Android Application Development

Dimension Units

Fragmentation 101: The Screen Resolution

4.0” 4.7” 5” 6”

The Screen Resolution

What does it mean for 300px?

300px in action

Rule 8:

Don’t use px

NO MATTER WHAT

Dimension types and the rise of dp & sp

Digital Dimension

px

Pixel esponds tual pixels scree

Physical Dimension

mm

Milli - Based on physi of the s

in

Inches - Bas physical size of the

pt

Poin 2 of an in d on the al size of the

Density-independent Pixels

dp (a.k.a. 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

sp

Scale-independent Pixels - This is like the dp unit, but it is also scaled by the *user's font size preference*

What is dp?

480x800

720x1200

960x1600

What is dp?

More dpi means **more pixels**

What is dp?

Definition

The density-independent pixel is equivalent to one physical pixel on a 160 dpi screen, which is the baseline density assumed by the system for a "medium" density screen

Equation

```
px = dp * (dpi / 160)
```

The dpi

$$\text{dpi} = \text{Dot Per Inch}$$

$$= \underline{\text{Dot}} \quad / \quad \underline{\text{Inch}}$$

Screen Resolution

Screen Size

What is dp?

Galaxy Note 3

1080x1920

198px

256px

Galaxy Note 4

1440x2560

What is dp?

Something

1440x2560

256px

256px

Galaxy Note 4

1440x2560

What is dp?

Definition

The density-independent pixel is equivalent to one physical pixel on a 160 dpi screen, which is the baseline density assumed by the system for a "medium" density screen

Equation

```
px = dp * (dpi / 160)
```

The dpi & Screen Size

- dpi in Android is defined as a “Range” *(There is a reason, knows more in next chapter)*

- A set of six generalized **densities**:
  - *ldpi* (low) ~120dpi
  - *mdpi* (medium) ~160dpi
  - *hdpi* (high) ~240dpi
  - *xhdpi* (extra-high) ~320dpi
  - *xxhdpi* (extra-extra-high) ~480dpi
  - *xxxhdpi* (extra-extra-extra-high) ~640dpi

Scale Factor

Screen in the same DPI range will have the same scaleFactor, in the other words, 24dp for 500dpi and for 550dpi are exactly the same px

Equation

```
px = dp * scaleFactor
```

dp in action (200dp)

What is dp?

480x800

720x1200

960x1600

Fact about dp

- Don’t expect the same physical size for the same dp value
  - Just almost the same
  - Does matter for both Designer and Developer
- You might feel a little bit strange at the beginning about this unit but keep in mind that user has never felt that
- You have no need to remember anything about dpi and scaleFactor value, once you care, fragmentation problem will come.
- It is the best thing in Android. If you want to be an Android Developer, you HAVE TO love it.

Rule 9:

ALWAYS use dp for View's dimension and use sp for TextView

Rule 10:

Avoid using any fixed width/height unless you know what are you doing

dp in action (200dp)

More Examples

Rule 11:

If you fully understand the purpose of dp and dpi, you will 50% win over fragmentation

Magic of dp

- Once you use dp, the single value will always automatically fit every single screen with the same condition perfectly:
  - Mobile – Portrait
  - Mobile – Landscape
  - Tablet – Portrait
  - Tablet – Landscape
- Because Android is designed that way
- Android UI Guideline are all in dp unit
- Try it

Rule 12:

dp is mostly used for padding, margin and element’s height

Secret

Android App UI Design starts with ”Title Bar’s height”. Use it as a Reference.

Everything starts with Title Bar's height

56dp