

DITHERING

By Daniel O.



dith·er

verb

gerund or present participle: dithering

1. be indecisive.
"he was dithering about the election date"
2. display or print (a color image) in such a way that there appears to be more colors in it than are really available.
"dithered bitmaps"

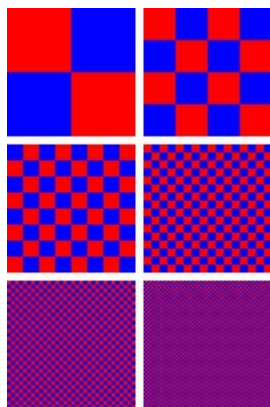
Source: [Google](#)

1.

Ok, cool. But how this works?

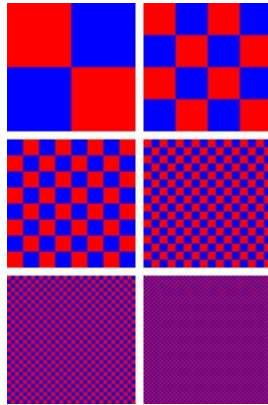
HOW MANY COLORS ARE PRESENT IN THE IMAGE BELOW?

4



HOW MANY COLORS ARE PRESENT IN THE IMAGE BELOW?

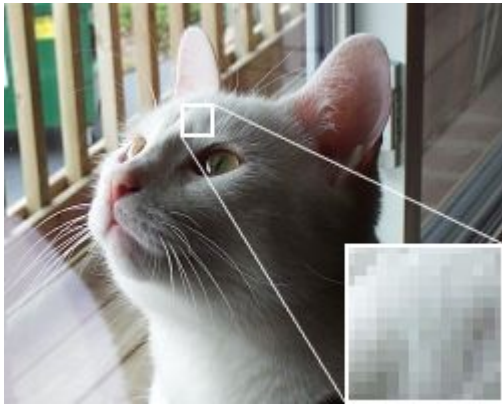
5



Red and blue are the only colors used but, as the red and blue squares are made smaller, the patch appears purple.

- » Colors that are not available in the palette are **approximated by a diffusion** of colored pixels from within the available palette.
- » The human eye **perceives** the diffusion as a **mixture** of the colors within it.

Original



Millions of colours

No dithering

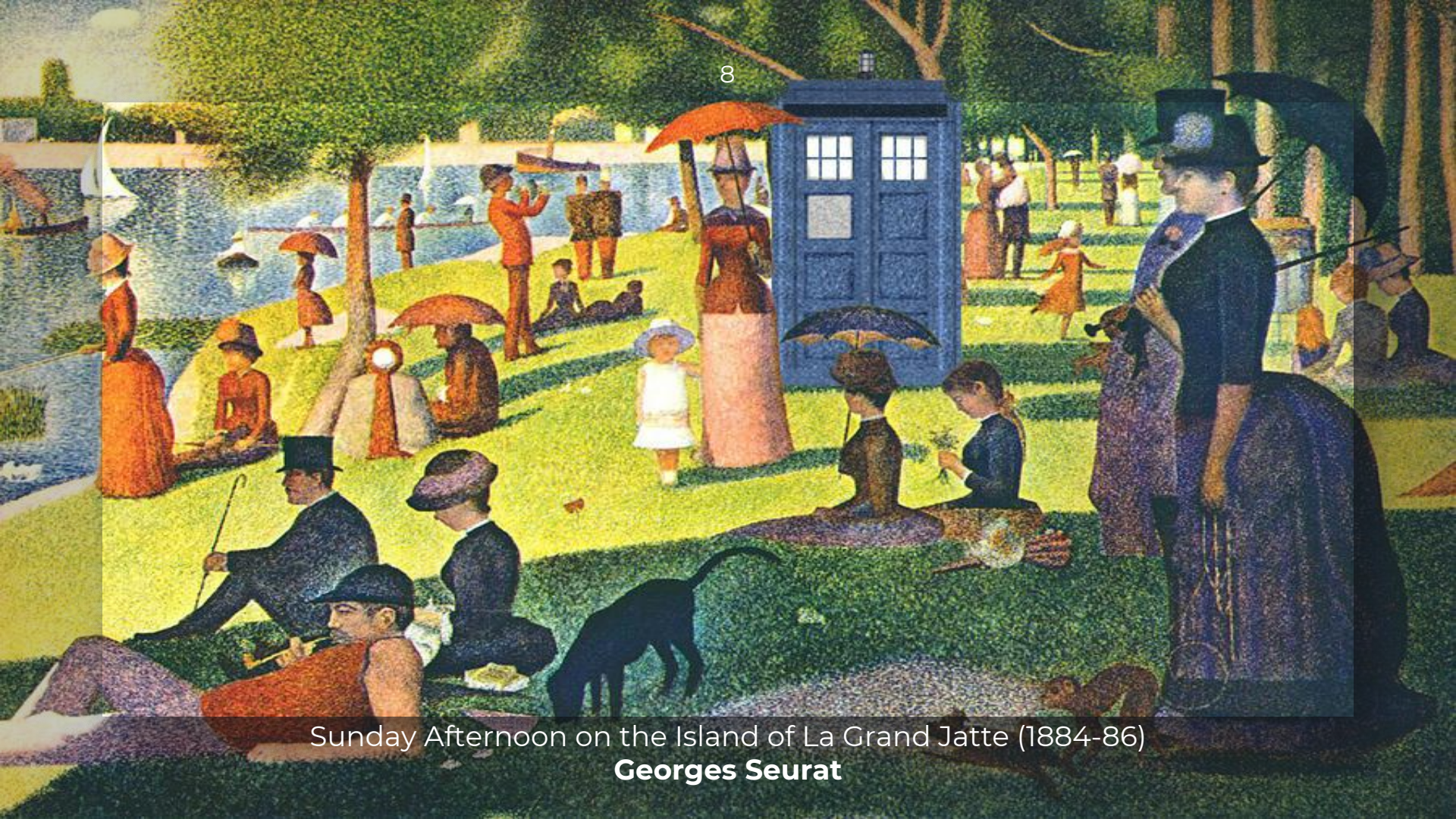


Web-safe colours

Dithered



256 colours



Sunday Afternoon on the Island of La Grande Jatte (1884-86)
Georges Seurat



La Seine à la Grande-Jatte (1888)
Georges Seurat

Advantages

Creates the illusion of **color depth** in images with a limited color palette

Disadvantages

Throws away a certain amount of color information and also can often be distinguished by a characteristic **graininess** or **speckled** appearance upon closer look.

2.

Got it. Why is it important?

Hardware

Many modern LCDs used in mobile phones and inexpensive digital cameras, shows a much smaller color range than more advanced displays.

Browser

It may be necessary for the browser to perform dithering on images with too many colors for the available display.

File format

GIF is restricted to 256 or fewer colors in many graphics editing programs. PNG may also have a restriction imposed on them for the sake of a reduction in file size.

- » The result of using "unsafe" colors for graphic elements is that readers with **colour-limited** displays will see a lot of **heavily** dithered images.
- » This may be **acceptable** for some visual elements, but if used in excess, parts of your work will be **lost** and the overall effect will be **amateurish**.

THANKS!

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Any questions?





Pixel art
Mark Ferrari

- » It enables to more accurately display graphics containing a greater range of colors than the hardware is **capable of showing**
- » It might be used to display a image containing **millions** of colors on video hardware that is only capable of showing **256 colors** at a time.

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HELLO!

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I am Jayden Smith

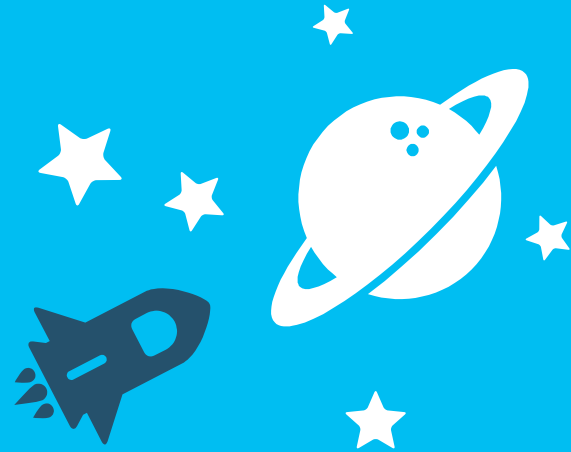
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give presentations.

You can find me at
@username



BIG T

Bring the attention of your audience over
a key concept using icons or illustrations



Yellow

Is the color of gold, butter and ripe lemons. In the spectrum of visible light, yellow is found between green and orange.

Blue

Is the colour of the clear sky and the deep sea. It is located between violet and green on the optical spectrum.

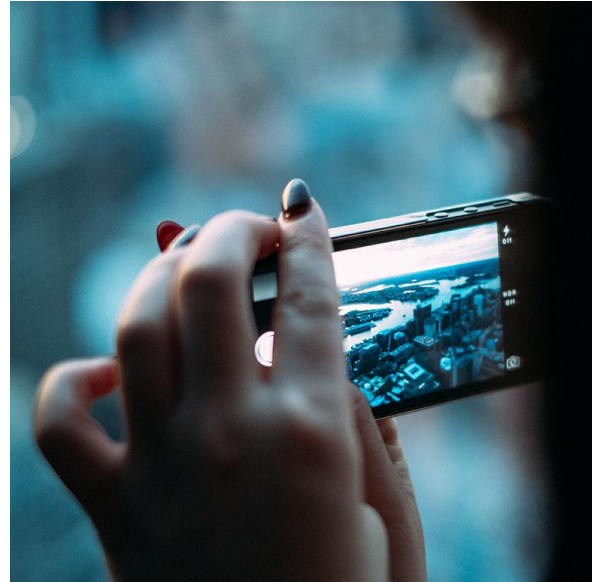
Red

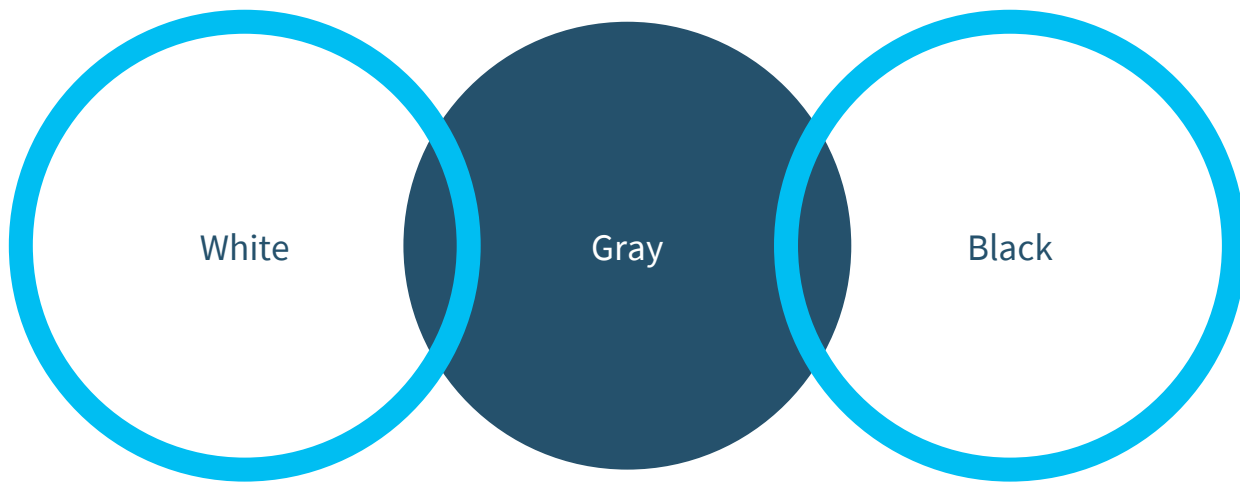
Is the color of blood, and because of this it has historically been associated with sacrifice, danger and courage.

A PICTURE IS WORTH A THOUSAND WORDS

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A complex idea can be conveyed with just a single still image, namely making it possible to absorb large amounts of data quickly.





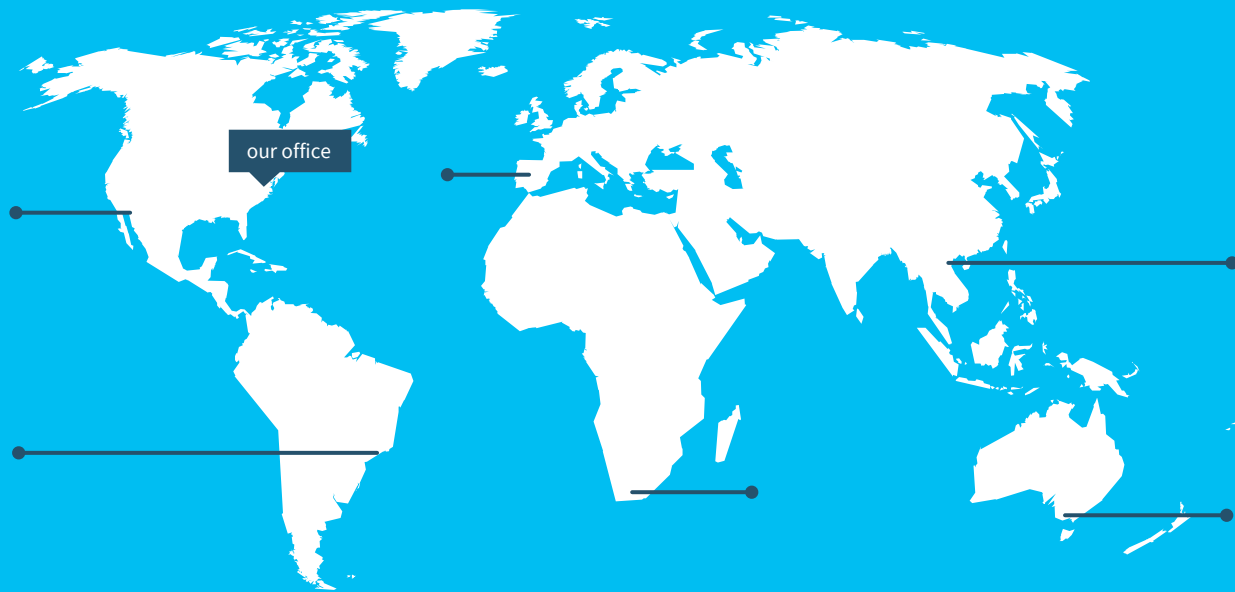
AND TABLES TO COMPARE DATA

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	A	B	C
Yellow	10	20	7
Blue	30	15	10
Orange	5	24	16

MAPS

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89,526,124

Whoa! That's a big number, aren't you proud?

89,526,124\$

That's a lot of money

185,244 users

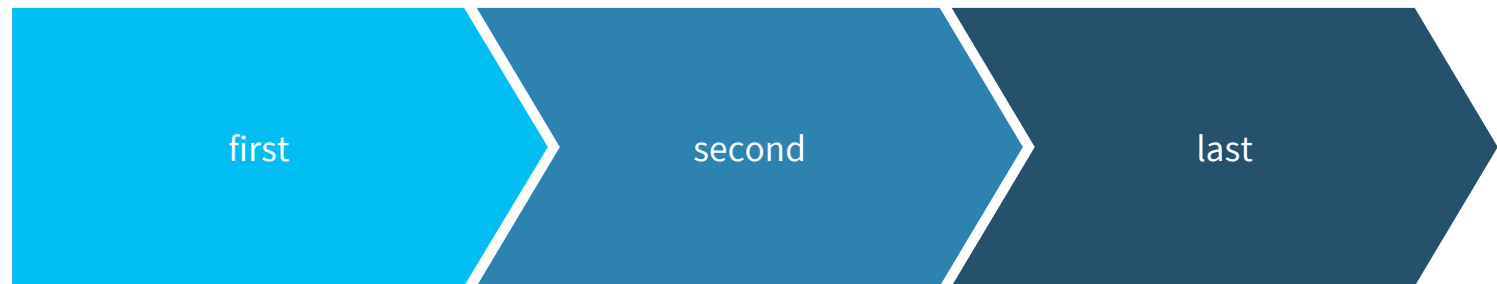
And a lot of users

100%

Total success!

OUR PROCESS IS EASY

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Let's review some concepts

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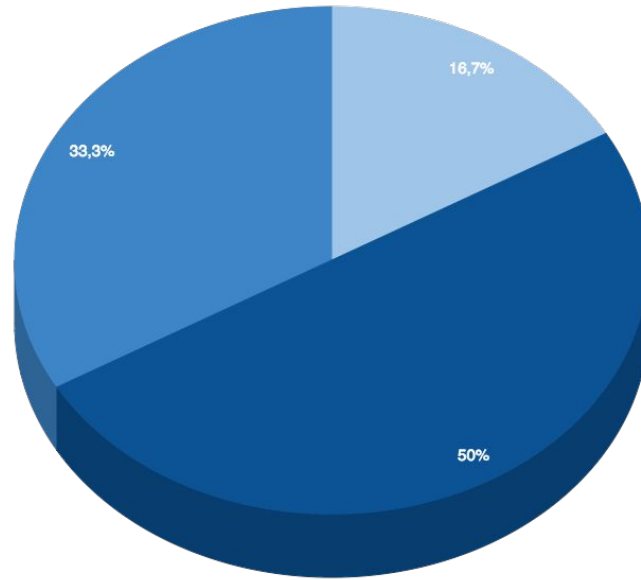
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Red

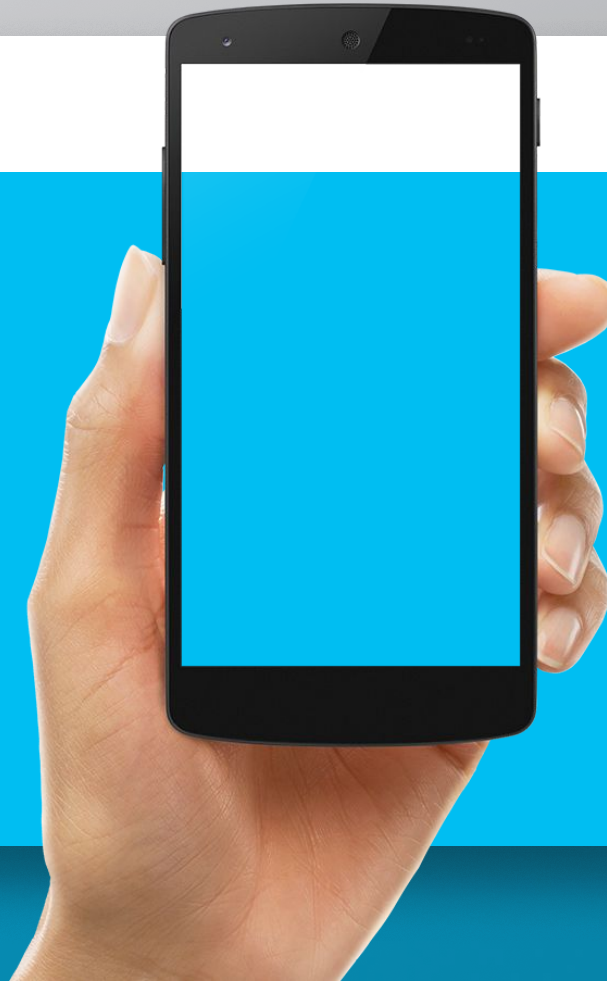
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You can insert graphs from [Google Sheets](#)

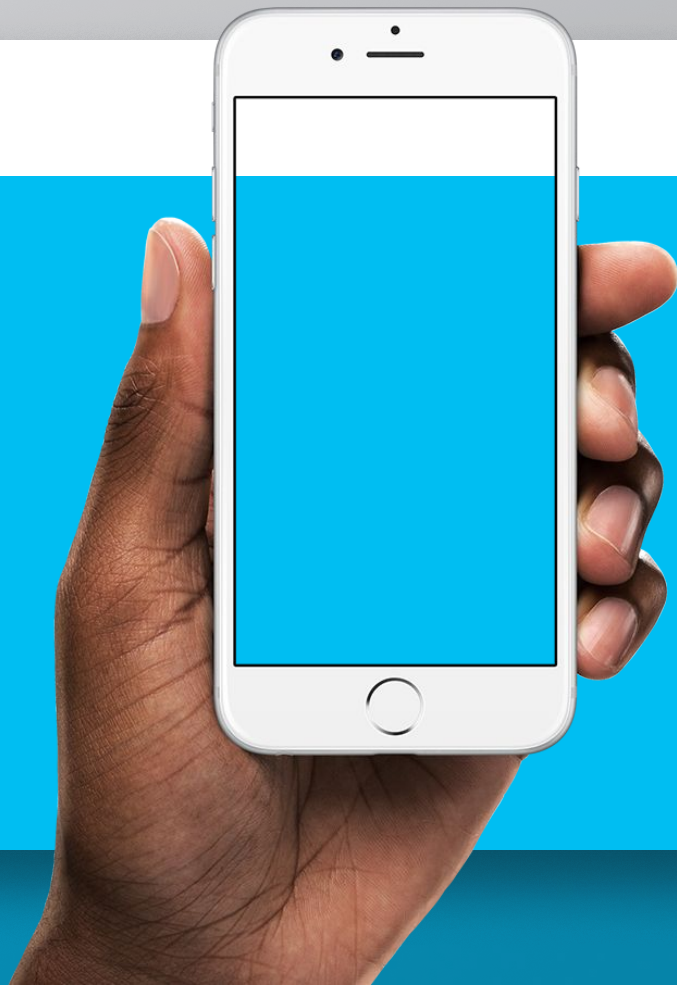
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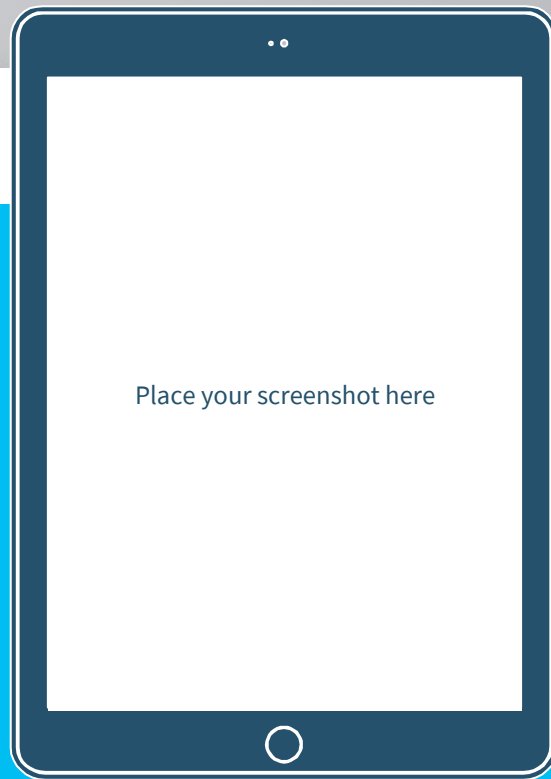
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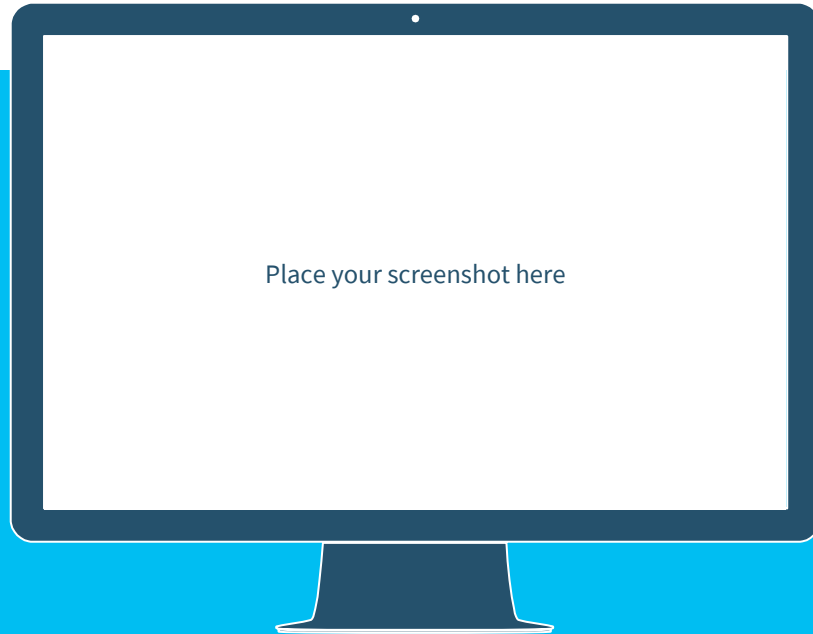
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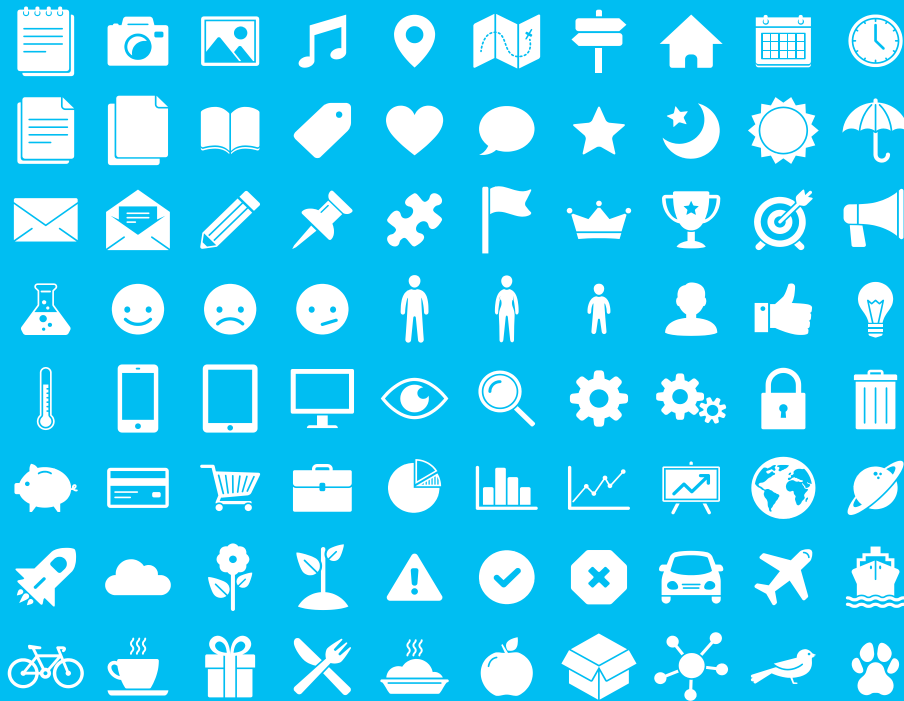
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- » Sky Blue **#00bef2** / Navy Blue **#25516c**



SlidesCarnival icons are editable shapes.

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This means that you can:

- Resize them without losing quality.
- Change fill color and opacity.
- Change line color, width and style.

Isn't that nice? :)

Examples:





Now you can use any emoji as an icon!

And of course it resizes without losing quality and you can change the color.

How? Follow Google instructions

<https://twitter.com/googledocs/status/730087240156643328>

