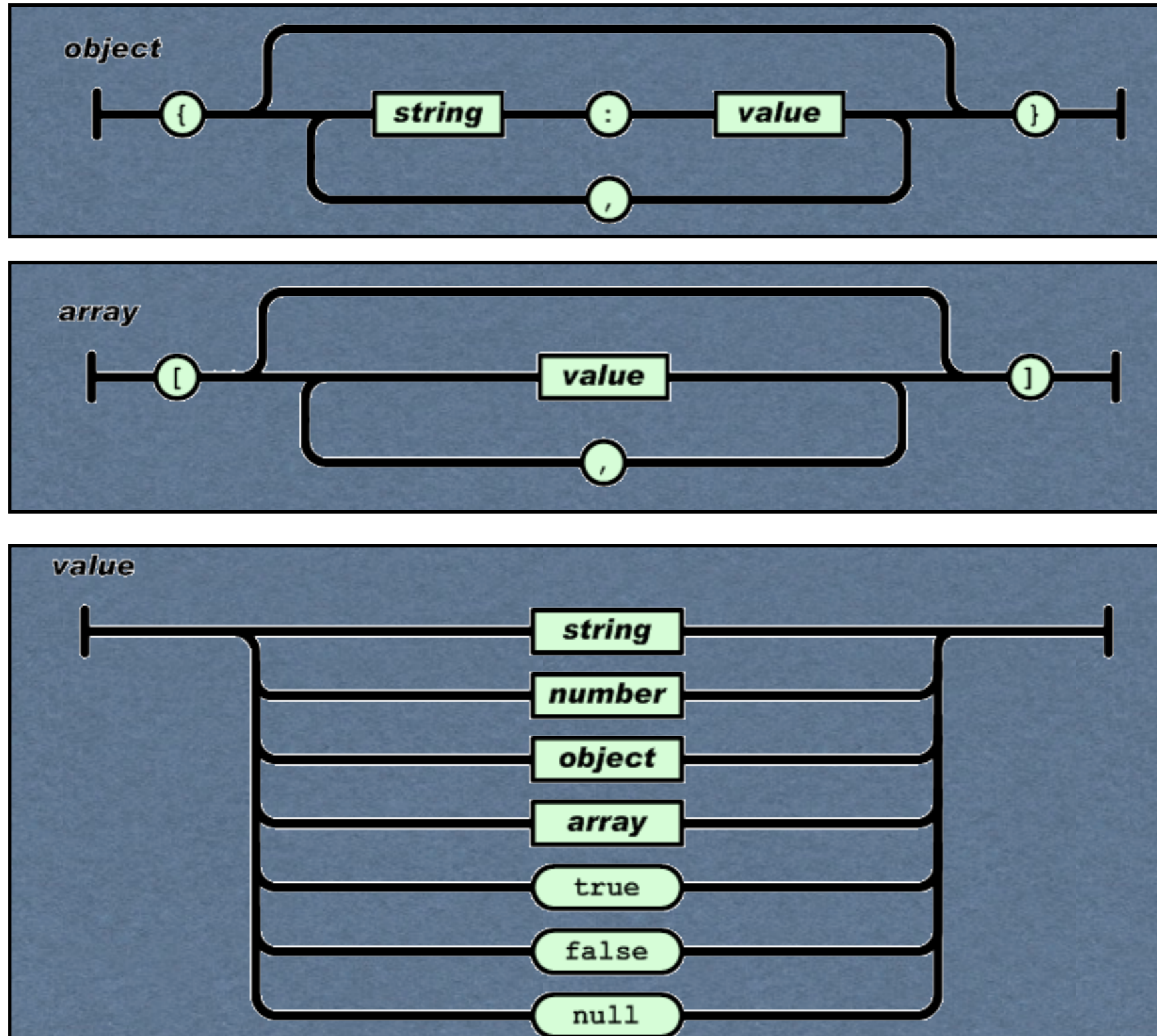
```
HashMap<String,Integer> object = new HashMap<String,Integer>();  
object.put("lowerBound", 18);  
object.put("upperBound", 139);
```

```
{"lowerBound":18,"upperBound":139}
```

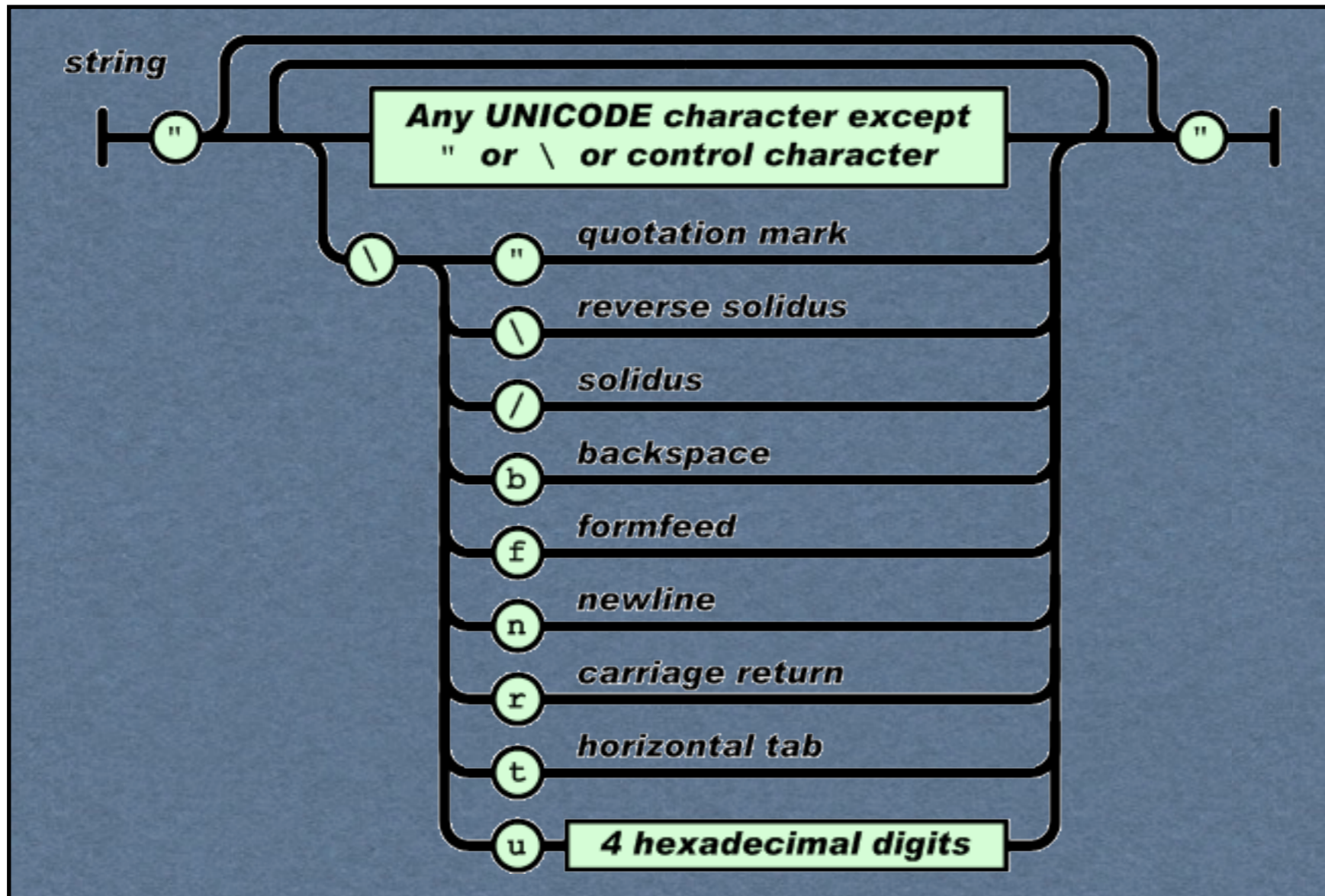


JSON Definition

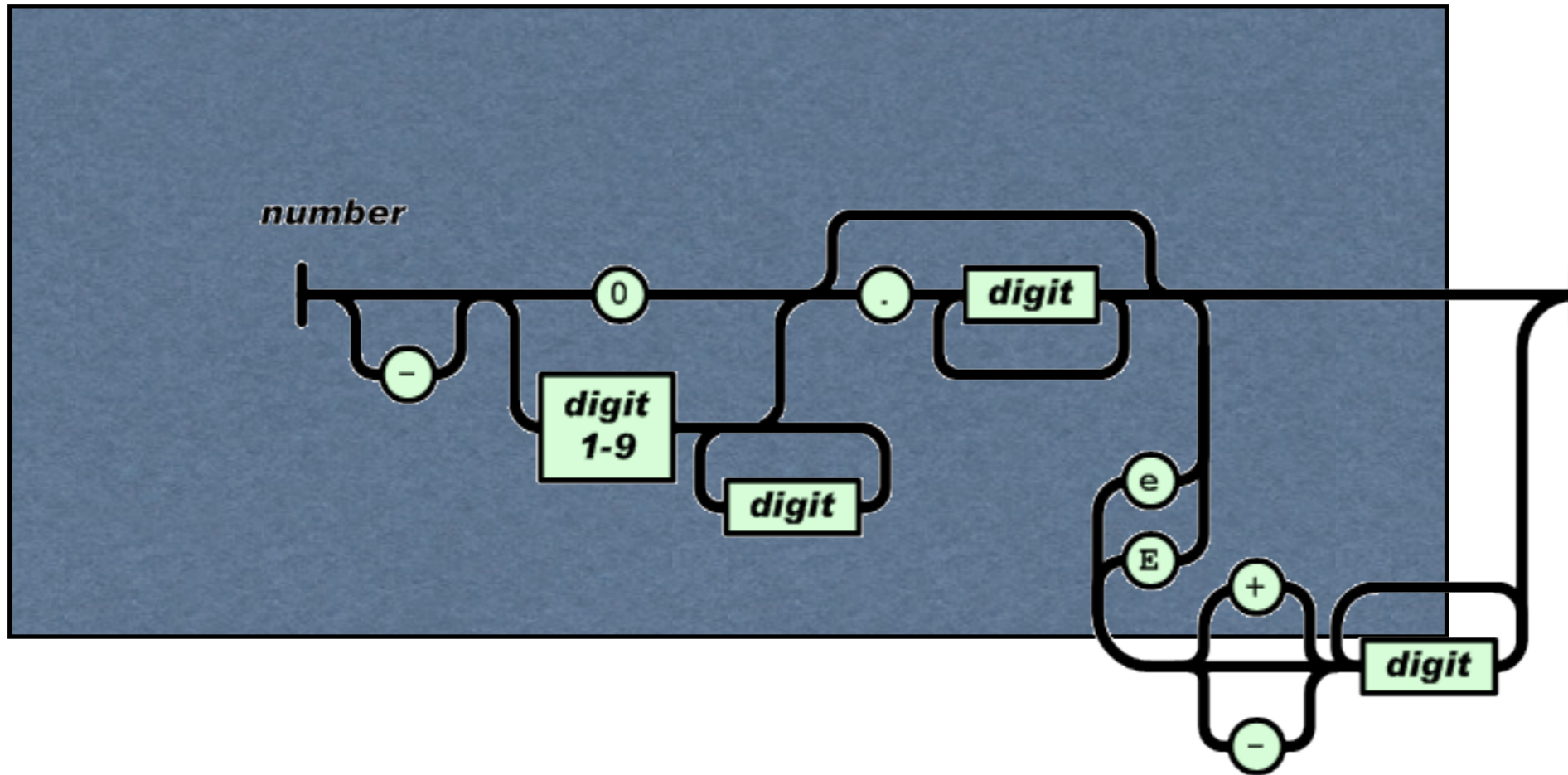
Source: <http://www.json.org/>



String



Number



JSON in Java

<http://www.json.org/java/index.html>

Part of Android

A Java JSON library

JSONObject

Constructs JSON strings

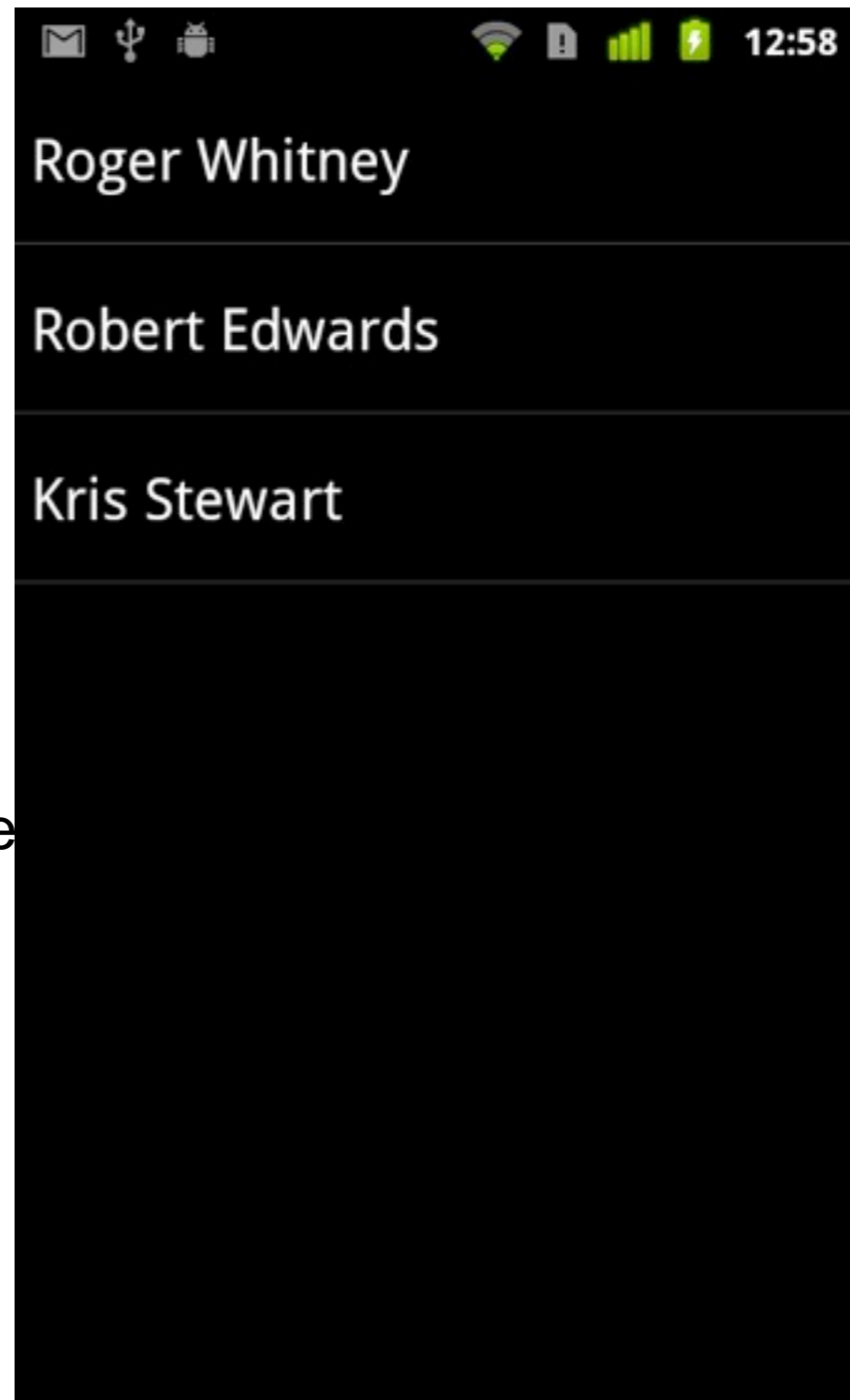
Parses JSON strings

```
JSONObject json = new JSONObject();  
json.put("lowerBound", 18);  
json.put("upperBound", 139);
```

```
String objectString = json.toString();    //{"lowerBound":18,"upperBound":139}"
```

```
JSONObject newJson = new JSONObject(objectString);  
int bound = newJson.getInt("lowerBound");    // 18
```

Android Example - Names



<http://www.eli.sdsu.edu/courses/fall09/cs696/e>

```
[{"firstname":"Roger","lastname":"Whitney"},  
{"firstname":"Robert","lastname":"Edwards"},  
{"firstname":"Kris","lastname":"Stewart"}]
```

The Activity

```
public class NameList extends ListActivity {  
  
    public void onCreate(Bundle savedInstanceState) {  
        super.onCreate(savedInstanceState);  
        setContentView(R.layout.main);  
        setListAdapter(new ArrayAdapter<String>(this,  
            android.R.layout.simple_list_item_1, this.fetchNetworkData()));  
    }  
}
```


The network part

```
public ArrayList<String> fetchNetworkData() {
    ArrayList<String> names = new ArrayList<String>();

    try {
        URL dataSource = new URL(
            "http://www.eli.sdsu.edu/courses/fall09/cs696/examples/
names.json");
        URLConnection dataConnection = dataSource.openConnection();
        BufferedReader in = new BufferedReader(new InputStreamReader(
            dataConnection.getInputStream()));

        String line = in.readLine();
        JSONArray dataArray = new JSONArray(line);
        for (int k = 0; k < dataArray.length(); k++) {
            JSONObject name = (JSONObject) dataArray.get(k);
            names.add(name.getString("firstname") + " "
                + name.getString("lastname"));
        }
    } catch (Exception e) { Log.e("rew", "error", e); }
    return names;
}
```

The Layout

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    >
    <ListView android:id="@id/android:list"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:background="#000000"
        android:layout_weight="1"
        android:drawSelectorOnTop="false"/>
</LinearLayout>
```

Android Example - Twitter

Public Tweets



The Activity

```
public class TwitterList extends ListActivity {
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.main);
        setListAdapter(new ArrayAdapter<String>(this,
            android.R.layout.simple_list_item_1,
            this.fetchTwitterPublicTimeline()));
    }
}
```

The Network Code

```
public ArrayList<String> fetchTwitterPublicTimeline() {
    ArrayList<String> listItems = new ArrayList<String>();

    try {
        URL twitter = new URL(
            "http://twitter.com/statuses/public_timeline.json");
        URLConnection twitterConnection = twitter.openConnection();
        BufferedReader in = new BufferedReader(new InputStreamReader(
            twitterConnection.getInputStream()));
        String line;
        while ((line = in.readLine()) != null) {
            JSONArray tweetArray = new JSONArray(line);
            for (int k = 0; k < tweetArray.length(); k++) {
                JSONObject tweet = (JSONObject) tweetArray.get(k);
                listItems.add(tweet.getString("text"));
            }
        }
    } catch (Exception e) { e.printStackTrace();
    }
    return listItems;
}
```

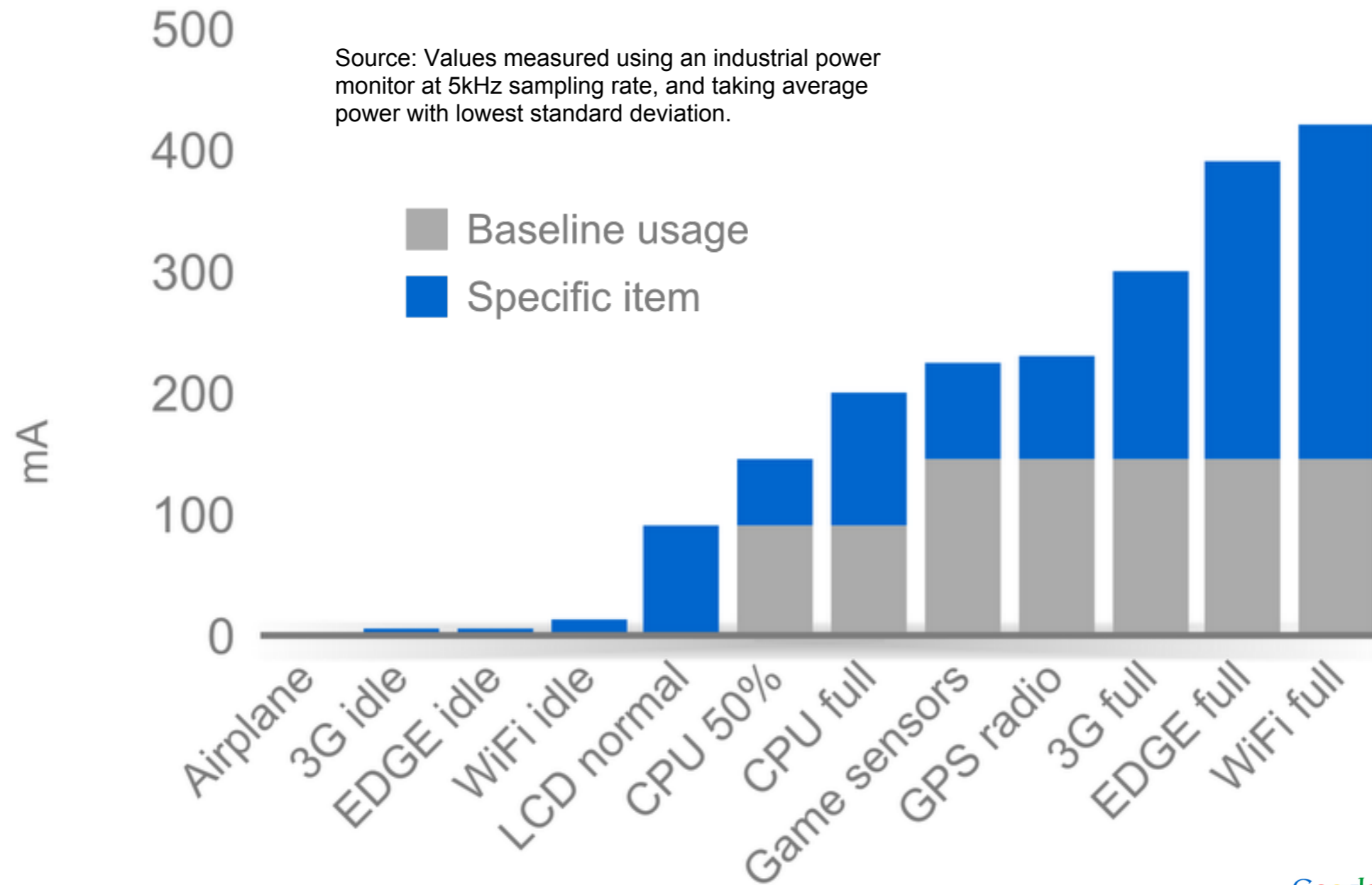
The Layout

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    >
    <ListView android:id="@id/android:list"
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:background="#000000"
        android:layout_weight="1"
        android:drawSelectorOnTop="false"/>
</LinearLayout>
```

Some Battery Information

	1420 mAh
Droid	1300 mAh
Nexus S	1500 mAh
iPad	~6500 mAh
MacBook Pro 17	8800 mAh

Where does it all go?



What costs the most?

- **Waking up in the background** when the phone would otherwise be sleeping
 - App wakes up every 10 minutes to update
 - Takes about 8 seconds to update, 350mA
- Cost during a given hour:
 - $3600 \text{ seconds} * 5\text{mA} = \mathbf{5\text{mAh resting}}$
 - $6 \text{ times} * 8 \text{ sec} * 350 \text{ mA} = \mathbf{4.6\text{mAh updating}}$
- Just *one app* waking up can trigger cascade

What costs the most?

- **Bulk data transfer** such as a 6MB song:
 - EDGE (90kbps): $300\text{mA} * 9.1 \text{ min} = \mathbf{45 \text{ mAh}}$
 - 3G (300kbps): $210\text{mA} * 2.7 \text{ min} = \mathbf{9.5 \text{ mAh}}$
 - WiFi (1Mbps): $330\text{mA} * 48 \text{ sec} = \mathbf{4.4 \text{ mAh}}$
- Moving between cells/networks
 - Radio ramps up to associate with new cell
 - BroadcastIntents fired across system
- Parsing textual data, regex without JIT



XML Verses JSON

How can we do better?

Networking

- Use an **efficient data format and parser**

