



Unit Awareness of Responsive Design in Android

KEYWORDS

Responsive Design, Android, Unit Measurement

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ABSTRACT

The era of information and communication technology, we are wanting all information fast, easily, any where, any time and any device. So today we all are used mobile device with android operating system. So I focused on mobile device with different device equipment so that in this research paper I want few to aware about responsive design in android based device and web based browser. In responsive design we concern different Measurement unit which are very useful when we developed responsive design web site. How do Android developers optimize for minor variations in screen sizes? How do Android developers account for screen density variations? Designing for multiple different screen sizes is not a new problem. Similarities between web and Android do not end with screen sizes. In web design a rising trend is to use responsive design. Simply put responsive design means that the website rearranges its components (like image, text size, audio and video) when size of the browser window changes therefore providing users the best possible user experience on different size browser windows on desktop, tablets and phones.



"Android" is a mobile operating system (OS) based on the Linux kernel which is developed by Google. Android is designed primarily for touchscreen mobile devices such as smartphones and tablet computers, with specialized user interfaces for televisions (Android TV), cars (Android Auto), and wrists (Android Wear). The OS uses touch inputs that loosely correspond to real-world actions, like swiping, tapping, pinching, and reverse pinching to manipulate on-screen objects, and a virtual keyboard.

History of Android



Andy Rubin

Chris White

Nick Sears

Rich Miner

Android, Inc. was founded in Palo Alto, California in October 2003 by Andy Rubin (co-founder of Danger), Rich Miner (co-founder of Wildfire Communications, Inc.), Nick Sears (once VP at T-Mobile), and Chris White (headed design and interface development at WebTV) to develop, in Rubin's words "smarter mobile devices that are more aware of its owner's location and preferences".

The early intentions of the company were to develop an advanced operating system for digital cameras, when it was realised that the market for the devices was not large enough, and diverted their efforts to producing a smartphone operating system to rival those of Symbian and Windows Mobile.

Google acquired Android Inc. on August 17, 2005; key

employees of Android Inc., including Rubin, Miner, and White, stayed at the company after the acquisition. Google was planning to enter the mobile phone market with this move.

As of 2011, Android has the largest installed base of any mobile OS and as of 2013, its devices also sell more than Windows, iOS, and Mac OS devices combined. Android is popular with technology companies which require a ready-made, low-cost and customizable operating system for high-tech devices.

Latest Stack of Android

Version	Code name	Release date
4.4	KitKat	October 31, 2013
4.3	Jelly Bean	July 24, 2013
4.2.x		November 13, 2012
4.1.x		July 9, 2012
4.0.3–4.0.4	Ice Cream Sandwich	December 16, 2011
2.3.3–2.3.7	Gingerbread	February 9, 2011
2.2	Froyo	May 20, 2010

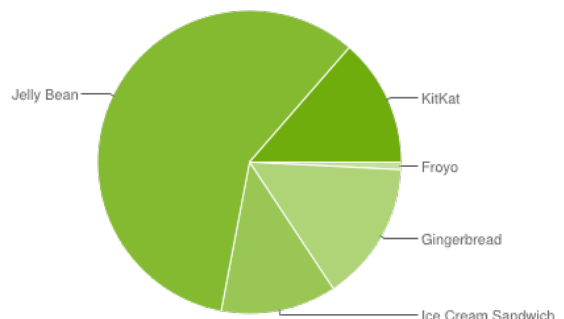


Figure 1: Android Version Usage

What is Responsive Design?

Responsive design is a general mindset where you are designing a website, but you are not assuming any details in terms of screen size or device size or interface options. Instead, you're just going to assume that anything's possible and implement rules and make choices.

The aim of responsive design is to present the best user experience possible in any context. Responsive design is rapidly becoming the new standard in our industry, along with its evolving of best practices, platforms and tools.

From content structure to scalable, we'll cover seven techniques to consider in your next responsive design.

If you are a designer or developer, what are some of your strategies for responsive web design?

1. Mobile First:

Mobile first, approach is focus and prioritize the constraints of mobile design, while you build new innovative experiences and capabilities.

2. Content Strategy:

Content strategy is to rethink your content to make it more readable and accessible on any device.

3. Sketch and Prototype:

The various screen sizes, resolutions and device capabilities available today mean more layouts to plan for. By using sketching as a responsive tool, you can take your rough ideas.

4. Frameworks:

It can speed up the development process, normalize common cross-browser compatibility issues and offer a structured, grid-based approach, all of which are invaluable features when creating a responsive design.

5. Breakpoints:

A common idea is that breakpoints should be based on common screen sizes (mobile, tablet and desktop).

6. Scalable Images:

It can help intelligently crop your responsive images so the main point of your image isn't lost when viewed on smaller devices.

7. Minification:

Minification is the practice of removing unnecessary characters from your source code (without changing its functionality), to reduce its size and improve load times. These unnecessary characters take the form of white space characters (space, line breaks, and tab) and comments, which are removed when the code is minified, so the operational qualities of the code are left intact, while reducing the overall byte footprint.

Revolution of responsive design

Android was built from ground up to support any screen size or resolution. Building an UI for multitude of devices requires, of course, more work than building for just one but with the platform support it isn't impossible.

Almost a year ago Google released Android Honeycomb (3.0). At that point Android was forked into two separate branches, one for tablets and one for phones. At that time it looked like Android was going to follow the same way iOS did and every app would have two versions. One for

tablets and one for phones. But is that a good approach?

Just look at the following devices and their screen sizes:



2.6"	Sony Ericsson Xperia Mini
3.7"	Nexus One
4.0"	Galaxy S
4.6"	Galaxy Nexus
5.3"	Galaxy Note
7.0"	Toshiba Thrive
8.9"	Galaxy Tab 8.9
10.1"	Asus Transformer

Where does a tablet begin and phone end? Would one interface be good for 7" tablet and 10" tablet? Those type of question which is raised.

Responsive design show in Web based and Mobile based Apps

Developing a mobile application is a creative process. You want to build something beautiful and functional. Something that kind of works is well done on any device. Something that delights your users and something that you're proud of. I want to show you how I develop these kinds of applications on Android.



Measurement unit used in web

In responsive design we concern different unit which are very useful when we developed responsive design web site.

Font Unit:

- Set body font size to 100%, so later can use ems to

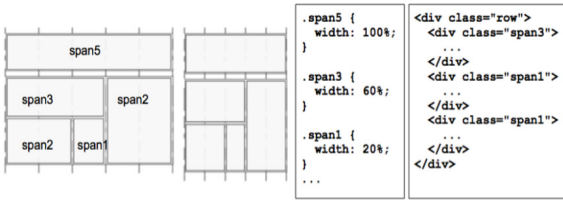
size the font.

- Use em for font-size
 - Most browser's default size is 16px, use that as base for em calculation. Browser converts em to pixel internally
 - Compounding effect: because it is relative to the font-size of the parent
- Use rem units
 - Introduced in CSS3
 - Root em – relative to the root "html" element


```
html { font-size: 100%; }
h1 { font-size: 1.4rem; }
```

Define a Fluid Grid System for layout:

- How to design a responsive layout
 - First float the content
 - Define content as elements
- each section uses percentage width (relative)



Use Flexible Margins and Padding

- It is important to understand the box model of CSS in order to get most of the box model size to relative dimensions(percentage) rather than absolute dimensions.
- When setting flexible margins on an element, your context is the width of the element's container.
- When setting flexible padding on an element, your context is the width of the element itself. This makes sense, if you think about the box model: we're describing the padding in relation to the width of the box itself.
- You can use negative margins to assist with the positioning

Make Images Responsive Where possible

- Why? It prevents images from exceeding the width of their container
- Max-width
 - Discovered by Richard Rutter
 - Use max-width : 100%
 - Can be applied to: img, embed, object, video
 - Alternative: overflow: hidden
- Make flexible background image
 - background-size
- Immature browser support
- For information/content rich images
- Multi-resolution images

Measurement unit used in android based device

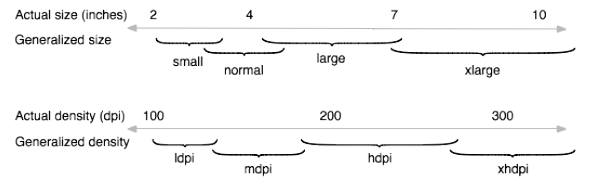
In this article, I will focus on three areas of variability in Android devices.

- How do Android developers optimize for minor variations in screen sizes? How are differences in width and height between devices managed?
- How do Android developers account for screen density variations?
- How are applications optimized to work well on different device categories? How can I make one app that works well on phone and tablet devices?

Type and full form of Android UI units

A dimension value defined in XML. A dimension is specified with a number followed by a unit of measure. For example: 10px, 2in, 5sp. The following units of measure are supported by Android:

Unit	Description
Dp / Dip	Density-independent Pixels - An abstract unit that is based on the physical density of the screen. These units are relative to a 160 dpi (dots per inch) screen, on which 1dp is roughly equal to 1px. When running on a higher density screen, the number of pixels used to draw 1dp is scaled up by a factor appropriate for the screen's dpi. Likewise, when on a lower density screen, the number of pixels used for 1dp is scaled down. The ratio of dp-to-pixel will change with the screen density, but not necessarily in direct proportion. Using dp units (instead of px units) is a simple solution to making the view dimensions in your layout resize properly for different screen densities. In other words, it provides consistency for the real-world sizes of your UI elements across different devices.
Sp	Scale-independent Pixels - This is like the dp unit, but it is also scaled by the user's font size preference. It is recommend you use this unit when specifying font sizes, so they will be adjusted for both the screen density and the user's preference.
Pt	Points - 1/72 of an inch based on the physical size of the screen.
Px	Pixels - Corresponds to actual pixels on the screen. This unit of measure is not recommended because the actual representation can vary across devices; each devices may have a different number of pixels per inch and may have more or fewer total pixels available on the screen.
Mm	Millimeters - Based on the physical size of the screen.
In	Inches - Based on the physical size of the screen.



How Android roughly maps sizes and densities (figures are not exact).

As you design your UI for different screen sizes, you will discover that each design requires a minimum amount of space. So, each generalized screen size above has an associated minimum resolution that's defined by the system. These minimum sizes are in "dp" units—the same units you should use when defining your layouts—which allows the system to avoid worrying about changes in screen density.

- xlarge screens are at least 960dp x 720dp
- large screens are at least 640dp x 480dp
- normal screens are at least 470dp x 320dp
- small screens are at least 426dp x 320dp



Conclusion and future

Designing for multiple different screen sizes is not a new problem. Web designers and developers have been wrestling with it for a long time. Similarities between web and Android do not end with screen sizes. When building for web we also have to take into account multiple browsers and multiple versions of each one of them. In web design a rising trend is to use *responsive design*. Simply put responsive design means that the website rearranges its components when size of the browser window changes therefore providing users the best possible user experience on different size browser windows on desktop, tablets and phones.

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