Lesson 15

Consuming RSS Feeds
Reading Internet Data

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Consuming RSS Feeds

What is an RSS Feed?

RSS Feeds define a structured world-wic
distribution system in which users **subscribe** to a source in order to pull in **XML** formatted online content.

Typical RSS sources include:

- news organizations,
- weather,
- financial services,
- public services,
- customer services,
- marketing & advertisement,
- blogs and
- video providers.

Why ?

RSS feeds keep users informed about subjects of interest to them.

Ref: Channel Definition Format (CDF) http://www.w3.org/TR/NOTE-CDFsubmit.html

Consuming RSS Feeds

What is an RSS Feed?

- First version of RSS was created by Netscape around 1999.
- Often called "**R**eally **S**imple **S**yndication"
- A typical *news feed (or channel)* contains entries which may be:
  - headlines,
  - full-text articles excerpts,
  - summaries,
  - Thumbnails, and/or
  - links to content on a website along with various metadata
- The **Atom Syndication Format** and **RSS** are common XML standards used to organize, create and update web feeds (these formats have been adopted by Google, Yahoo!, Apple/iTunes, CNN, NY Times,…)
- Validity of ATOM/RSS documents can be tested at http://validator.w3.org/appc/ (many other tools are available)

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Structure of RSS Feeds

Figure 1.
An **RSS** feed is an **XML** document that consists of a **<channel>** and zero or more **<item>** elements.

<rss>
<channel>
Channel_Elements
</channel>
<item>
Item1
<\item>
<item>
Item2
<\item>
</rss>

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Structure of RSS <channel> Element

Elements	Description	Type	# allowed
LastMod	Last modified date for this web page	ISO 8601:1988 Date	0 or 1
Title	Title	String	0 or 1
Abstract	Short description summarizing the article (200 characters or less recommended)	String	0 or 1
Author	Author	String	Any
Publisher	Publisher	String	Any
Copyright	Copyright	String	0 or 1
PublicationDate	Publication Date	String	0 or 1
Logo	Visual Logo for channel	Logo element	Any
Keywords	Comma delimited keywords that match this channel	String	Any
Category	A category to which this web page belongs in (as an URI).	Category element	Any
Ratings	Rating of the channel by one or more ratings services.	String	Any
Schedule	Schedule for keeping channel up to date	Schedule element	0 or 1
UserSchedule	Reference to a client/user specified schedule	UserSchedule element	0 or 1

Reference: http://www.w3.org/TR/NOTE-CDFsubmit.html

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Structure of an RSS <item> Element

A channel may contain any number of **<item>**s. An item may represent a "story" – similar to a story in a newspaper or magazine.

Element	Description
title	The title of the item.
link	The URL of the item.
description	The item synopsis.
author	Email address of the author of the item.
category	Includes the item in one or more categories.
comments	URL of a page for comments relating to the item.
enclosure	Describes a media object that is attached to the item.
guid	A string that uniquely identifies the item.
pubDate	Indicates when the item was published.
source	The RSS channel that the item came from.

Reference: http://www.w3.org/TR/NOTE-CDFsubmit.html

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Example of an RSS Feed

```
<?xml version="1.0" encoding="utf-8" ?>
<rss version="2.0" xmlns:atom="http://www.w3.org/2005/atom" >

  <channel>
    <title>rss title goes here...</title>
    <description>a description  goes here...</description>
    <link>http://www.publisherSite.com/index.html</link>
    <lastbuilddate>mon, 05 jul 2014 10:15:00 -0200</lastbuilddate>
    <pubdate>tue, 06 jul 2014 12:00:00 -0200</pubdate>

    <item>
      <title>Item's title  goes here...</title>
      <description>item's synopsis  goes here...</description>
      <link>http://www.moreAboutItemLink.org/</link>
      <guid>http://www.publisherSite.com/archives/id000123.html</guid>
      <pubdate>wed, 07 jul 2014 12:00:15 -0200</pubdate>
    </item>

  </channel>
</rss>
```

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Using the <![CDATA[. . .]]> Tag

You may simplify the **<description> portion of an <item> by entering** *non-escaped HTML text inside a **CDATA tag.***

For example, if your item's text is literally: `This is <b>bold</b>` then the escaped **<description> would be:**

```
<description> This is &lt;b&gt;bold&lt;/b&gt; </description>
```

In the example "**<**" becomes "**<**" and "**>**" turns into "**>**".

The equivalent version using the XML **CDATA** tag would be:

```
<description><![CDATA[ This is <b>bold</b> ]]></description>
```

Sample of RSS Aggregators

World weather
http://www.rssweather.com/dir
US weather:
http://www.weather.gov/view/national.php?map=on
The Weather Channel
http://rss.weather.com/weather/rss/local/44114

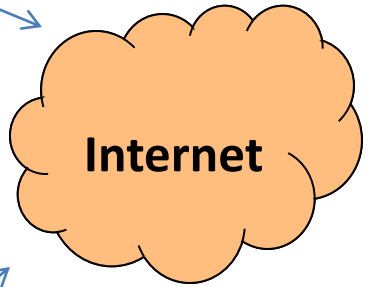
News
http://www.npr.org/rss/
http://www.cnn.com/services/rss/
http://news.bbc.co.uk/2/hi/help/3223484.stm
http://www.nytimes.com/services/xml/rss

Money Exchange
http://themoneyconverter.com/RSSFeeds.aspx

Entertainment
http://www.nbclosangeles.com/rss/
http://www.movies.com/rss/

RSS Aggregator
http://www.rss-network.com/
http://www.nytimes.com/services/xml/rss

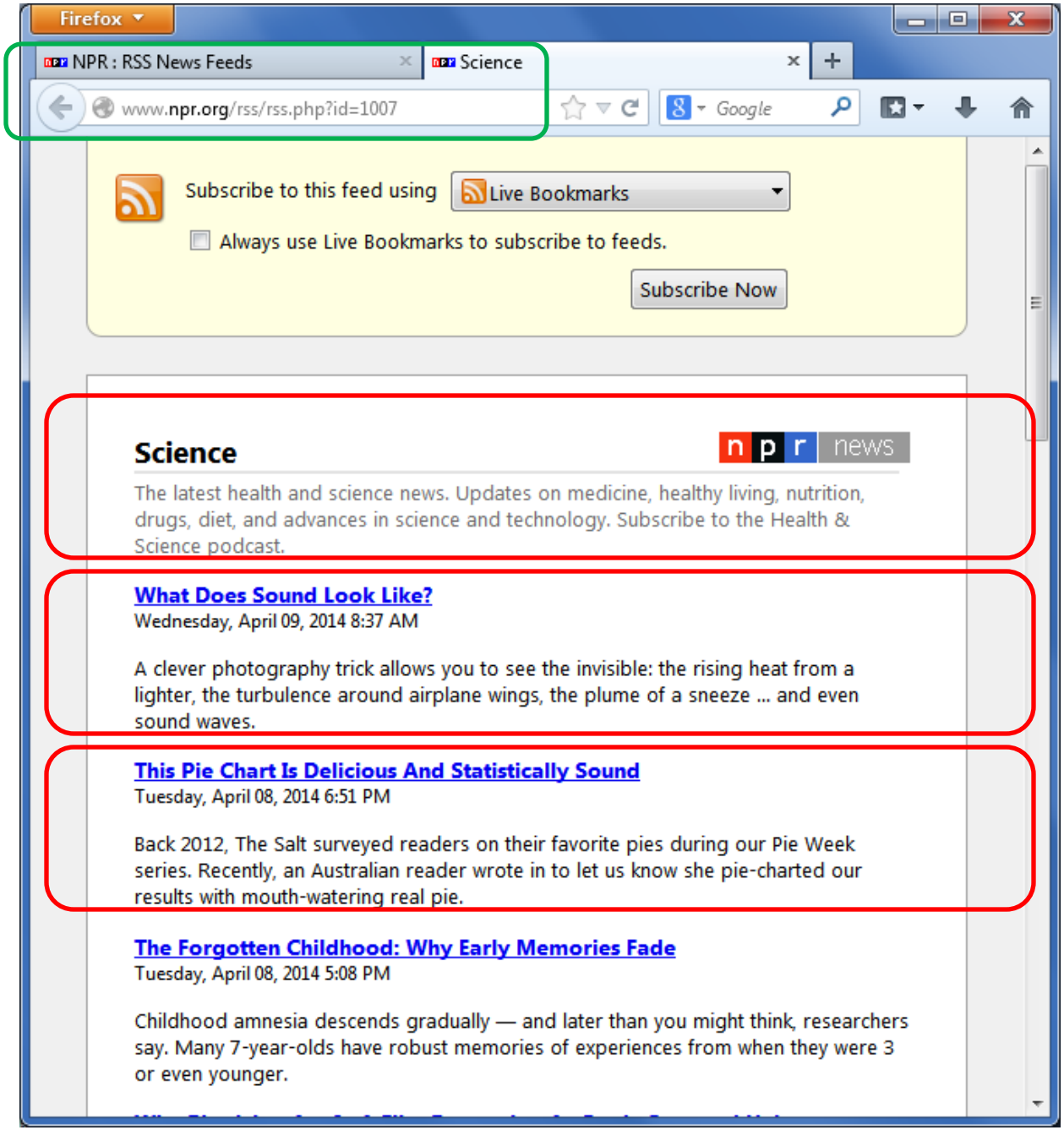
Corporate
http://www.toyota.co.jp/en/rss/rss-responsibility.html
http://home3.americanexpress.com/corp/rss/
http://www.aa.com/i18n/urls/rss.jsp
http://www.amazon.com/gp/tagging/rss-help.html



How do RSS feeds look like when using a browser?

NPR National Public Radio (9-Apr-2014)

Note:
Your browser may require a 'plugin' to nicely display RSS , otherwise it may show plain XML text.



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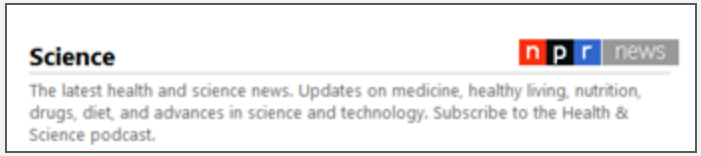
XML Version of NPR RSS Feed (just a fragment! 1/3)

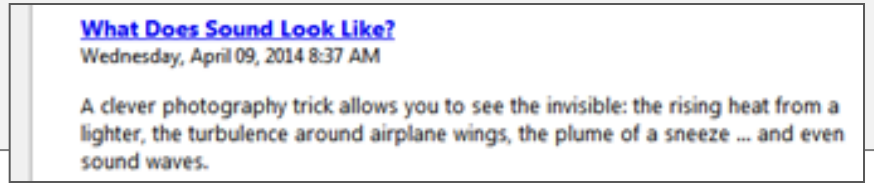
```
<?xml version="1.0" encoding="UTF-8"?>
<rss  xmlns:npr="http://www.npr.org/rss/" xmlns:nprml="http://api.npr.org/nprml"
      xmlns:itunes="http://www.itunes.com/dtds/podcast-1.0.dtd"
      xmlns:content="http://purl.org/rss/1.0/modules/content/" version="2.0">

  <channel>
    <title>Science</title>

    <link>http://www.npr.org/templates/story/story.php?storyId=1007&amp;</link>

    <description>The latest health and science news. Updates on medicine,
        healthy living, nutrition, drugs, diet, and advances in science and
        technology. Subscribe to the Health &amp; Science podcast.</description>

    <language>en</language>
    <copyright>Copyright 2014 NPR - For Personal Use Only</copyright>
    <generator>NPR API RSS Generator 0.94</generator>
    <lastBuildDate>Tue, 09 Apr 2014 12:28:00 -0400</lastBuildDate>

    <image>
        <url>http://media.npr.org/images/npr_news_123x20.gif</url>
        <title>Science</title>
        <link>http://www.npr.org/templates/story/story.php?storyId=1007
        &amp;ft=1&amp;f=1007</link>
    </image>
```



Consuming RSS Feeds

XML Version of NPR RSS Feed (just a fragment! 1/3)

```
<item>
   <title>What Does Sound Look Like?</title>

   <description>A clever photography trick allows you to see the invisible:
     the rising heat from a lighter, the turbulence around airplane wings, the
     plume of a sneeze ... and even sound waves.</description>

   <pubDate>Wed, 09 Apr 2014 08:37:19 -0400</pubDate>

   <link>http://www.npr.org/2014/04/09/300563606/what-does-sound-look-
     like?ft=1&amp;f=1007</link>

   <guid>http://www.npr.org/2014/04/09/300563606/what-does-sound-look-
     like?ft=1&amp;f=1007</guid>

   <content:encoded><![CDATA[<p>A clever photography trick allows you to see
     the invisible: the rising heat from a lighter, the turbulence around
     airplane wings, the plume of a sneeze ... and even sound waves.</p><p>
     <a href="http://www.npr.org/templates/email/emailAFriend.php?storyId
     =300563606">&raquo; E-Mail This</a></p>]]></content:encoded>

</item>
```



Consuming RSS Feeds

XML Version of NPR RSS Feed (just a fragment! 1/3)

```
<item>
    <title>This Pie Chart Is Delicious And Statistically Sound</title>

    <description>Back 2012, The Salt surveyed readers on their favorite pies
      during our Pie Week series. Recently, an Australian reader wrote in to
      let us know she pie-charted our results with mouth-watering real
      pie.</description>
```


```
    <pubDate>Tue, 08 Apr 2014 18:51:00 -0400</pubDate>
    <link>http://www.npr.org/blogs/thesalt/2014/04/08/300620654/this-pie-
        chart-is-delicious-and-statistically-sound?ft=1&amp;f=1007</link>
    <guid>http://www.npr.org/blogs/thesalt/2014/04/08/300620654/this-pie-
        chart-is-delicious-and-statistically-sound?ft=1&amp;f=1007</guid>

    <content:encoded><![CDATA[<p>Back 2012, The Salt surveyed readers on their
      favorite pies during our Pie Week series. Recently, an Australian reader
      wrote in to let us know she pie-charted our results with mouth-watering
      real pie.</p><p><a href="http://www.npr.org/templates/email/emailAFriend.
      php?storyId=300620654">&raquo; E-Mail This</a></p>]]></content:encoded>
  </item>
```

Many **<item>**s were intentionally removed to fit page size

```
</channel>
</rss>
```

Consuming RSS Feeds

Representing RSS Web Feed as DOM Trees

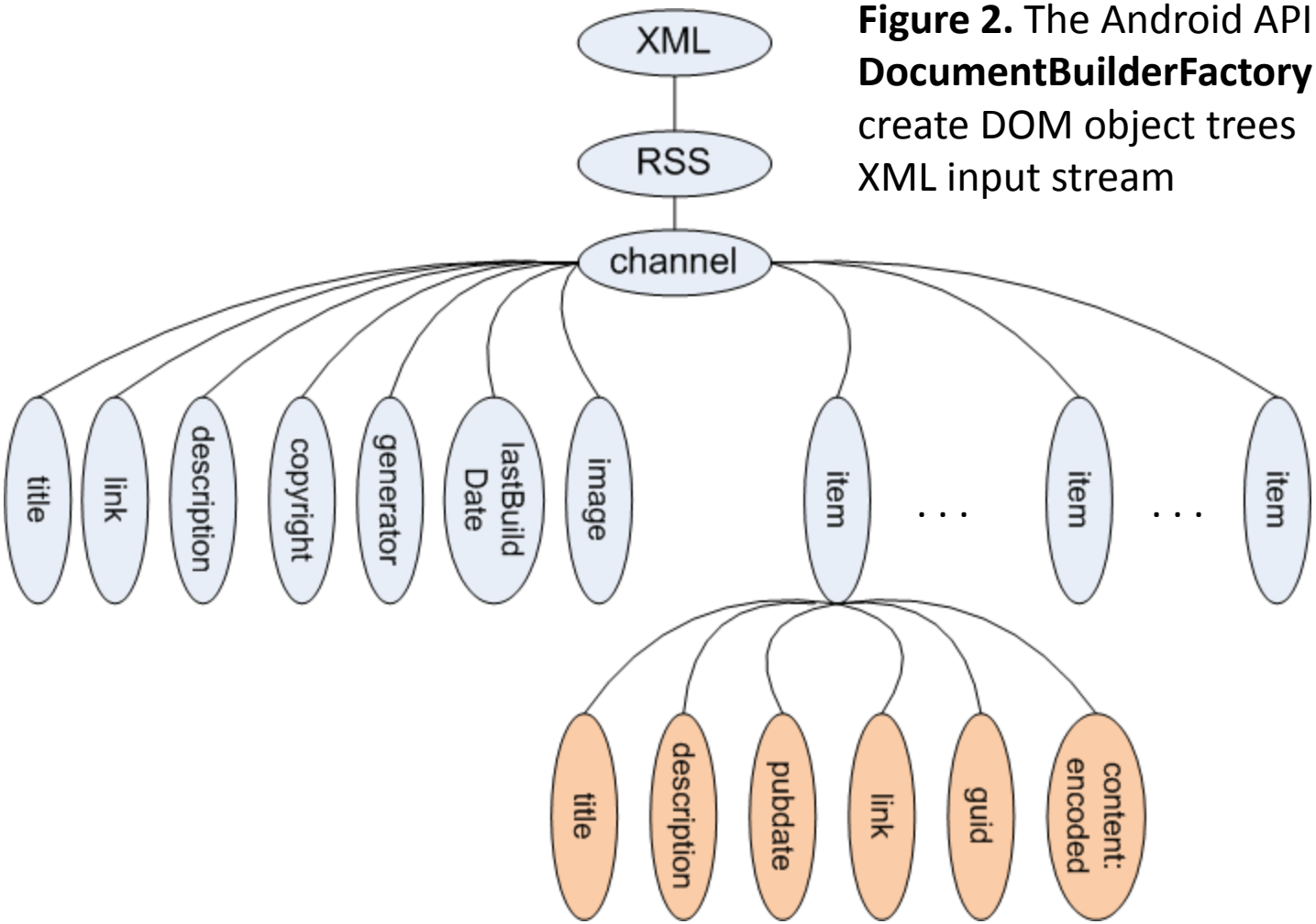


Figure 2. The Android API includes a **DocumentBuilderFactory** class to create DOM object trees from an XML input stream

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DOM – Document Object Model

The **Document Object Model** (**DOM**) is a language-independent API that allows applications to make parsers to produce a tree-based representation of valid HTML and well-formed XML documents. DOM-trees are exposed as a collection of data **Nodes**

With the Document Object Model, programmers can build documents, navigate their structure, and add, modify, or delete elements and content.

```
DocumentBuilder db = DocumentBuilderFactory
                              .newInstance();
                              .newDocumentBuilder();

Document dom = db.parse(someHttpInputStream);
```

Reference:
http://docs.oracle.com/javase/7/docs/api/javax/xml/parsers/DocumentBuilderFactory.html

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DOM – Document Object Model

Example: The tree in **Figure 2** contains a set of **item** nodes.

Assume *dom* is the DOM-tree made by parsing the input stream returned by an RSS aggregator.

Accessing **item** data could be done as follows

```
// define access to all nodes in the parse tree
Element treeElements = dom.getDocumentElement();

// look for individual news ("items" in this case)
// put items in a NodeList collection
NodeList itemNodes = treeElements.getElementsByTagName("item");
```

Reference:
http://docs.oracle.com/javase/7/docs/api/javax/xml/parsers/DocumentBuilderFactory.html

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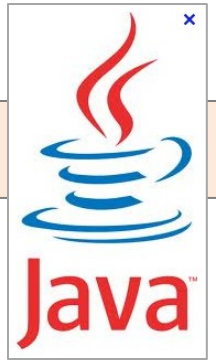

HTTP Processing in Android

Android's handling of HTTP network resources is typically done using either of the client-side included APIs

1. Standard Java network **java.net** package, and/or
2. Apache **HttpClient** library.

In particular, the often used java.net class **HttpUrlConnection** follows the next steps:

1. Obtain a new HttpURLConnection
2. Prepare the request (URI including header, credentials, content, cookies…)
3. Read the response (non-buffered stream returned by getInputStream())
4. Disconnect as soon as response is read.

References: http://docs.oracle.com/javase/6/docs/api/java/net/package-summary.html
http://hc.apache.org/httpcomponents-client-ga/
http://developer.android.com/reference/org/apache/http/impl/client/DefaultHttpClient.html

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Example. 'All things considered'

In this project we will develop an application to expose on Android devices the public-access RSS material aggregated by **National Public Radio** (**NPR**).

Consuming RSS Feeds

Example. NPR Project – Action Plan

Step1.

A little research shows that NPR supports a number of web feeds, among them the following:

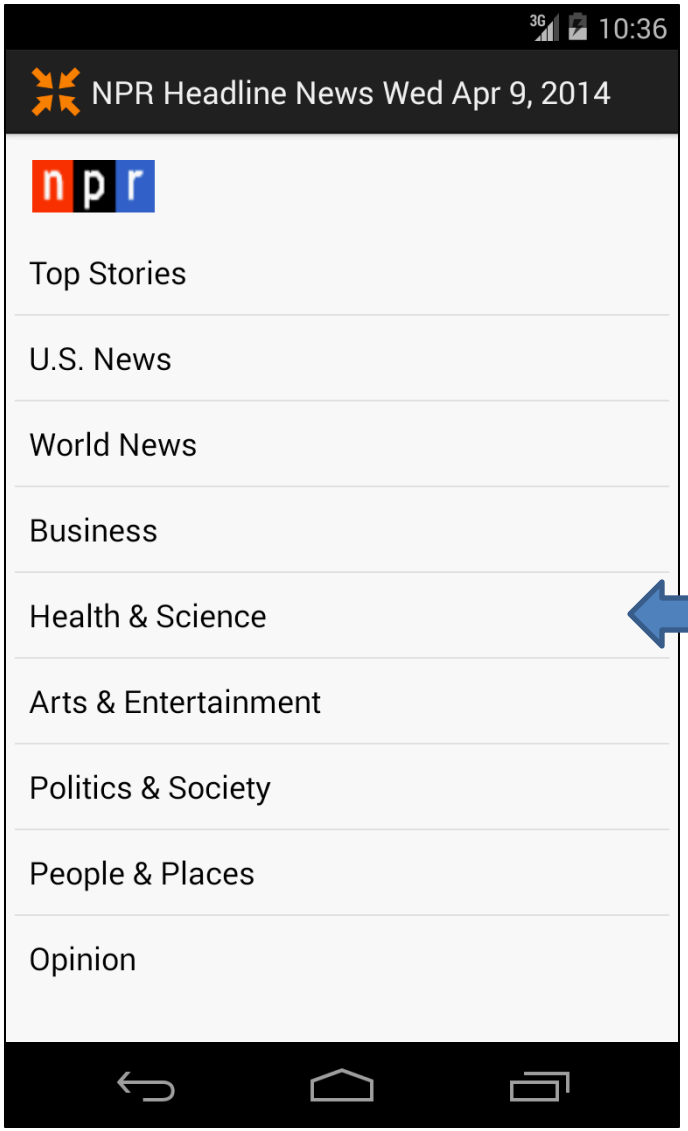
Topic	URL
Top Stories	http://www.npr.org/rss/rss.php?id=1001
U.S. News	http://www.npr.org/rss/rss.php?id=1003
World News	http://www.npr.org/rss/rss.php?id=1004
Business	http://www.npr.org/rss/rss.php?id=1006
Health & Science	http://www.npr.org/rss/rss.php?id=1007
Arts & Entertainment	http://www.npr.org/rss/rss.php?id=1008
Politics & Society	http://www.npr.org/rss/rss.php?id=1012
People & Places	http://www.npr.org/rss/rss.php?id=1021
Opinion	http://www.npr.org/rss/rss.php?id=1057

Consuming RSS Feeds

Example. NPR Project – Action Plan

Step2.
We will display on a ListView widget, a basic menu consisting of a fixed set of topics (for instance: Top Stories, US News, World News, Business, etc)

We wait for the user to make a selection. Once a category is chosen its corresponding headlines will be downloaded.



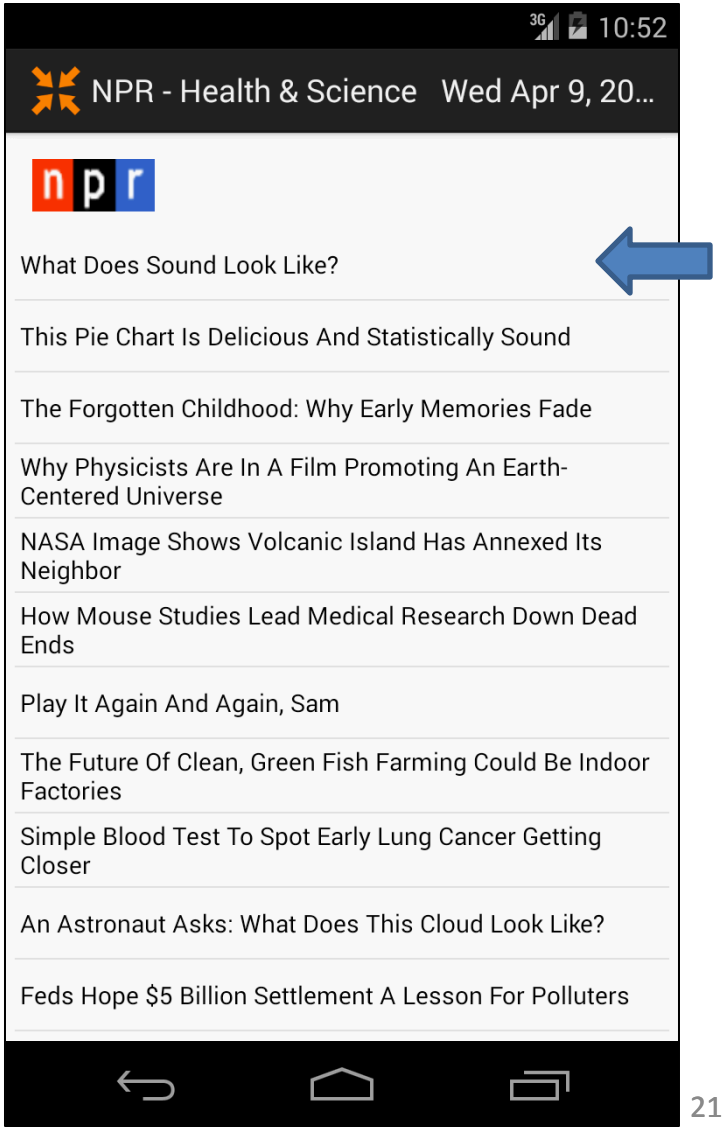
Consuming RSS Feeds

Example. NPR Project – Action Plan

Step3.
Again, a simple ListView box is used to show the most current headlines from the selected category (notice the TextSize is now slightly smaller). The user can scroll the list and click on a particular story.

Observe that individual lines in the ListView correspond to the feed's XML **<item>** entries discussed earlier.

We have already expressed our interest in the "Health & Science" subject. Assume we want to follow the first article dealing with the 'shape of sounds'.



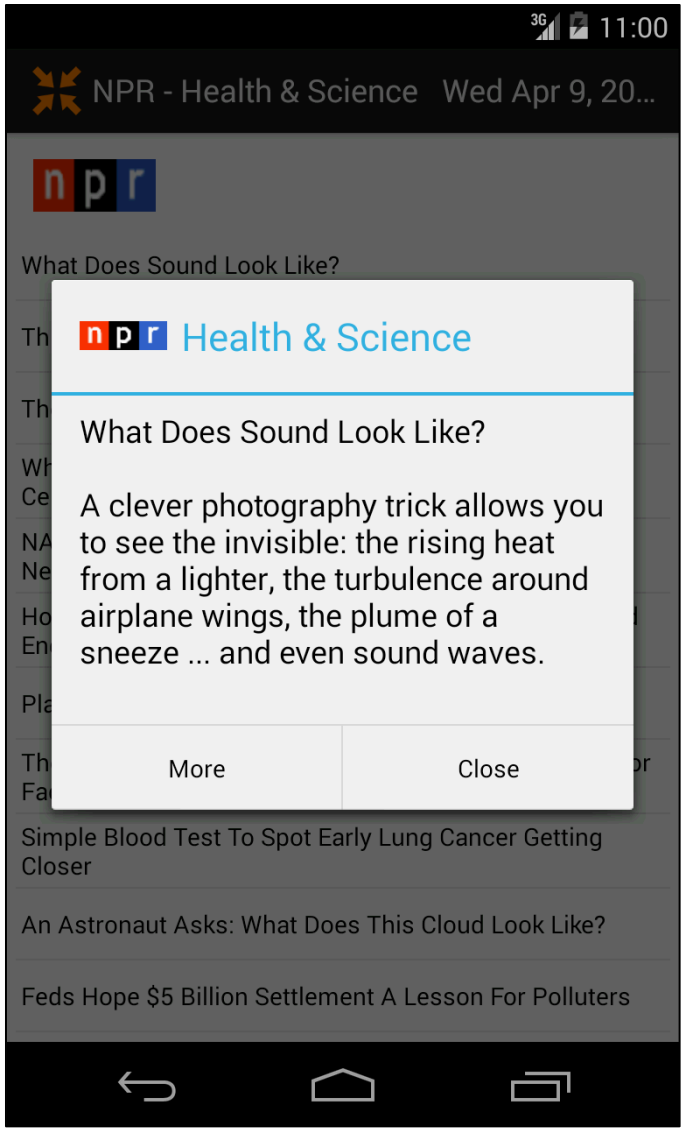
Consuming RSS Feeds

Example. NPR Project – Action Plan

Step4.
A brief summary of the chosen story is displayed inside a DialogBox (this material corresponds to a **<content:encoded>** tag held in the source web-feed).

The user is given the option of *closing* the window or obtaining *more* information.

Assume we want additional information, so we click the "More" button



Consuming RSS Feeds

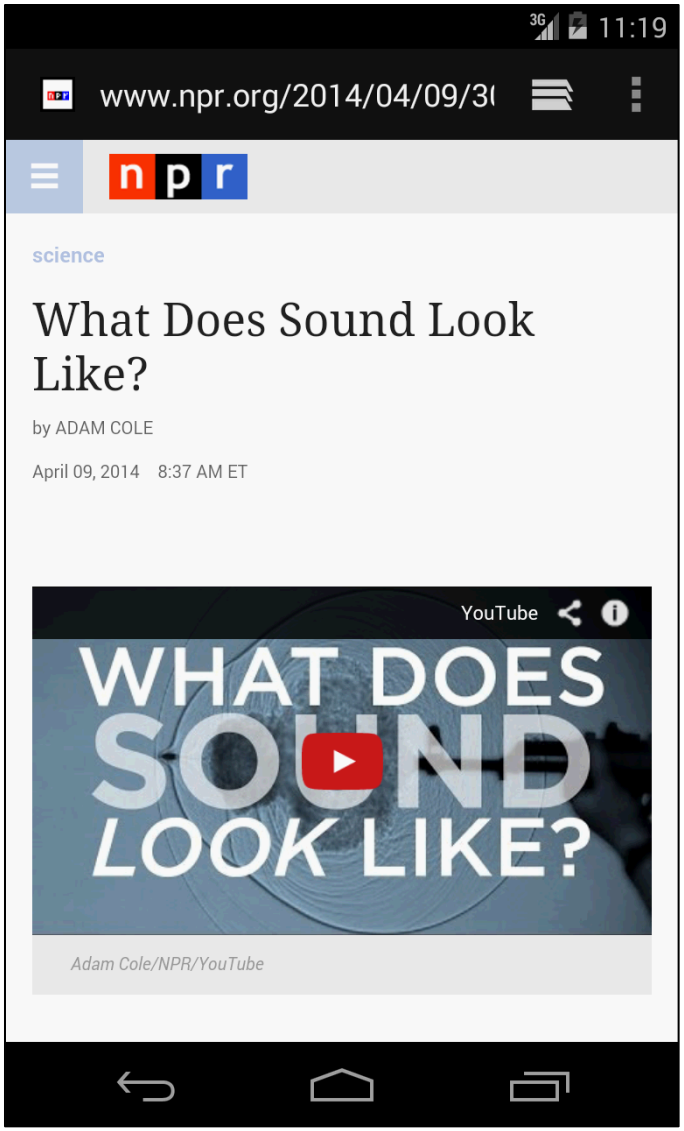
Example. NPR Project – Action Plan

Step5.
The **<link>** associated to the **<item>** that is currently displayed is given to a browser so the full document that is stored at the NPS site could be read.

An internal browser on the given URL is started using a basic ACTION_VIEW Intent.

To return to the app, the users taps on the BACK key 

In addition to text, NPR stories often include images, videos, and sound clips; which are all available to the Android app.



Consuming RSS Feeds

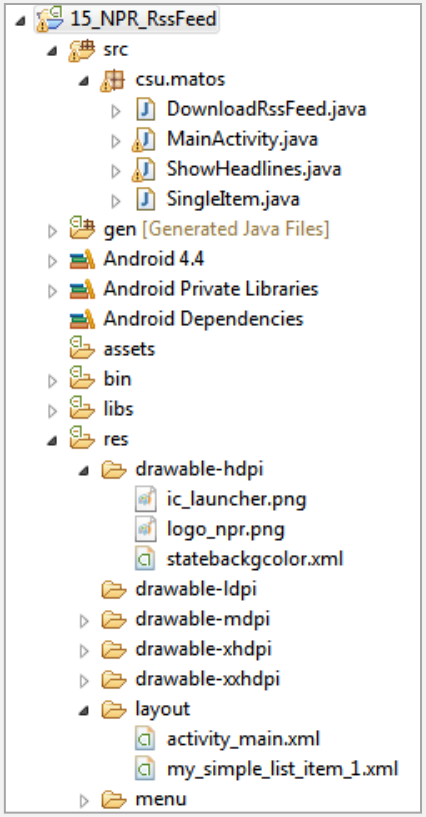
Example. NPR App - Manifest – Structure

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="csu.matos"
    android:versionCode="1"
    android:versionName="1.0" >

    <uses-sdk
        android:minSdkVersion="8"
        android:targetSdkVersion="17" />

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

    <application
        android:allowBackup="true"
        android:icon="@drawable/ic_launcher"
        android:label="@string/app_name"
        android:theme="@style/AppTheme" >
        <activity
            android:name="csu.matos.MainActivity"
            android:label="@string/app_name" >
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
        <activity android:name=".ShowHeadlines" >
        </activity>
    </application>
</manifest>
```



Consuming RSS Feeds

Example. Layouts

App's Main GUI
(activity_main.xml)

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout
xmlns:android="http://schemas.android.com/apk/
res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="5dp"
    android:orientation="vertical" >

    <ImageView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="10dp"
        android:background="@drawable/logo_npr"
        />

    <ListView
        android:id="@+id/myListView"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        />

</LinearLayout>
```

Custom version of ListView's row
(my_simple_list_item_1.xml)

```
<?xml version="1.0" encoding="utf-8"?>
<TextView
xmlns:android="http://schemas.android.com/
apk/res/android"
   android:id="@android:id/text1"
   android:layout_width="match_parent"
   android:layout_height="wrap_content"
   android:gravity="center_vertical"
   android:minHeight="40sp"
   android:padding="3dip"
   android:textColor="#ff000000"

   android:background=
   "@drawable/statebackgcolor" >

   android:textAppearance=
   "@android:style/TextAppearance.
   DeviceDefault.Small"

</TextView>
```

Text size is smaller than default, the drawable 'statebackcolor' uses different color (light blue) to signal 'state_pressed' (see **Appendix A**)

Consuming RSS Feeds

Example. MainActivity.java

1 of 3

```
public class MainActivity extends Activity {

    // Main GUI - A NEWS application based on National Public Radio RSS material
    ArrayAdapter<String> adapterMainSubjects;
     ListView myMainListView;
     Context  context;
     SingleItem selectedNewsItem;

    // hard-coding main NEWS categories (TODO: use a resource file)
1 → String [][] myUrlCaptionMenu = {
    {"http://www.npr.org/rss/rss.php?id=1001",   "Top Stories"},
    {"http://www.npr.org/rss/rss.php?id=1003",   "U.S. News"},
    {"http://www.npr.org/rss/rss.php?id=1004",   "World News"},
    {"http://www.npr.org/rss/rss.php?id=1006",    "Business"},
    {"http://www.npr.org/rss/rss.php?id=1007",   "Health & Science"},
    {"http://www.npr.org/rss/rss.php?id=1008",   "Arts & Entertainment"},
    {"http://www.npr.org/rss/rss.php?id=1012",    "Politics & Society"},
    {"http://www.npr.org/rss/rss.php?id=1021",   "People & Places"},
    {"http://www.npr.org/rss/rss.php?id=1057",   "Opinion"}
     };

  //define convenient URL and CAPTIONs arrays
   String [] myUrlCaption = new String[myUrlCaptionMenu.length];
   String [] myUrlAddress = new String[myUrlCaptionMenu.length];
```

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Example. MainActivity.java


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

   for (int i=0; i<myUrlAddressCaption.length; i++) {
      myUrlAddress[i] = myUrlCaptionMenu][0];
      myUrlCaption[i] = myUrlCaptionMenu[i][1];
   }

  context = getApplicationContext();
  this.setTitle("NPR Headline News\n" + niceDate() );

  // user will tap on a ListView's row to request category's headlines
  myMainListView = (ListView)this.findViewById(R.id.myListView);
  myMainListView.setOnItemClickListener(new OnItemClickListener() {
    public void onItemClick(AdapterView<?> _av, View _v,
                            int _index, long _id) {
       String urlAddress = myUrlAddress[_index];
       String urlCaption = myUrlCaption[_index];

       //create an Intent to talk to activity: ShowHeadlines
       Intent callShowHeadlines = new Intent( MainActivity.this,
                                              ShowHeadlines.class);
```

Consuming RSS Feeds

Example. MainActivity.java


```
        //prepare a Bundle and add the input arguments: url & caption
        Bundle myData = new Bundle();
        myData.putString("urlAddress", urlAddress);
        myData.putString("urlCaption", urlCaption);
        callShowHeadlines.putExtras(myData);

        startActivity(callShowHeadlines);
         }
      });

      // fill up the Main-GUI's ListView with main news categories
      adapterMainSubjects = new ArrayAdapter<String>(this,
                        android.R.layout.simple_list_item_1; //android's default
                        myUrlCaption);
3 →   myMainListView.setAdapter(adapterMainSubjects);

   }//onCreate

    // method returns a value such as "Monday Apr 7, 2014"
    public static String niceDate() {
      SimpleDateFormat sdf = new SimpleDateFormat("EE MMM d, yyyy ", Locale.US);
      return sdf.format(new Date() );
   }

}//MainActivity
```

Consuming RSS Feeds

Example. MainActivity.java Comments

1. This is the main thread. It shows a menu (as a ListView) on which the main categories are listed. We have hard-coded the URL and CAPTION for each menu entry, a better practice is to supply a resource file with this set of values. The main NPR categories are subjects such as: 'Top Stories', 'US. News', 'World News', 'Business', etc.

2. A listener waiting for the **onItemClick** event is set on the main GUI's ListView. When the user selects a row, its index is used to get from the menu array the corresponding URL and CAPTION. Those values are stored in a Bundle and sent to the *ShowHeadlines* activity; which is started using a non-result returning Intent.

3. The main level ListView is shown to the user. This ListView is displayed using the standard `android.R.layout.simple_list_item_1` row layout (medium text size, etc.) Later, in the *ShowHeadlines* activity we use a custom layout (smaller font, light blue background color on selected state)

Consuming RSS Feeds

Example. ShowHeadlines.java


```
public class ShowHeadlines extends Activity {
   // a main category has already been selected by the user
   // such as: 'Top Stories', 'World News', 'Business', ...
   // ["urlCaption", "urlAddress"] comes in a bundle sent
   // by main thread, here we access RSS-feed and show the
   // corresponding headlines.
    ArrayList<SingleItem> newsList = new ArrayList<SingleItem>();
    ListView myListView;
    String urlAddress = "";
    String urlCaption = "";
    SingleItem selectedNewsItem;

    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        myListView = (ListView)this.findViewById(R.id.myListView);

        // find out which intent is calling us
        Intent callingIntent = getIntent();

        // grab data bundle holding selected url & caption sent to us
1 →     Bundle myBundle = callingIntent.getExtras();
        urlAddress = myBundle.getString("urlAddress");
        urlCaption = myBundle.getString("urlCaption");
```

Consuming RSS Feeds

Example. ShowHeadlines.java

1 of 3

```
        // update app's top 'TitleBar' (eg. 'NPR - Business Wed April 09, 2014')
        this.setTitle("NPR - " + urlCaption + " \t" + MainActivity.niceDate());

        // clicking on a row shows dialogBox with more info about selected item
        myListView = (ListView)this.findViewById(R.id.myListView);
2 →     myListView.setOnItemClickListener(new OnItemClickListener() {
            public void onItemClick(AdapterView<?> av, View v,
                                    int index, long id) {
              selectedNewsItem = newsList.get(index);
              showNiceDialogBox(selectedNewsItem, getApplicationContext());
            }
          });

      // get stories for the selected news option
3 →   DownloadRssFeed downloader =  new DownloadRssFeed(ShowHeadlines.this);
      downloader.execute(urlAddress, urlCaption);

    }//onCreate


    public void showNiceDialogBox(SingleItem selectedStoryItem,
                                  Context context){
      // make a nice looking dialog box (story summary, btnClose, btnMore)
      // CAUTION: (check)on occasions title and description are the same!
      String title = selectedStoryItem.getTitle();
```

Consuming RSS Feeds

Example. ShowHeadlines.java

1 of 3

```
   String description = selectedStoryItem.getDescription();
      if (title.toLowerCase().equals(description.toLowerCase())){
         description = "";
      }
      try {
4        //CAUTION: sometimes TITLE and DESCRIPTION include HTML markers
         final Uri storyLink =  Uri.parse(selectedStoryItem.getLink());
         AlertDialog.Builder myBuilder = new AlertDialog.Builder(this);
         myBuilder
               .setIcon(R.drawable.logo_npr)
               .setTitle(Html.fromHtml(urlCaption) )
               .setMessage( title + "\n\n" + Html.fromHtml(description) + "\n" )
               .setPositiveButton("Close", null)
               .setNegativeButton("More", new OnClickListener() {
               public void onClick(DialogInterface dialog, int whichOne) {
                  Intent browser = new Intent(Intent.ACTION_VIEW, storyLink);
                  startActivity(browser);
               }
              })//setNegativeButton
               .show();
      } catch (Exception e) {
         Log.e("Error DialogBox", e.getMessage() );
      }
    }//showNiceDialogBox
}//ShowHeadlines
```

Consuming RSS Feeds

Example. ShowHeadlines.java Comments

1. The activity begins by extracting the ***urlAddress*** and ***urlCaption*** data supplied in the incoming Bundle.

2. A listener (bound to the local ListView displaying selected stories) watches for the **onItemClick** event to show a DialogBox offering an expanded description of the clicked-on item.

3. The incoming arguments are passed to an **asynctask** responsible for contacting NPR RSS computer and download the selected channel. Before it finishes, the asynctask updates the current activity's ListView with all the stories retrieved from the RSS feed.

4. A 'nice' DialogBox holding: title, description, and two buttons (cancel & more) is displayed when the user requests a summary of a story. Observe the method checks whether or not title and description are the same (not to repeat the same message). Also the HTML.fromHtlm(…) method is used to properly display non-escaped text (commonly used in the <description> items)

Consuming RSS Feeds

Example. DownloadRssFeed.java

1 of 5

```
public class DownloadRssFeed extends
             AsyncTask<String, Void, ArrayList<SingleItem> > {
   // Use supplied URL to download web-feed. This process is inherently
   // slow and MUST be performed inside a thread or asynctask (as in here)
   ShowHeadlines callerContext;  //caller class
   String  urlAddress;
   String  urlCaption;
   ProgressDialog dialog = null;

   public  DownloadRssFeed ( Context callerContext){
      this.callerContext = (ShowHeadlines) callerContext;
      dialog = new ProgressDialog(callerContext);
   }

   protected void onPreExecute() {
      this.dialog.setMessage("Please wait\nReading RSS feed ..." );
      this.dialog.setCancelable(false); //outside touching doesn't dismiss you
      this.dialog.show();
   }

   @Override
   protected ArrayList<SingleItem> doInBackground(String... params) {
      ArrayList<SingleItem> newsList = new ArrayList<SingleItem>();
      urlAddress = params[0];    // eg. "http://www.npr.org/rss/rss.php?id=1004"
      urlCaption = params[1];    // eg. "World News"
```

1

Consuming RSS Feeds

Example. DownloadRssFeed.java


```
this.dialog.setMessage("Please wait\nReading RSS feed " +
                       urlCaption + "...");
try {

// try to get connected to RSS source
URL url = new URL(urlAddress);
URLConnection connection;
connection = url.openConnection();

HttpURLConnection httpConnection = (HttpURLConnection) connection;
int responseCode = httpConnection.getResponseCode();

if (responseCode == HttpURLConnection.HTTP_OK) {
   InputStream in = httpConnection.getInputStream();
   // define a document builder to work on incoming stream
   DocumentBuilderFactory dbf = DocumentBuilderFactory
         .newInstance();
   DocumentBuilder db = dbf.newDocumentBuilder();
   // make DOM-tree for incoming XML stream
   Document dom = db.parse(in);
   // make available all access nodes in the parse tree
   Element treeElements = dom.getDocumentElement();

   // look for individual 'stories' (<items> in this case)
   // add each found item to a NodeList collection (newsList)
```

Consuming RSS Feeds

Example. DownloadRssFeed.java

3 of 5

```
        newsList.clear();
        NodeList itemNodes = treeElements.getElementsByTagName("item");
        if ((itemNodes != null) && (itemNodes.getLength() > 0)) {
           for (int i = 0; i < itemNodes.getLength(); i++) {
3 →           newsList.add( dissectItemNode(itemNodes, i) );
           }// for
        }// if

     }// if
     // time to close. we don't need the connection anymore
     httpConnection.disconnect();

  } catch (Exception e) {
     Log.e("Error>> ", e.getMessage() );
  }

     return newsList;  //to be consumed by onPostExecute
  }//doInBackground

  @Override
4 → protected void onPostExecute(ArrayList<SingleItem> result) {
     super.onPostExecute(result);
     callerContext.newsList = result;
     // the 'result' list contains headlines for selected news category
     // use custom row layout (small font, blue background on state-pressed)
```

Consuming RSS Feeds

Example. DownloadRssFeed.java


```
      int layoutID = R.layout.my_simple_list_item_1;
      ArrayAdapter<SingleItem> adapterNews =
            new ArrayAdapter<SingleItem>(callerContext, layoutID, result);
      callerContext.myListView.setAdapter(adapterNews);

      dialog.dismiss();

   }

   public SingleItem dissectItemNode(NodeList nodeList, int i){
      // disassemble i-th entry in NodeList collection
      // get the first child of elements: extract fields:
      // title, description, pubData, and link. Put those pieces
      // together into a POJO 'SingleItem' object, and return it

      try {
5 →      Element entry =  (Element) nodeList.item(i);
         Element title = (Element) entry.getElementsByTagName(
                                    "title").item(0);
         Element description = (Element) entry.getElementsByTagName(
                                    "description").item(0);
         Element pubDate = (Element) entry.getElementsByTagName(
                                    "pubDate").item(0);
         Element link = (Element) entry.getElementsByTagName(
                                    "link").item(0);
```

Consuming RSS Feeds

Example. DownloadRssFeed.java


```
        String titleValue = title.getFirstChild().getNodeValue();
        String descriptionValue =description.getFirstChild().getNodeValue();
        String dateValue = pubDate.getFirstChild().getNodeValue();
        String linkValue = link.getFirstChild().getNodeValue();

        SingleItem singleItem = new SingleItem( dateValue,
                                                titleValue,
                                                descriptionValue,
                                                linkValue );

        return singleItem;

      } catch (DOMException e) {

        return new SingleItem("", "Error", e.getMessage(), null);
      }

    }//dissectNode


}//AsyncTask
```

Consuming RSS Feeds

Example. DownloadRssFeed.java Comments

1. The activity begins by extracting the ***urlAddress*** and ***urlCaption*** parameters. Anticipating slow Internet traffic, the method displays a rotating DialogBox telling the user to wait for results to be fetched.

2. The asyntask uses common **java.net HTTP** methods to set a connection to the NPR RSS site. If successful, the **InputStream** arriving from the RSS source is converted into a DOM-tree. The method `.getDocumentElement()` allows direct access to all the tree nodes inside the document.

3. Each **item-type** node stored in the tree is fetched (remember that each <item> represents a story). The publication-date, title, description, and link are extracted from the item-node and stored in a custom **SingleItem** object (see bullet 5). SingleItem objects are added to a *result* list.

4. As soon as the HTTP transfer is over, the asynctask activity closes the connection, dismisses the circular progress bar, and updates the caller's ListView with the headlines held in the *result* list.

Consuming RSS Feeds

Example. SingleItem.java

```
public class SingleItem {
    private String pubDate;
    private String title;
    private String description;
    private String link;

    public String getPubDate()      { return pubDate; }
    public String getTitle()        { return title;}
    public String getDescription()  { return description; }
    public String getLink()         { return link; }

    public SingleItem( String _pubDate, String _title,
                       String _description,  String _link) {
      pubDate = _pubDate;
      description = _description;
      title = _title;
      link = _link;
    }

    @Override
    public String toString() {
      return title;
    }
}
```

Consuming RSS Feeds

Questions ?

Consuming RSS Feeds

Appendix A. Custom ListView Rows

Instead of using the default layout specs in `android.R.layout.simple_list_item_1` you may tell your **ArrayAdapter** to use a custom row layout.

For instance, the file *my_simple_list_item_1.xml* contains our own specs for how a ListView's row should look like. In that file we made the textSize smaller. We also set its background to a specification provided by **/res/drawable/statebackcolor**.

We did this so, when the row is selected we apply a background color of our choosing (light-blue in this example). The state specification is given below.

```
<?xml version="1.0" encoding="utf-8"?>
<selector xmlns:android="http://schemas.android.com/apk/res/android">

   <!-- pressed -->
   <item android:drawable="@android:color/holo_blue_light"
         android:state_pressed="true"/>

   <!-- default -->
   <item android:drawable="@android:color/transparent"/>

</selector>
```