Android App Development

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Relevance of Android App to LFEV

- Would be useful for technician at Formula EV race course to monitor vehicle conditions on cellphone
- Can serve as useful demo of LFEV software for prospective students/parents in ECE open houses
- Not part of VSCADA deliverables for 2015 due to time constraints

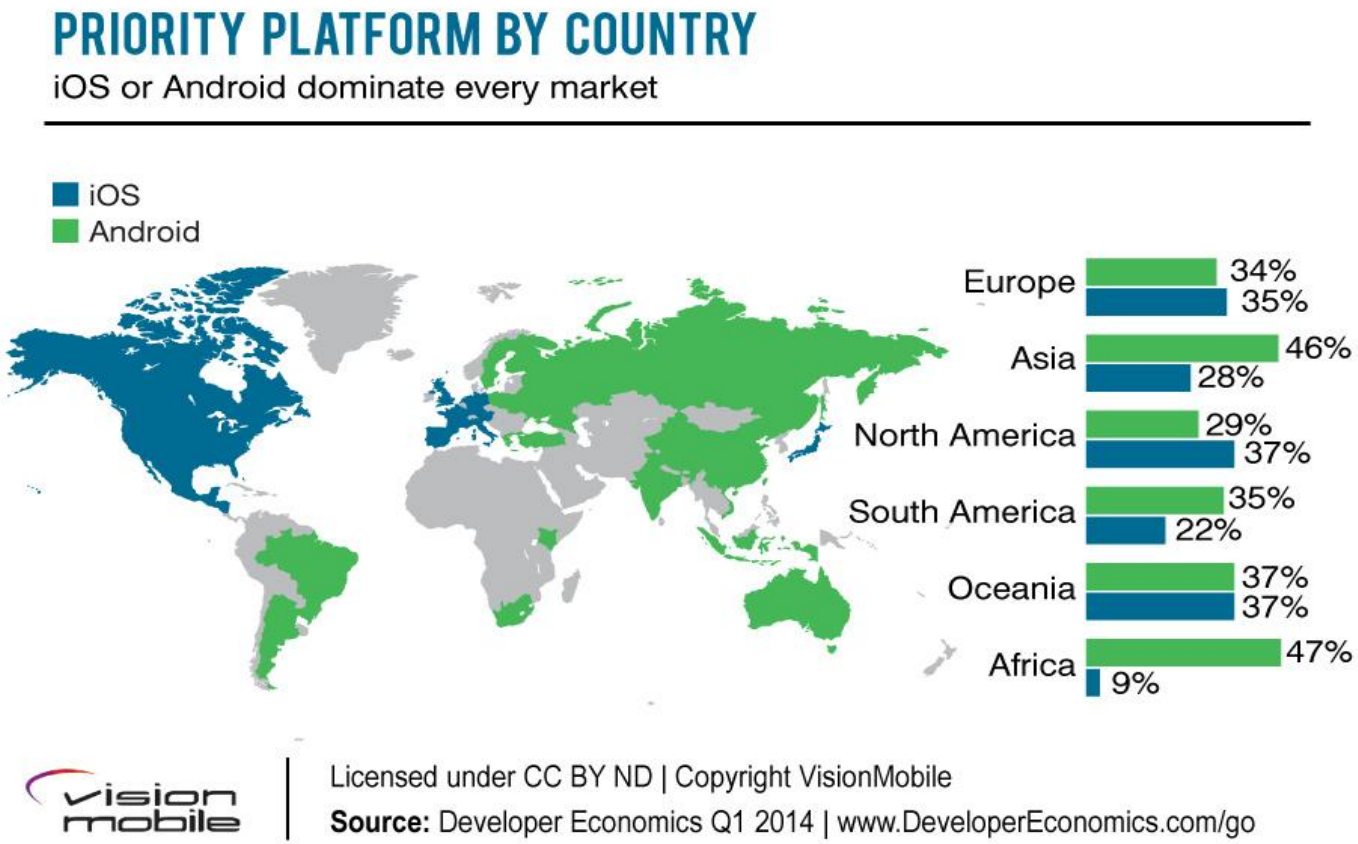
Sample Android SCADA app

Source: play.google.com/store/apps/details?id=org.prowl.torque

Android vs iOS (development-wise)

Android	iOS
Java; less verbose (compared to Objective-C)	Objective-C; extremely verbose
Any dev OS fine	Need Mac OS X to dev
Publishing to Play Store easy	Difficult process of publishing to App Store
Free to develop	$99/yr to join iOS Developer Program
Many different devices and screen sizes need to be catered to	Max of 3 devices (iPod, iPhone, iPad) with known screen sizes
Eclipse IDE hard-to-use (Android Studio now official IDE though buggy)	Xcode mature IDE
Clunky drag-and-drop UI editor; need to write tons of XML	Easy-to-use Interface Builder

Android vs iOS Market Share



Source: developereconomics.com/report/q1-2014-regional-outlook/

Android OS

- First released in 2007; current version 5.1 ‘Lollipop’
- Based on Linux kernel
- Build system previously ANT; switched to Gradle
- Apps primarily written in Java; UI layout in XML
- Android Studio IDE and SDK Tools available at developer.android.com/sdk/index.html

Android - Activity

- Instance of Activity class in Android SDK
- Manages user interaction with screen of information
- Provide app functionality by extending Activity class
- Complex apps may have several activities

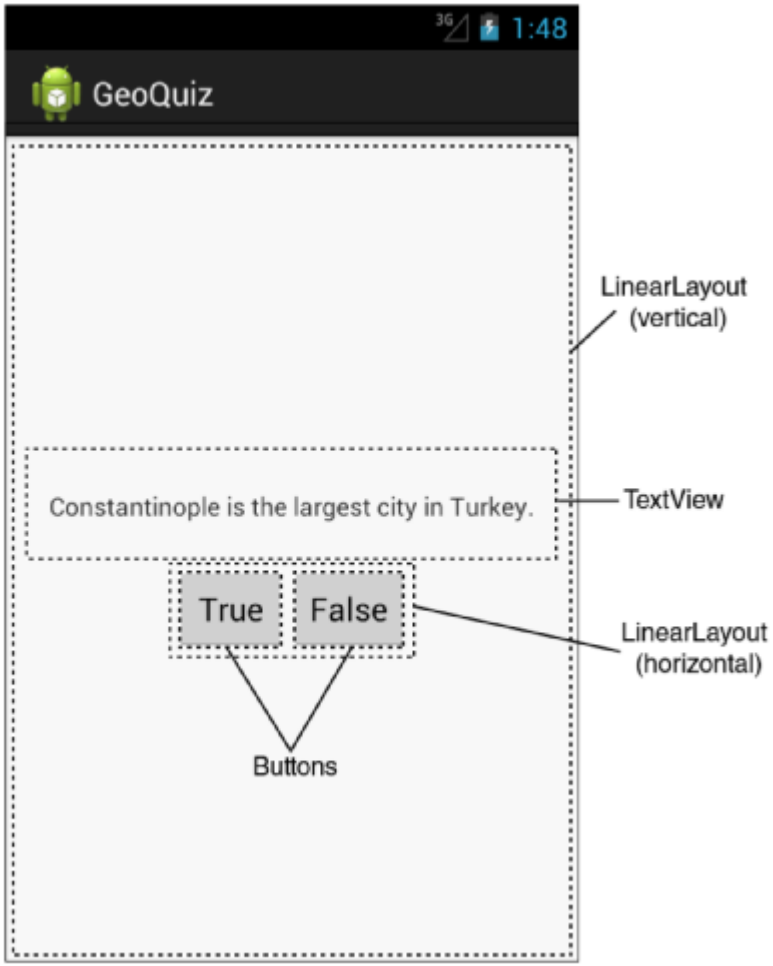
Android - Layout

- Defines set of user interface objects and position on screen
- Composed of XML definitions which create widgets on screen (e.g. text fields, buttons, sliders)
- Resulting widgets exist in hierarchy of View objects called view hierarchy

A simple Android app - GeoQuiz

Source: Android Programming: The Big Nerd Ranch Guide (2013)

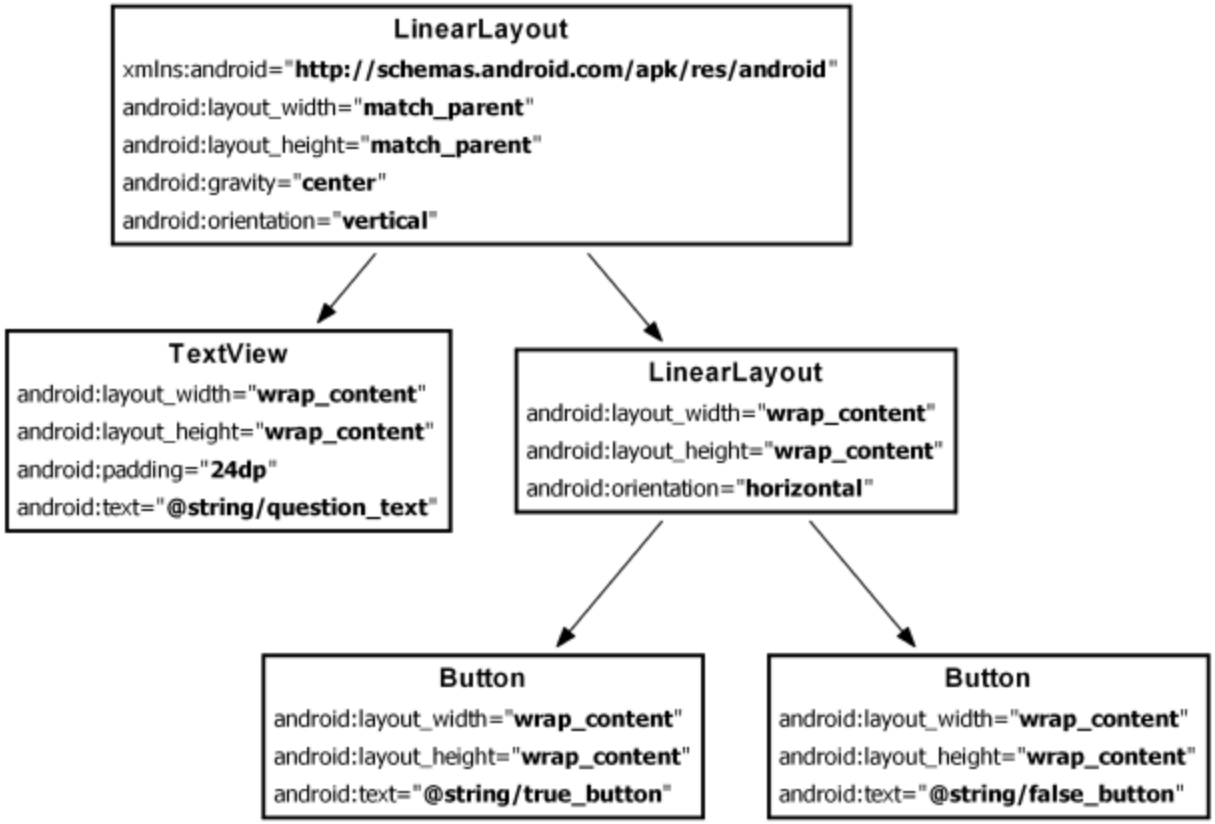
GeoQuiz - Layout (layout/activity_quiz.xml)




```
<LinearLayout xmlns:android="http://schemas.android.
com/apk/res/android"
android:layout_width="match_parent"
android:layout_height="match_parent"
android:gravity="center"
android:orientation="vertical" >
        <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:padding="24dp"
        android:text="@string/question_text" />
        <LinearLayout
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:orientation="horizontal" >
                <Button
                android:id="@+id/true_button"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:text="@string/true_button" />
                <Button
                android:id="@+id/false_button"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:text="@string/false_button" />
        </LinearLayout>
</LinearLayout>
```

Source: Android Programming: The Big Nerd Ranch Guide (2013)

GeoQuiz - View Hierarchy



Source: Android Programming: The Big Nerd Ranch Guide (2013)

GeoQuiz - String Resources (res/strings.xml)

```
<?xml version="1.0" encoding="utf-8"?>
<resources>
    <string name="app_name">GeoQuiz</string>
    <string name="question_text">Constantinople is the largest city in Turkey.</string>
    <string name="true_button">True</string>
    <string name="false_button">False</string>
    <string name="correct_toast">Correct!</string>
    <string name="incorrect_toast">Incorrect!</string>
    <string name="menu_settings">Settings</string>
</resources>
```

Source: Android Programming: The Big Nerd Ranch Guide (2013)

GeoQuiz - Activity (QuizActivity.java)

```
public class QuizActivity extends Activity {
    private Button mTrueButton;
    private Button mFalseButton;

    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_quiz);
    }

    mTrueButton = (Button)findViewById(R.id.true_button);
    mTrueButton.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            Toast.makeText(QuizActivity.this,
                    R.string.incorrect_toast,
                    Toast.LENGTH_SHORT).show();
        }
    });

    mFalseButton = (Button)findViewById(R.id.false_button);
    mFalseButton.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View v) {
            Toast.makeText(QuizActivity.this,
                    R.string.correct_toast,
                    Toast.LENGTH_SHORT).show();
        }
    });
}
```

Source: Android Programming: The Big Nerd Ranch Guide (2013)