Assignment 02

COS30017 - Software Development for Mobile Devices

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1. Task 1

1.1. Three activities

Activities are connected using intents. Intents allow new activities to be launched on events that occur in the main activity. Furthermore, data can be passed between the activities if necessary to give the activity context. The main activity in this app, *MainActivity.java* uses intents to launch the other two activites, *HeightActivity.java* and *TempActivity.java*. If the user presses the back button in one of the second two activities they will return to the *MainActivity.java*

```
@Click(R.id.temp_convert_button)
void tempConvertButton(){
    Intent tempConvertIntent = new Intent(this, TempActivity_.class);
    startActivity(tempConvertIntent);
}

@Click(R.id.height_convert_button)
void heightConvertButton() {
    Intent heightConvertIntent = new Intent(this, HeightActivity_.class);
    startActivity(heightConvertIntent);
}
```

When one of the form-based activity's orientation changes, the *onSaveInstanceState* event is called. By overriding that method, the form data can be saved and then retrieved after the activity is recreated by overriding *onRestoreInstanceState* and restoring that data to the correct views in the activity.

```
/**
 * Save the instance data so that it can be retained
 * after the orientation has changed.
```

```
     * @param savedInstanceState
     */
    @Override
    public void onSaveInstanceState(Bundle savedInstanceState) {
        savedInstanceState.putString(STATE_RESULT, result.getText().toString());

        super.onSaveInstanceState(savedInstanceState);
    }

    /**
     * Restore the data from before orientation change
     * @param savedInstanceState
     */
    @Override
    public void onRestoreInstanceState(Bundle savedInstanceState) {
        super.onRestoreInstanceState(savedInstanceState);

        result.setText(savedInstanceState.getString(STATE_RESULT));
    }
```

1.2. Layouts

1.2.1. activity_main.xml

```
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:paddingLeft="@dimen/activity_horizontal_margin"
    android:paddingRight="@dimen/activity_horizontal_margin"
    android:paddingTop="@dimen/activity_vertical_margin"
    android:paddingBottom="@dimen/activity_vertical_margin"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/instruction_text"
        android:text="@string/main_instruction"
        android:textSize="@dimen/text_normal"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content" />

    <Button
        android:id="@+id/temp_convert_button"
        android:text="@string/convert_temp"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/instruction_text" />

    <Button
        android:id="@+id/height_convert_button"
        android:text="@string/convert_height"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/temp_convert_button" />

</RelativeLayout>
```

1.2.2. activity_height.xml

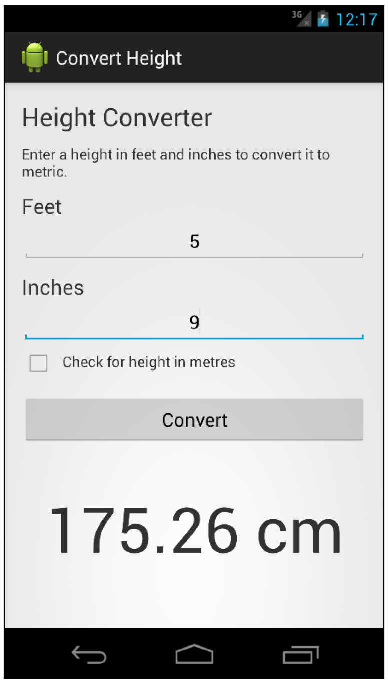
```
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:paddingLeft="@dimen/activity_horizontal_margin"
    android:paddingRight="@dimen/activity_horizontal_margin"
    android:paddingTop="@dimen/activity_vertical_margin"
    android:paddingBottom="@dimen/activity_vertical_margin"
    tools:context=".ConvertActivity">

    <TextView
        android:id="@+id/title"
        android:text="@string/title_height"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:textSize="@dimen/title_font_size"/>

    <TextView
        android:id="@+id/instructions"
        android:text="@string/instructions"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/title"
        android:layout_marginTop="@dimen/text_top_margin"/>

    <TextView
        android:id="@+id/feet_label"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:text="@string/feet"
        android:textSize="@dimen/label_size"
        android:layout_below="@id/instructions"
        android:layout_marginTop="@dimen/text_top_margin"/>
    <EditText
        android:inputType="number"
        android:id="@+id/feet"
        android:layout_below="@id/feet_label"
        android:layout_width="fill_parent"
        android:layout_height="@dimen/text_input_height"
        android:gravity="center"/>

    <TextView
        android:id="@+id/inches_label"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:text="@string/inches"
        android:textSize="@dimen/label_size"
        android:layout_below="@id/feet"
        android:layout_marginTop="@dimen/text_top_margin"/>

    <EditText
        android:id="@+id/inches"
        android:inputType="number"
        android:layout_below="@id/inches_label"
        android:layout_width="fill_parent"
        android:layout_height="@dimen/text_input_height"
        android:gravity="center"/>

    <CheckBox
        android:id="@+id/meters_checkbox"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@id/inches"/>

    <TextView
        android:id="@+id/checkbox_description"
        android:layout_width="fill_parent"
        android:layout_height="@dimen/text_height"
        android:text="@string/metres"
        android:layout_toRightOf="@id/meters_checkbox"
        android:layout_below="@id/inches"
        android:gravity="center_vertical"/>

    <Button
        android:id="@+id/convert_button"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/meters_checkbox"
        android:text="@string/convert"
        android:layout_marginTop="@dimen/text_top_margin"/>

    <TextView
        android:id="@+id/result"
        android:layout_width="fill_parent"
        android:layout_height="fill_parent"
        android:layout_below="@id/convert_button"
        android:textSize="@dimen/result_text_size"
        android:gravity="center"/>
</RelativeLayout>
```

1.2.3. activity_temp.xml

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

<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:paddingLeft="@dimen/activity_horizontal_margin"
    android:paddingRight="@dimen/activity_horizontal_margin"
    android:paddingTop="@dimen/activity_vertical_margin"
    android:paddingBottom="@dimen/activity_vertical_margin">

    <TextView
        android:id="@+id/title"
        android:text="@string/title_temp"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:textSize="@dimen/title_font_size"/>

    <TextView
        android:id="@+id/instructions"
        android:text="@string/instructions_temp"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/title"
        android:layout_marginTop="@dimen/text_top_margin"/>

    <TextView
        android:id="@+id/fahr_label"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:text="@string/fahrenheit"
        android:textSize="@dimen/label_size"
        android:layout_below="@id/instructions"
        android:layout_marginTop="@dimen/text_top_margin"/>

    <EditText
        android:inputType="number"
        android:id="@+id/fahr"
        android:layout_below="@id/fahr_label"
        android:layout_width="fill_parent"
        android:layout_height="@dimen/text_input_height"
        android:gravity="center"/>

    <Button
        android:id="@+id/convert_button"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:layout_below="@id/fahr"
        android:text="@string/convert"
        android:layout_marginTop="@dimen/text_top_margin"/>

    <TextView
        android:id="@+id/result_temp"
        android:layout_width="fill_parent"
        android:layout_height="fill_parent"
        android:layout_below="@id/convert_button"
        android:textSize="@dimen/result_text_size"
        android:gravity="center"/>
</RelativeLayout>
```

1.3. Screenshots

The following two screenshots show how the orientation change doesn't cause the data in the activity to disappear, due to it being passed in the state change bundle and then restored to the activity when it is recreated.



Height Converter

Enter a height in feet and inches to convert it to metric.

Feet

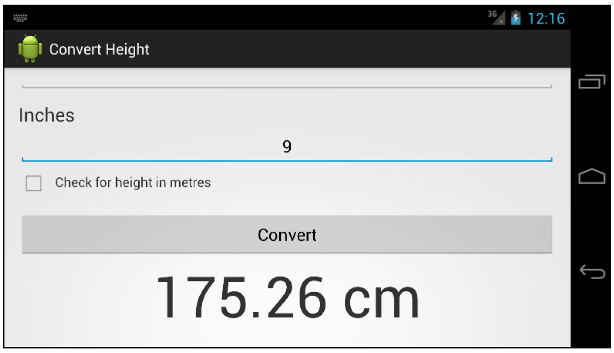
5

Inches

9

□ Check for height in metres

175.26 cm



Inches

9

□ Check for height in metres

175.26 cm

1.4. Task 2

In this app, the image and description resource IDs are passed through the intent to the recieving Activity which then sets the resource using those IDs.

1.5. ImageGallery.java

```java
/**
 * Create intent for lasagna press.
 */
@Click(R.id.lasagna_image)
void lasangaImage() {
    Intent imageIntent = new Intent(this, ImageActivity_.class);
    imageIntent.putExtra("image_name", R.drawable.lasagna);
    imageIntent.putExtra("desc", R.string.lasagna);
    startActivity(imageIntent);
}

/**
 * Create intent for pasta press.
 */
@Click(R.id.pasta_image)
void pastaImage() {
    Intent imageIntent = new Intent(this, ImageActivity_.class);
    imageIntent.putExtra("image_name", R.drawable.pasta);
    imageIntent.putExtra("desc", R.string.pasta);
    startActivity(imageIntent);
}

/**
 * Create intent for porridge press.
 */
@Click(R.id.porridge_image)
void porridgeImage() {
    Intent imageIntent = new Intent(this, ImageActivity_.class);
    imageIntent.putExtra("image_name", R.drawable.porridge);
    imageIntent.putExtra("desc", R.string.porridge);
    startActivity(imageIntent);
}

/**
 * Create intent for sardines press.
 */
@Click(R.id.sardines_image)
void sardinesImage() {
    Intent imageIntent = new Intent(this, ImageActivity_.class);
    imageIntent.putExtra("image_name", R.drawable.sardines);
    imageIntent.putExtra("desc", R.string.sardines);
    startActivity(imageIntent);
}
```

1.6. ImageActivity.java

```
    /**
     *  Set the image and description passed in the intent to show on the screen.
     */
    @AfterViews
    public void showImage() {
        Intent intent = getIntent();
        imageContainer.setImageResource(intent.getIntExtra("image_name", 0));
        description.setText(intent.getIntExtra("desc", 0));
    }
```

1.7. Layouts

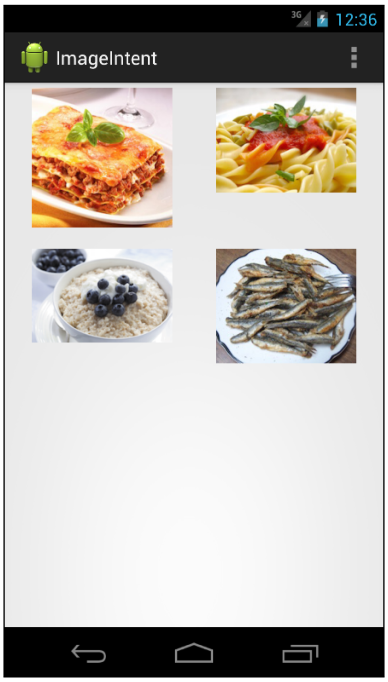
1.7.1. activity_image_gallery.xml

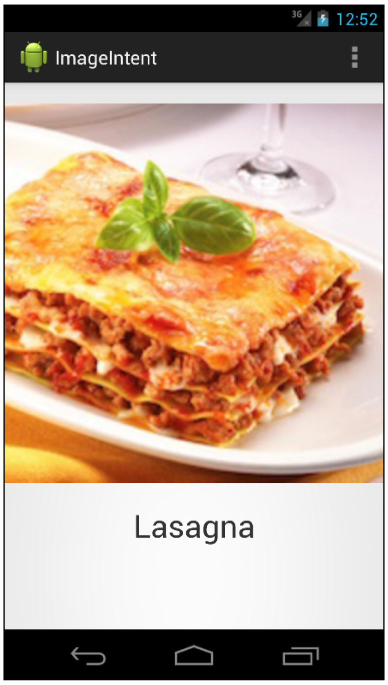
```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    android:padding="5dp"
    tools:context=".ImageGallery">

    <TableLayout
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:stretchColumns="*">
        <TableRow
            android:paddingBottom="20dp">
            <ImageView
                android:id="@+id/lasagna_image"
                android:src="@drawable/lasagna"
                android:scaleType="center"
                android:layout_weight="1"/>
            <ImageView
                android:id="@+id/pasta_image"
                android:src="@drawable/pasta"
                android:scaleType="center"
                android:layout_weight="1"/>
        </TableRow>

        <TableRow>
            <ImageView
                android:id="@+id/porridge_image"
                android:src="@drawable/porridge"
                android:scaleType="center"
                android:layout_weight="1"/>
            <ImageView
                android:id="@+id/sardines_image"
                android:src="@drawable/sardines"
                android:scaleType="center"
                android:layout_weight="1"/>
        </TableRow>
    </TableLayout>
</LinearLayout>
```

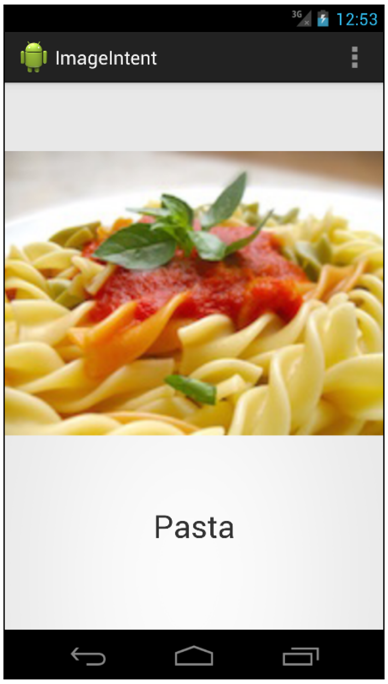
1.7.2. activity_image.xml

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

<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="vertical" android:layout_width="match_parent"
    android:layout_height="match_parent">
    <ImageView
        android:id="@+id/image_container"
        android:layout_width="fill_parent"
        android:layout_height="400dp"/>

    <TextView
        android:id="@+id/description"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:gravity="center"
        android:textSize="30sp"/>
</LinearLayout>
```

1.8. Screenshots







2. Task 3

2.1. Why is the intent messaging facility considered as a late run-time binding be- tween components?

It is considered a late run-time binding because it's not something that gets evaluated when the main app is compiled, but rather something that happens at run-time.

2.2. What are the contents of the passive data structure (of an intent)?

The contents of the passive intent are actions and data. Actions are to be performed and the data is the what the action will be performed on / with.

2.3. Why is the word passive used for the intent data structure?

It means that the data structure doesn't do anything, in the case of intents there is just messages telling some other activity what to do and it's not the Intent's responsibility to do it. It is essentially just a means of messaging other activities.

2.4. Phone Example

The intent is constructed with the action to call and the phone number. The intent is then passed into the *startActivity* method as a parameter. The intent is just an abstract representation of the action to call the number.

```
String number = "5555555555";
Intent intent = new Intent(Intent.ACTION_CALL);
intent.setData(Uri.parse(number));
startActivity(intent);
```