Questions for UI Control Adapters

1. The simplest UI Control with a Data Source for Android is the `AutoCompleteTextView`. Look up this control, and explain the functionality of this control and what the data source provides to the control. In general, how is a data source (also called an adapter in Android) used by its underlying widget/UI Control?

2. Name three other UI Controls (widgets) that require a data source, and give an example usage for each.

3. An `ArrayAdapter` can be used as the data source for a Spinner, for example. If you want the ability to add and remove elements from the control, you would initialize the `ArrayAdapter` with which of the following:

   ```java
   ArrayAdapter aa = ArrayAdapter.createFromResource(this, R.array.student_names, R.layout.textview);
   ArrayAdapter aa = new ArrayAdapter(this, R.layout.simple_spinner_item, new ArrayList(Arrays.asList(categories)));
   ```

4. If you want to use something other than TextView's, such as an ImageView or a LinearLayout that includes an ImageView and a TextView, to display the items of the list, what must you do?

5. Suppose I want to provide both image and text together with a single button widget. Can this be accomplished? Explain how an attribute, such as: `android:drawableLeft` can be used with a Button. What other approaches can be taken?

6. Explain what the following methods from a `BaseExpandableListAdapter` class are used for.

   ```java
   public View getGroupView ( int groupPosition, boolean isExpanded, View convertView, boolean isLastChild, View convertView, ViewGroup parent);
   public View getChildView ( int groupPosition, final int childPosition, View convertView, ViewGroup parent);
   public int getGroupCount();
   public Object getChild(int groupPosition, int childPosition);
   ```

   Explain the `convertView` parameter to both of the above calls. Why can it be null?

   ```java
   public int getGroupCount();
   public Object getChild(int groupPosition, int childPosition);
   ```