

Android Data Binding: ***This is the DSL you're looking for***

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The plan

- ★ Why Data Binding ?
- ★ Brief intro to Data Binding Library
- ★ Adding Data Binding to an existing app
- ★ Two-way Data Binding
- ★ Using less common widgets with DBL
- ★ Using 3rd Party Libraries with DBL
- ★ Summary

UI's

Ye Olde Days



Application UI's: Ye Olde Days

```
forward 100  
back 50  
to square  
repeat 4 [forward 50 right 90]  
end  
to flower  
repeat 36 [right 10 square]  
end
```

Application UI's: Ye Olde Days

```
$> co -l services
```

```
$> ci -u inetd.conf
```

```
$> rlog hello.c
```

```
$> rcsdiff -r2.1 -r2.2 hello.c
```

App UI's: 2017

```
2 L 85/99/99 22:24 Pieter de Sive (0.76)
1 F 82/99/99 17:32 To git@pogoprogren (1.56) [PATCH] UserNavui: Add disclaimer as to what Git is
2 L 85/99/99 18:03 Pieter de Sive (0.76)
2 F 85/99/99 15:02 To git@pogoprogren (1.46) [PATCH v2] UserNavui: Add disclaimer as to what Git is
4 L 85/99/99 16:05 Pieter de Sive (0.56)
1 F 85/99/99 20:00 To git (0.56) PEGRepositoryWatcher as good as done
1 F 85/99/99 17:36 To git@pogoprogren (1.22) [PATCH] About-Panel: Show git-describe using Info.plist
2 F 85/99/99 14:02 To git@pogoprogren (1.22) [PATCH v2] About-Panel: Show git-describe using Info.plist
1 F 82/99/99 07:22 Gerrit Knapp (1.76) [PATCH 1/2] Fix build with external build products directory
2 F 28/99/99 11:52 To git@pogoprogren (1.35)
2 L 28/99/99 09:26 Stenwell Bellare (0.6)
4 L 28/99/99 08:30 Pieter de Sive (0.6)
5 F 28/99/99 18:50 To git@pogoprogren (1.46)
6 L 28/99/99 02:20 Gerrit Knapp (1.96)
7 L 28/99/99 12:05 Pieter de Sive (0.86)
8 F 12/99/99 07:22 Gerrit Knapp (1.76) [PATCH 2/2] Add short ID to history view
9 F 85/99/99 18:00 To git@pogoprogren (0.56)
1 F 28/99/99 22:00 Stenwell Bellare (1.96) [PATCH] Add preferences for opening things at launch
2 F 28/99/99 17:20 Stenwell Bellare (1.46)
3 L 28/99/99 17:20 Stenwell Bellare (2.46)
4 F 28/99/99 13:40 To git@pogoprogren (2.46)
5 L 28/99/99 22:20 Pieter de Sive (1.96)
6 F 28/99/99 22:00 Stenwell Bellare (1.96)
7 F 82/99/99 14:01 To git@pogoprogren (1.56)
8 F 82/99/99 17:04 Benjamin Krumer (0.46)
9 F 82/99/99 17:32 To git@pogoprogren (0.46)
10 L 82/99/99 17:49 Benjamin Krumer (2.86)
11 L 82/99/99 21:05 Pieter de Sive (2.86)
12 F 84/99/99 22:11 To git@pogoprogren (1.26) [PATCH] Preferences: Add "Development"
13 L 84/99/99 22:27 Pieter de Sive (1.26)
14 F 85/99/99 06:00 To git@pogoprogren (0.76)
15 F 85/99/99 18:00 To git@pogoprogren (0.56) [PATCH] Sites: Get rid of auto-refresh description
1 F 85/99/99 14:22 To git@pogoprogren (1.26) What's cooking in my branches for v0.7
1 F 86/99/99 15:05 To git (1.26)
2 F 86/99/99 16:02 Pieter de Sive (2.26)
3 F 86/99/99 17:20 To git@pogoprogren (2.26)
4 L 85/99/99 12:55 Pieter de Sive (2.46)
5 F 85/99/99 14:12 To git@pogoprogren (0.76)
6 L 85/99/99 14:10 Pieter de Sive (0.76)
7 L 85/99/99 13:20 Pieter de Sive (0.26)
8 F 85/99/99 14:11 Pieter de Sive (0.46)
9 F 85/99/99 14:10 To git@pogoprogren (0.46)
10 L 85/99/99 14:22 Pieter de Sive (0.46)
11 L 85/99/99 15:10 Pieter de Sive (0.56)
12 L 85/99/99 15:22 Pieter de Sive (0.56)
13 L 85/99/99 22:04 Pieter de Sive (0.46)
14 L 85/99/99 23:10 Pieter de Sive (0.36)
15 L 85/99/99 20:00 John (0.56)
16 L 85/99/99 23:11 Pieter de Sive (1.16)
17 L 85/99/99 23:15 Pieter de Sive (1.36)
18 L 86/99/99 06:37 John (1.36) [PATCH] PEGRepository: Improve binary-file decision
1 F 86/99/99 15:11 To git@pogoprogren (1.46) [PATCH] PEGRepository: Improve binary-file decision
[PATCH] UserNavui: Add disclaimer as to what Git is
[PATCH v2] UserNavui: Add disclaimer as to what Git is
PEGRepositoryWatcher as good as done
[PATCH] About-Panel: Show git-describe using Info.plist
[PATCH v2] About-Panel: Show git-describe using Info.plist
Fix build with external build products directory
- Re: Fix build with external build products directory
- Re: Fix build with external build products directory
[PATCH 2/2] Add short ID to history view
[PATCH] Add preferences for opening things at launch
- Re: Add preferences for opening things at launch
[PATCH] Preferences: Add "Development"
What's cooking in my branches for v0.7
[PATCH v4] PEGRepository: Don't duplicate binary-file content
- Re: What's cooking in my branches for v0.7
Why "gitx README.txt" doesn't work
Open in Terminal Toolbar Item
- Re: Gitx toggle diff patch
Open in Terminal Toolbar Item
[PATCH] PEGRepository: Improve binary-file decision
[PATCH] PEGRepository: Improve binary-file decision
```

MacBook

App UI's: 2017

The screenshot displays the Android Studio IDE interface. The main editor shows the `SKNotesActivity.java` file, which implements the `onOptionsItemSelected()` method. The method handles various menu items: `R.id.menu_draw` (sets eraser mode to false), `R.id.menu_eraser` (sets eraser mode to true), `R.id.menu_new_page` (saves the current sketch and starts a new page), `R.id.menu_settings` (starts the settings activity), and `R.id.menu_share` (shares the current sketch). A `shareSketch()` method is also defined, which saves the current sketch and starts the sharing intent.

The right sidebar shows the `Sketch-Notes` project structure, including `android`, `build`, `build setup`, `help`, `install`, `other`, and `verification` tasks.

The bottom panel shows the `Gradle Console` output, which includes the following log entries:

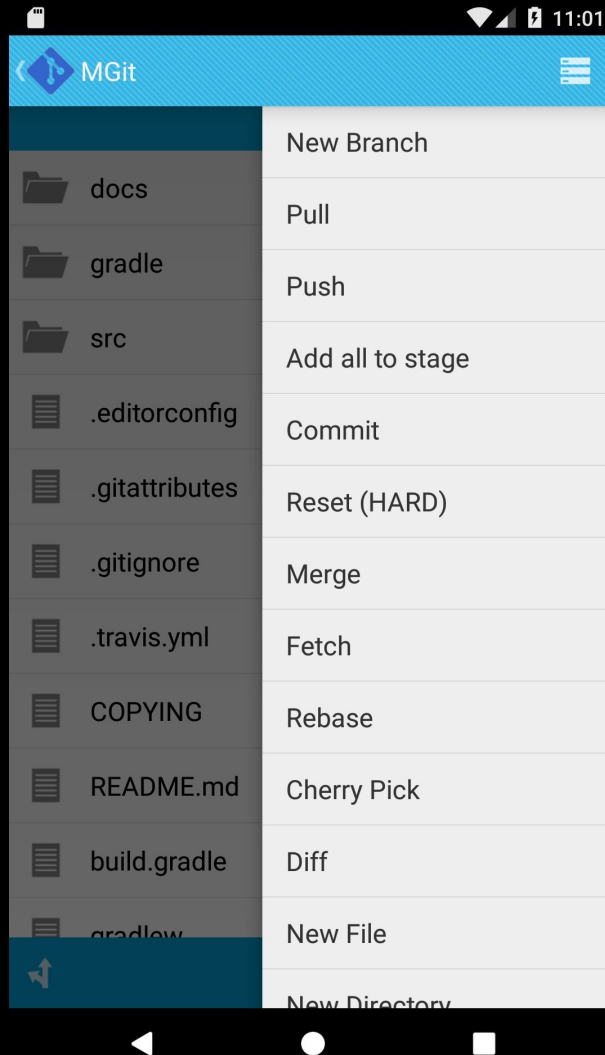
```
app:compileDebugJdk UP-TO-DATE
app:compileDebugSources
app:mergeDebugShaders
app:compileDebugShaders
app:generateDebugAssets
app:mergeDebugAssets
app:transformClassesWithDexForDebug
app:mergeDebugJniLibFolders
app:transformNativeLibsWithMergeJniLibsForDebug
app:transformNativeLibsWithStripDebugSymbolForDebug
app:processDebugJavaRes UP-TO-DATE
app:transformResourcesWithMergeJavaResForDebug
app:validateSigningDebug
app:packageDebug
app:assembleDebug

BUILD SUCCESSFUL

Total time: 4.029 secs
```

The bottom status bar shows the app is running on a virtual device (API 25) and the build is successful.

App UI's: 2017



Build Android UI's



Build Android UI's

```
<?xml version="1.0" encoding="utf-8"?>
```

```
...
```

```
<TextView
```

```
    android:id="@+id/statusLabel"
```

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

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

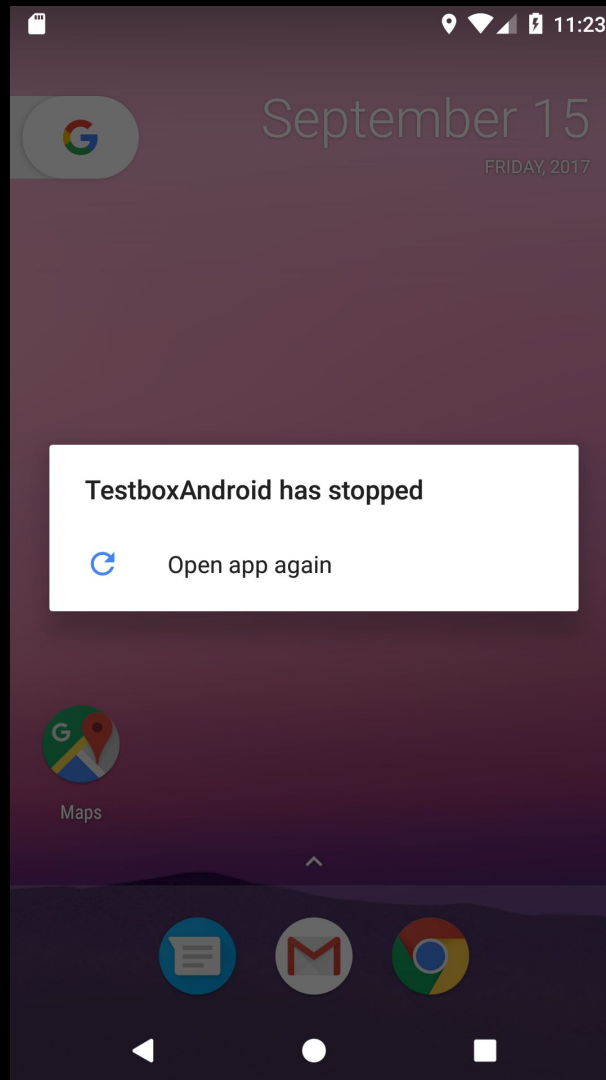
```
...
```

```
/>
```

Build Android UI's

- ★ `public void onCreate()`
- ★ `statusLabel = findViewById(R.id.statusLabel)`
- ★ `@BindView(R.id.title) TextView statusLabel`
- ★ `public void onResume()`
- ★ `statusLabel.setText(model.getStatus())`

Build Android UI's



Build Android UI's

~~★ `statusLabel.setText(model.getStatus())`~~

★ `.setText(model.getStatus().toUpperCase())`

★ `(model.getStatus() == null) == true`

★ `String status = (model.getStatus() != null) ?
model.getStatus().toUpperCase() : "";`

Build Android UI's



Build Android UI's

```
<TextView
    android:id="@+id/statusLabel"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="@string/default_status"
    ...
/>
```

Adding DBL

```
android {
```

```
....
```

```
    dataBinding {
```

```
        enabled = true
```

```
    }
```

```
}
```

DBL !

```
<layout>
  <data>
    <variable name="model" type="foo.Tests" />
  ...
  <TextView
    android:id="@+id/statusLabel"
    android:text="@{model.status}"
    ...
  />
```

Adding Data Binding to an existing app

Example Apps



git

MGit



Sketch Notes

Two-Way



Two-way Binding

```
~ $ curl -s  
https://developer.android.com/topic/libraries/data-binding/index.html | grep -i "two-way"  
~ $
```



But:



<https://medium.com/@georgemount007>

Using One-way Binding

@{ }

Using Two-way Binding

@={}

Magic!



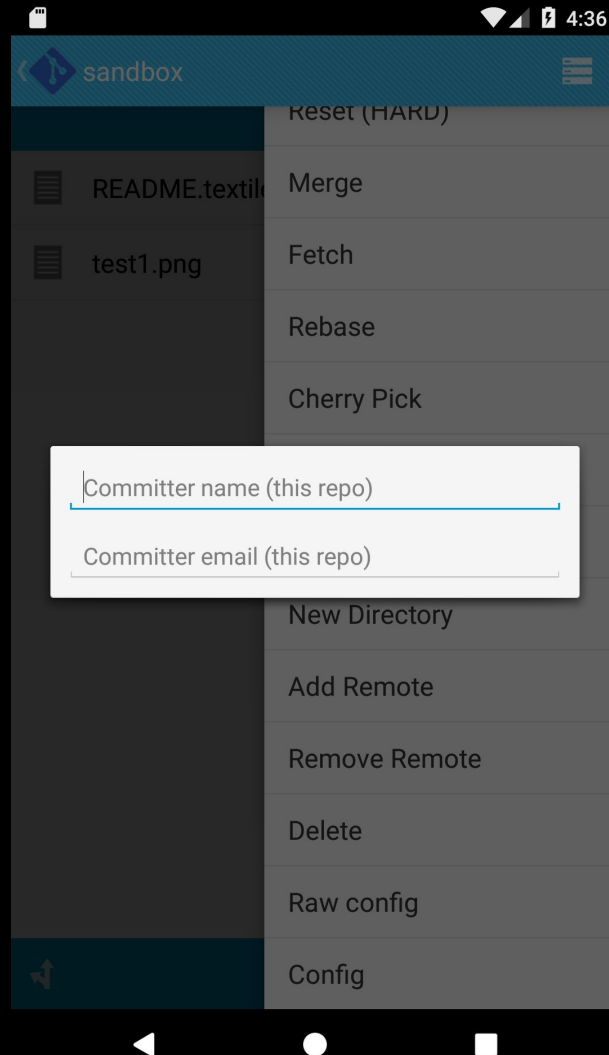
Magic ?

*“Any sufficiently
advanced
technology is
indistinguishable
from magic.”*



Two-Way Binding Example

Add Simple Dialog...



Simple ?!?!?

Before DBL...

--- /src/.../...
+++ /src/.../...

```
<?xml version="1.0" encoding="utf-8"?>
```

```
...
```

```
<EditText  
    android:id="@+id/gitName"  
    android:layout_width="match_parent"  
    android:layout_height="wrap_content"
```

```
...
```

```
/>
```

```
<EditText  
    android:id="@+id/gitEmail"  
    android:layout_width="match_parent"  
    android:layout_height="wrap_content"
```

```
...
```

```
/>
```

--- /src/.../...
+++ /dev/null

```
import org.eclipse.jgit.lib.StoredConfig;
```

```
...
```

```
public class ConfigRepoDialog extends SheimiDialogFragment implements  
    DialogInterface.OnClickListener
```

```
@Override
```

```
public Dialog onCreateDialog(Bundle savedInstanceState) {  
    super.onCreateDialog(savedInstanceState);  
    mActivity = getActivity();  
    AlertDialog.Builder builder = new AlertDialog.Builder(mActivity);  
    LayoutInflater inflater = mActivity.getLayoutInflater();  
    View layout = inflater.inflate(R.layout.dialog_repo_config, null);  
    builder.setView(layout);  
    mGitName = (EditText) layout.findViewById(R.id.gitName);  
    mGitEmail = (EditText) layout.findViewById(R.id.gitEmail);
```

```
    StoredConfig config;  
    String stored_name = "";  
    String stored_email = "";
```

contd...

--- /src/.../...
+++ /dev/null

```
try {  
    config =  
    ((Repo)getArguments().getSerializable(REPO_ARG_KEY)).getGit().getRepository().getConfig();  
    stored_name = config.getString("user", null, "name");  
    stored_email = config.getString("user", null, "email");  
} catch (StopTaskException e) {  
}  
if (stored_name == null)  
    stored_name = "";  
if (stored_email == null)  
    stored_email = "";  
mGitName.setText(stored_name);  
mGitEmail.setText(stored_email);  
// set button listener  
builder.setTitle(R.string.title_config_repo);  
builder.setNegativeButton(R.string.label_cancel,  
    new DummyDialogListener());  
builder.setPositiveButton(R.string.label_save, this);  
return builder.create();  
}
```

contd...

--- /src/.../...
+++ /dev/null

```
@Override
public void onClick(DialogInterface dialogInterface, int i) {
    try {
        StoredConfig config =
((Repo)getArguments().getSerializable(REPO_ARG_KEY)).getGit().getRepository().getConfig();
        String email = mGitEmail.getText().toString();
        String name = mGitName.getText().toString();

        if (email == null || email.equals("")) {
            config.unset("user", null, "email");
        } else {
            config.setString("user", null, "email", email);
        }
        if (name == null || name.equals("")) {
            config.unset("user", null, "name");
        } else {
            config.setString("user", null, "name", name);
        }
        config.save();
    } catch (StopTaskException e) {
        ...
    }
}
```

After DBL...

--- /src/.../...

+++ /src/.../...

```
public class ConfigAction extends RepoAction {
    @Override
    public void execute() {

+       try {
+           DialogRepoConfigBinding binding =
+           DataBindingUtil.inflate(LayoutInflater.from(mActivity), R.layout.dialog_repo_config, null,
+           false);
+           GitConfig gitConfig = new GitConfig(mRepo);
+           binding.setViewModel(gitConfig);
+
+           AlertDialog.Builder builder = new AlertDialog.Builder(mActivity);
+           builder.setView(binding.getRoot())
+           .setNeutralButton(R.string.label_done, null)
+           .create().show();
+
+       } catch (StopTaskException e) {
+           Timber.e(e);
+       }
    }
```

--- /src/.../...

+++ /src/.../...

```
+ public class GitConfig {
+   private final StoredConfig mConfig;
+
+   private final String USER_SECTION = "name";
+   private final String NAME_SUBSECTION = "name";
+   private final String EMAIL_SUBSECTION = "email";
+
+   /**
+    * Create a Git Config for a specific repo
+    *
+    * @param repo
+    */
+   public GitConfig(Repo repo) throws StopTaskException {
+       mConfig = repo.getStoredConfig();
+   }
+
+   public String getUserName() {
+       return getSubsection(NAME_SUBSECTION);
+   }
+
+   public void setUserName(String name) {
+       setSubsection(NAME_SUBSECTION, name);
+   }
+   private void setSubsection(String subsection, String value) {
```

...

--- /src/.../...

+++ /src/.../...

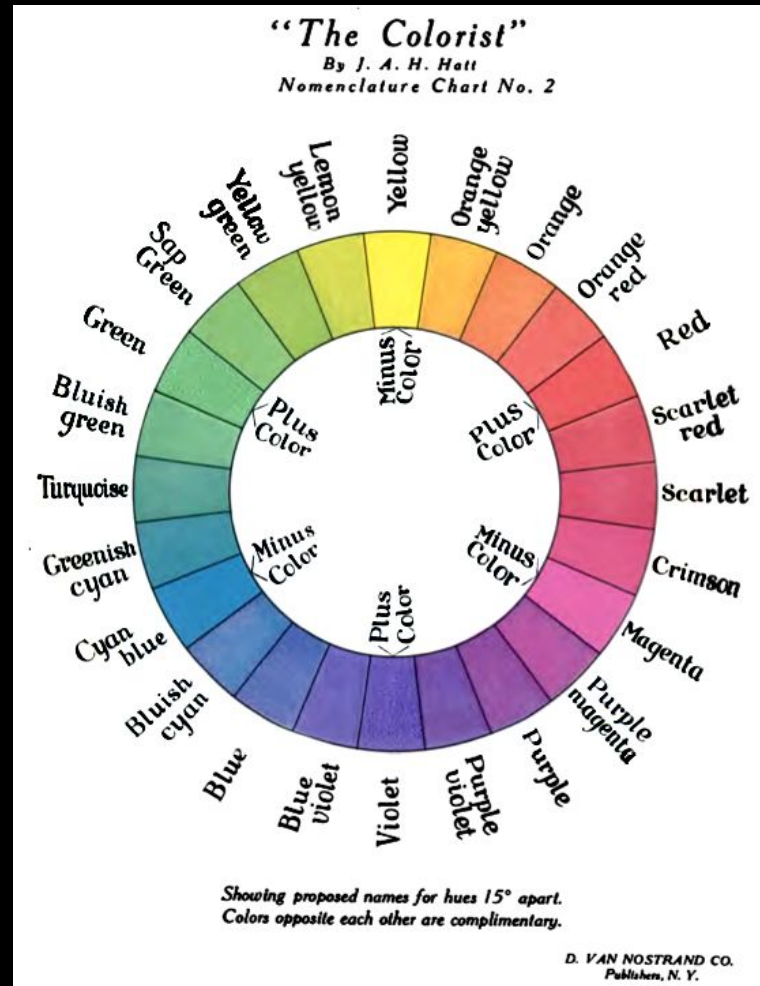
```
<?xml version="1.0" encoding="utf-8"?>
+<layout>
+  <data>
+    <variable
+      name="viewModel"
+      type="me.sheimi.sgit.database.models.GitConfig" />
+  </data>

-  <EditText
-    android:id="@+id/gitName"
+
+    <EditText
+      android:text="@={viewModel.userName}"

-  <EditText
-    android:id="@+id/gitEmail"
-
+    <EditText
+      android:text="@={viewModel.userEmail}"
+
+ </layout>
```

Using less common widgets with DBL

Spinning the wheel



Google recommends...

```
public class SpinnerActivity extends Activity implements
    OnItemSelectedListener {
    ...

    public void onItemSelected(AdapterView<?> parent, View view,
        int pos, long id) {
        // An item was selected. You can retrieve the selected item using
        // parent.getItemAtPosition(pos)
    }

    public void onNothingSelected(AdapterView<?> parent) {
        // Another interface callback
    }
}
```

2-way attributes

*“Two-way binding doesn’t work for every attribute — only the **ones that have event notifications for changes**. Fortunately, this includes pretty much all the ones you really care about for user input.”*

- George Mount

Some attributes are more equal than others....

[https://developer.android.com/reference/android/widget/AdapterView.html#getSelectedItemPosition\(\)](https://developer.android.com/reference/android/widget/AdapterView.html#getSelectedItemPosition())

2-way Binding a Spinner Widget

```
<data>
  <variable
    name="spinModel"
    type="...sketchnotes.PenSelectionSpinnerModel"/>

<Spinner
  android:id="@+id/penColourSpinner"
  android:layout_width="wrap_content"
  ...
  android:entries="@array/penNameList"
  android:selectedItemPosition="@={spinModel.penPos}"
/>
```



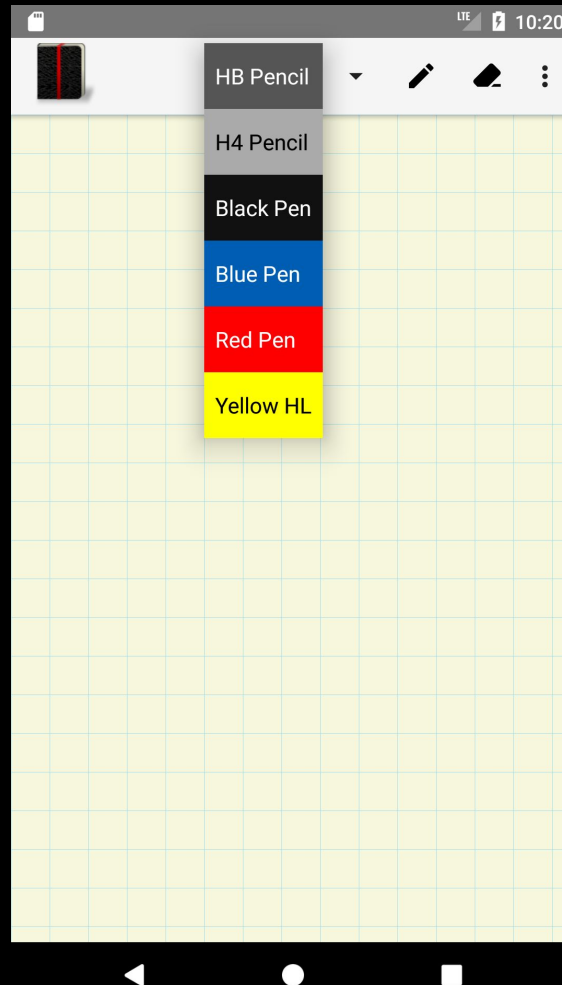
2-way Binding a Spinner Widget

```
public class PenSelectionSpinnerModel extends BaseObservable {  
    private final SketchView mView;  
  
    public PenSelectionSpinnerModel(SketchView view) {  
        mView = view;  
    }  
  
    public void setPenPos(int pos) {  
        mView.setCurrentPenIndex(pos);  
        notifyPropertyChanged(BR.spinModel);  
    }  
  
    @Bindable  
    public int getPenPos() {  
        return mView.getCurrentPenIndex();  
    }  
}
```

2-way Binding a Spinner Widget

```
/**
 * Set and persist the current pen used for drawing
 *
 * @param penIndex
 */
public void setCurrentPenIndex(int penIndex) {
    int penColour = getResources().getIntArray(
        R.array.penColourList)[penIndex];
    Timber.d("Set pen colour %d", penColour);
    mPrefHelper.setPenIndex(penIndex);
    mPenPainter.setColor(penColour);
}
```

2-way Binding a Spinner Widget



Using 3rd Party Libraries with DBL

On Final Glide



Using Glide library with DBL



“Glide is a fast and efficient image loading library for Android focused on smooth scrolling.”

Using Glide API

```
Glide.with(fragment)  
    .load(url)  
    .into(imageView);
```

Using Glide with DBL

★ Strategy: Use a **custom attribute & setter**

★ Means: implement **@BindingAdapter**

“...have to create a way to set the “app:imageUrl” attribute. Binding adapters are annotated methods in any class that are used to do just this. Typically, you’d organize your adapters into a classes based on the target View type.”

– George Mount

Using Glide with DBL



<ImageView

android:layout_width="48dp"

android:layout_height="48dp"



app:imageUrl="@{viewModel.LogoUrl}"

tools:src="@drawable/ic_placeholder" />



@BindingAdapter({"bind:imageUrl"})



public static void loadImage(ImageView view, String imageUrl) {

Context cxt = view.getContext();

Glide.with(cxt)



.load(imageUrl)

.diskCacheStrategy(DiskCacheStrategy.SOURCE)

.placeholder(ContextCompat.getDrawable(cxt,

R.drawable.ic_placeholder))



.into(view);

}

Summary

- ★ DBL is great for removing boilerplate
- ★ Two-way binding is even better
- ★ Documentation could be better
- ★ Less common widgets possible
- ★ Integration with other libraries is easy

Thank You!

Questions?

<http://www.manichord.com>

github.com/maks

@mklin

<https://plus.google.com/+MaksimLin>

Credits

"One way" by *kkusy* is licensed under CC BY-NC-SA 3.0

Colour wheel wikipedia entry: https://en.wikipedia.org/wiki/Color_wheel#/media/File:RGV_color_wheel_1908.png

"ABC Clarke predicts internet and PC": https://en.wikipedia.org/wiki/File:ABC_Clarke_predicts_internet_and_PC.ogv

"Paragliders at Flowerdale" by Illin Daniel

<https://stackoverflow.com/questions/4114095/how-to-revert-git-repository-to-a-previous-commit>

"Android Under construction gif" <http://abun880007.co.uk/homepage.html>

2-way data binding with a Spinner: <https://stackoverflow.com/a/41372953/85472>

"Macbook terminals" Jesus Vigo

"Ken Thompson (sitting) and Dennis Ritchie working together at a PDP-11" :

[https://en.wikipedia.org/wiki/Ken_Thompson#/media/File:Ken_Thompson_\(sitting\)_and_Dennis_Ritchie_at_PDP-11_\(2876612463\).jpg](https://en.wikipedia.org/wiki/Ken_Thompson#/media/File:Ken_Thompson_(sitting)_and_Dennis_Ritchie_at_PDP-11_(2876612463).jpg)