

# Colour and contrast

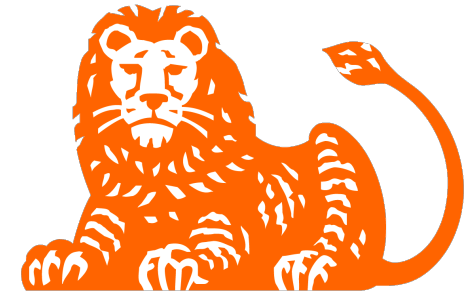
What does it mean?



# Let's talk about me first

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- Photographer
- Visual Artist
- Creative Coder
- Accessibility Specialist
- Front End Developer
- Online Fabric Store Owner



# Colour and contrast

A short recap

Text has a contrast ratio  
of at least 4.5:1

Except large text, that should be at least 3.0:1

Foreground Colour

#FF6200

Show RGB Sliders

Background Colour

#FFFFFF

Show RGB Sliders

Luminosity

Colour/Brightness

Colour Deficiency

Contrast Ratio: 3.0:1

Normal text

✗

Fail AA

✗

Fail AAA

Large text

✓

Pass AA

✗

Fail AAA

## contrast ratio

white

3

#ff6200

Text color:

## How to use

↔ Swap colors

ratio indicated will update.  
more detailed information.  
ent colors are involved as  
will have an error margin,  
colors they may be over.

This sample text attempts to visually demonstrate how readable this color combination is, for normal or **bold** text of various sizes and font styles.

**Hint:** Press the up and down keyboard arrows while over a number inside a functional color notation. Watch it increment/decrement. Try with the Shift or Alt key too!

By Lea Verou • WCAG 2.0 on contrast ratio

A screenshot of a digital color picker application. At the top, there's a large orange-to-black gradient bar. Below it, a color selection tool features a circular orange color swatch, a horizontal rainbow gradient bar with a white slider, and a checkerboard pattern bar with a white slider. A text input field displays the hex code "#ff6200" with a small up/down arrow to its right. Below the input field, the text "HEX" is centered. A horizontal line separates this section from the contrast section below. The contrast section displays "Contrast ratio 3.00" with a green checkmark. To the right is a small grey button with an upward arrow. Below the contrast ratio, "AA: 3.0" is marked with a green checkmark, and "AAA: 4.5" is marked with a red prohibition sign. To the right of this text is a pencil icon and a circular button containing the text "Aa". At the bottom, a grid of 24 color swatches is shown, arranged in three rows of eight. The first row includes various colors like purple, blue, green, yellow, brown, orange, and pink. The second and third rows consist of different shades of grey. A small up/down arrow is to the right of the grid.

# But let's go back a step

My fabric store





# It's a mess

Wordpress, woocommerce, a theme, a child theme, lots of extensions and two versions of bootstrap.



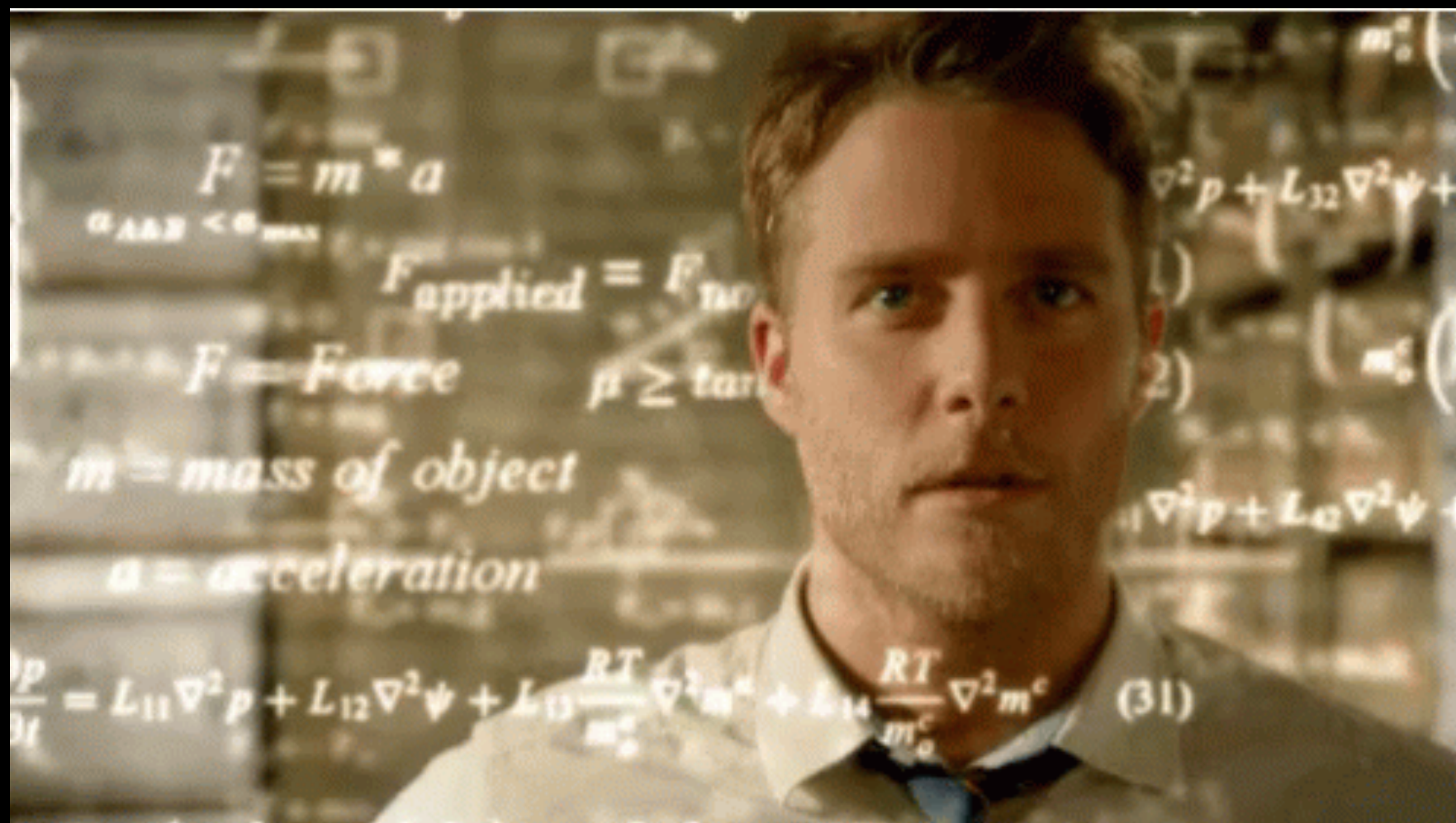


# Clean this up the right

Start with a color palette, easy



An accessible color palette



$$F = m \cdot a$$

$$G_{ABD} < G_{\max}$$

$$F_{\text{applied}} = F_{\text{net}}$$

$$F = \text{Force}$$

$$\mu \geq \tan$$

$$m = \text{mass of object}$$

$$a = \text{acceleration}$$

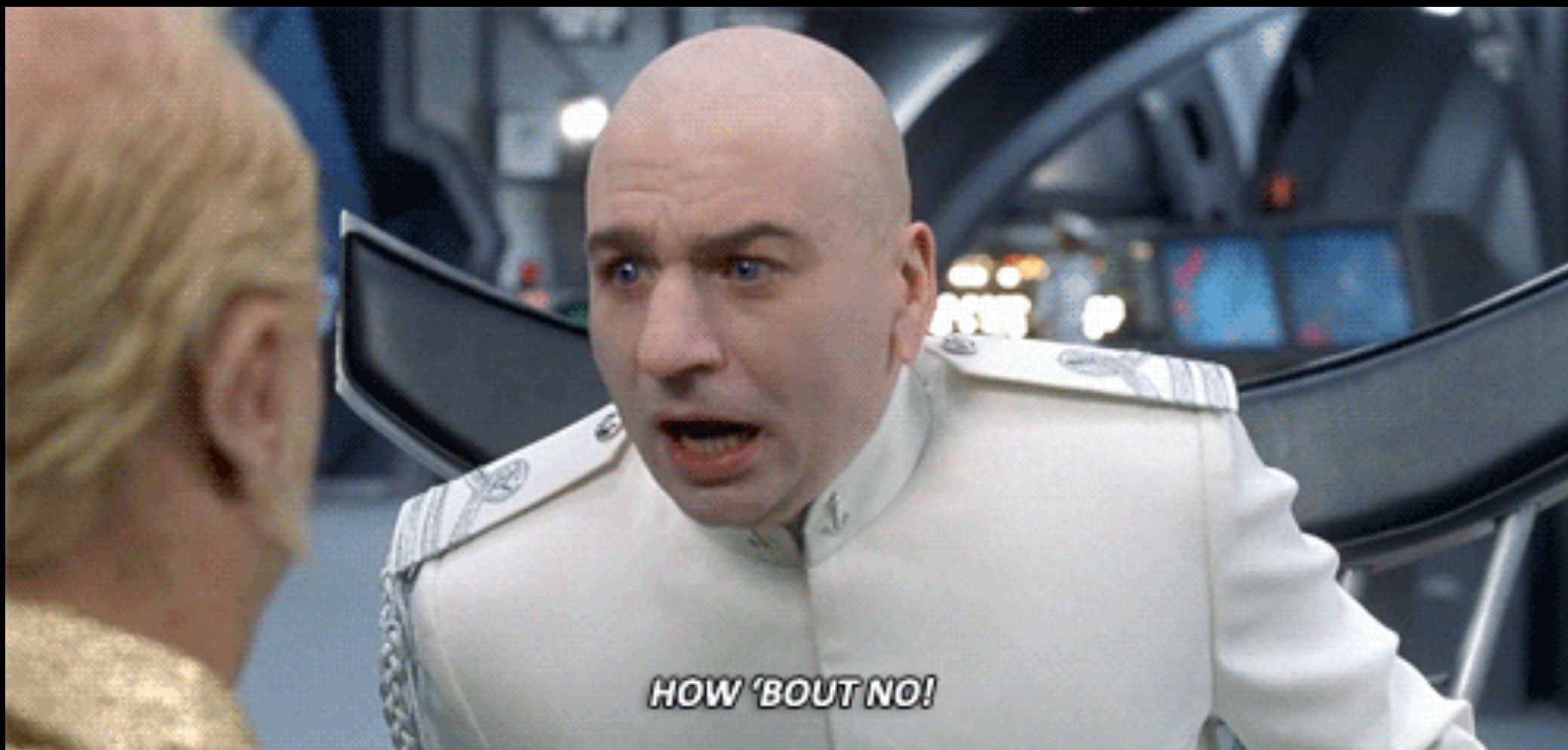
$$\frac{\partial p}{\partial t} = L_{11} \nabla^2 p + L_{12} \nabla^2 \psi + L_{13} \frac{RT}{m_a^c} \nabla^2 m^c + L_{14} \frac{RT}{m_a^c} \nabla^2 m^c \quad (31)$$

One does not  
simply pick a colour

How many colour spaces are there?



Which colour space  
does WCAG use?



**HOW 'BOUT NO!**

# HSL sounds good

But it's not

Hue: 240°

Saturation: 100%

Luminance: 50%

Hue: 60°

Saturation: 100%

Luminance: 50%

3.0:1

Hue: 0°

Saturation: 100%

Lightness: 68%

4.5:1

Hue: 0°

Saturation: 100%

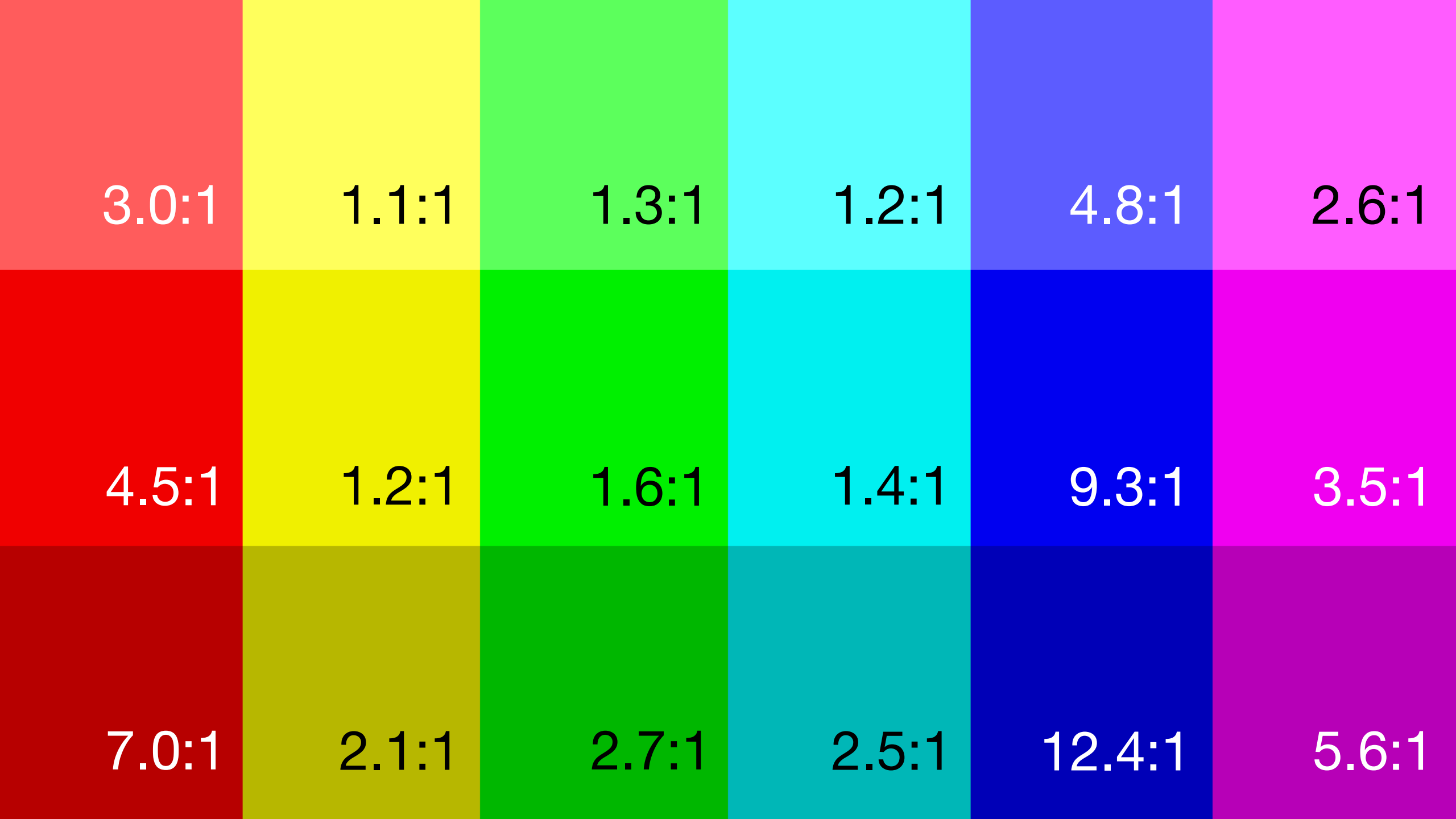
Lightness: 47%

7.0:1

Hue: 0°

Saturation: 100%

Lightness: 36%



3.0:1

1.1:1

1.3:1

1.2:1

4.8:1

2.6:1

4.5:1

1.2:1

1.6:1

1.4:1

9.3:1

3.5:1

7.0:1

2.1:1

2.7:1

2.5:1

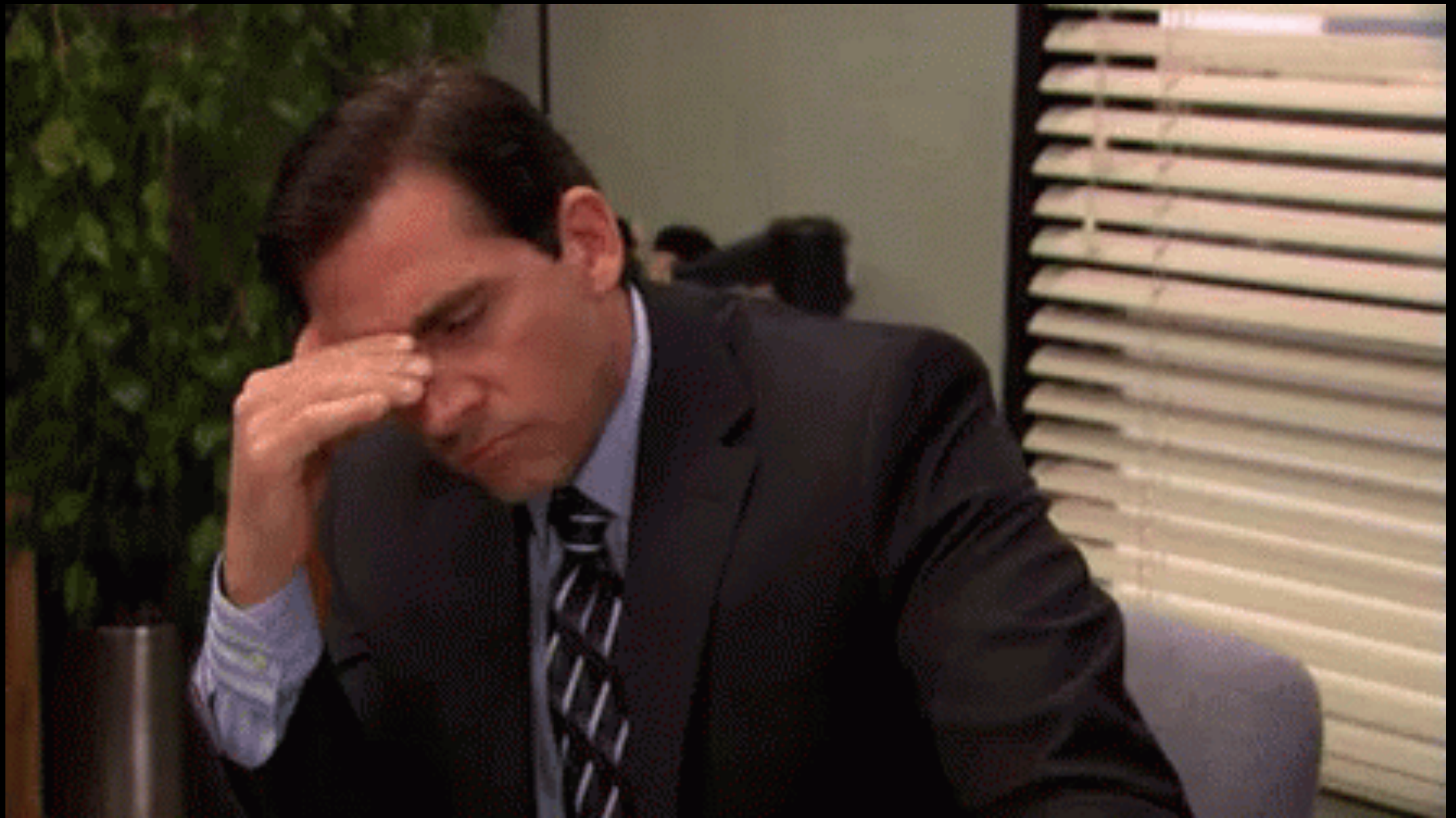
12.4:1

5.6:1

# So where does it come from?

ITU-R Recommendation BT.709







- It is a television standard
  - It has the same color coverage as sRGB
  - It has a component called Luma
  - It is a way to measure brightness in sRGB
- that takes the human eye in account



# It's not the Luma that matters

It's what you do with it

It's a contrast ratio

Black on white is 21:1

- Black is 21 times as dark as white
- White is 21 times as bright as black
- The range we work with is always 21

A color that is 3.0:1 on white...

21 / 3... 7.0:1 on black

A color that is 4.5:1 on white...

21 / 4.5... 4.67:1 on black







Only 3 shades fit with 3.0:1

1:3:9

Only 3 shades fit with 4.5:1

1:4.5:20.25

Only 2 shades fit with 7:1

1:7

Where does that leave us?

<div>Text</div> <div>Background</div>	#F8F8F8	#B3B3B3	#909090	#727272	#555	#282828
<div>#F8F8F8</div> <div>✕ ⋮</div>		<div>Text</div> <div>DNP1.9</div>	<div>Text</div> <div>AA183</div>	<div>Text</div> <div>AA4.5</div>	<div>Text</div> <div>AAA7</div>	<div>Text</div> <div>AAA13.8</div>
<div>#B3B3B3</div>	<div>Text</div> <div>DNP1.9</div>		<div>Text</div> <div>DNP1.5</div>	<div>Text</div> <div>DNP2.2</div>	<div>Text</div> <div>AA183.5</div>	<div>Text</div> <div>AAA7</div>
<div>#909090</div>	<div>Text</div> <div>AA183</div>	<div>Text</div> <div>DNP1.5</div>		<div>Text</div> <div>DNP1.5</div>	<div>Text</div> <div>DNP2.3</div>	<div>Text</div> <div>AA4.6</div>
<div>#727272</div>	<div>Text</div> <div>AA4.5</div>	<div>Text</div> <div>DNP2.2</div>	<div>Text</div> <div>DNP1.5</div>		<div>Text</div> <div>DNP1.5</div>	<div>Text</div> <div>AA183</div>
<div>#555</div>	<div>Text</div> <div>AAA7</div>	<div>Text</div> <div>AA183.5</div>	<div>Text</div> <div>DNP2.3</div>	<div>Text</div> <div>DNP1.5</div>		<div>Text</div> <div>DNP1.9</div>
<div>#282828</div>	<div>Text</div> <div>AAA13.8</div>	<div>Text</div> <div>AAA7</div>	<div>Text</div> <div>AA4.6</div>	<div>Text</div> <div>AA183</div>	<div>Text</div> <div>DNP1.9</div>	

<div>Text</div> <div>Background</div>	#F8F8F8	#49C4C4	#11A0A1	#107F84	#005F62	#282828
#F8F8F8		<div>Text</div> <div>DNP1.9</div>	<div>Text</div> <div>AA183</div>	<div>Text</div> <div>AA4.5</div>	<div>Text</div> <div>AAA7</div>	<div>Text</div> <div>AAA13.8</div>
#49C4C4	<div>Text</div> <div>DNP1.9</div>		<div>Text</div> <div>DNP1.5</div>	<div>Text</div> <div>DNP2.2</div>	<div>Text</div> <div>AA183.5</div>	<div>Text</div> <div>AAA7</div>
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# I made a thing

<https://github.com/erikkroes/color-tool>

But my website is still a mess



- <http://contrast-grid.eightshapes.com>
- <http://bit.ly/a11y-color-palette>
- <https://github.com/erikkroes/color-tool>
- <https://twitter.com/erikkroes>