Lecture 7

DD 324:
Data Visualisation

Colors and Cartography

25 Feb 2025 · Gyan Lakhwani · gyanlakhwani@gmail.com · Department of Design, DTU

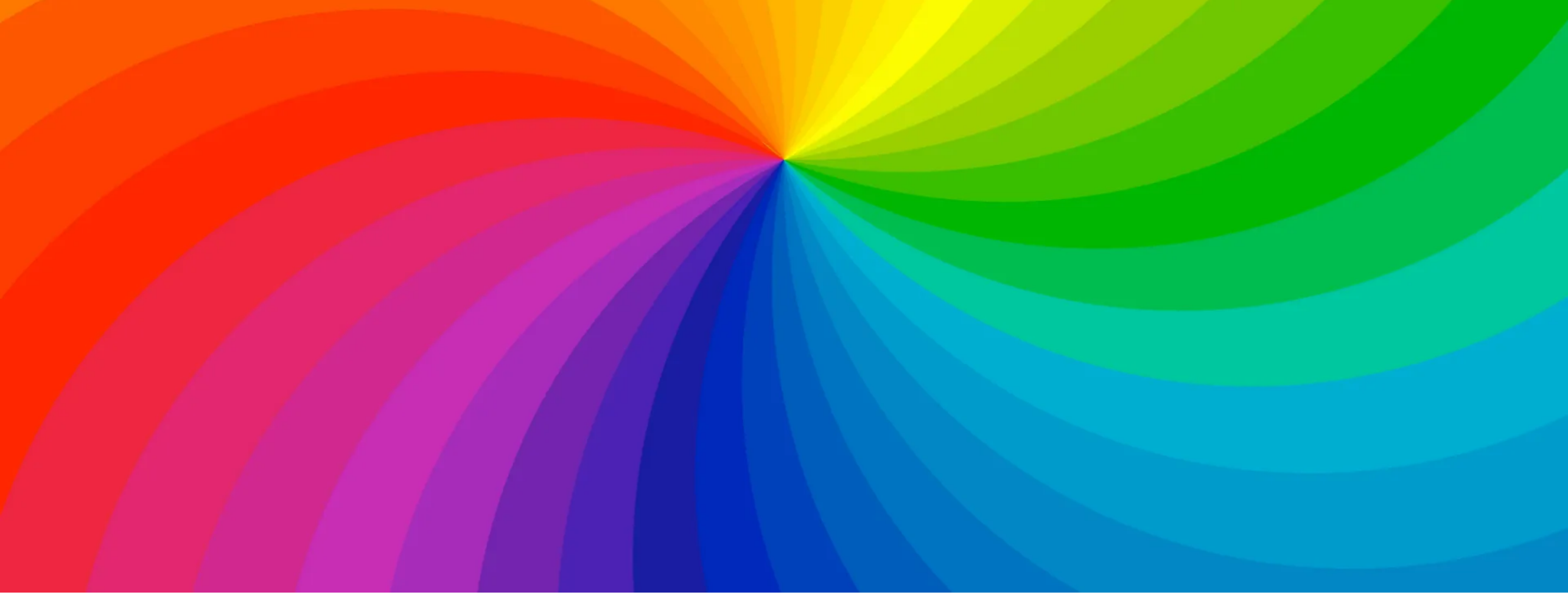
What do you think when you see the following colours?

What is the worst color you can come up with?

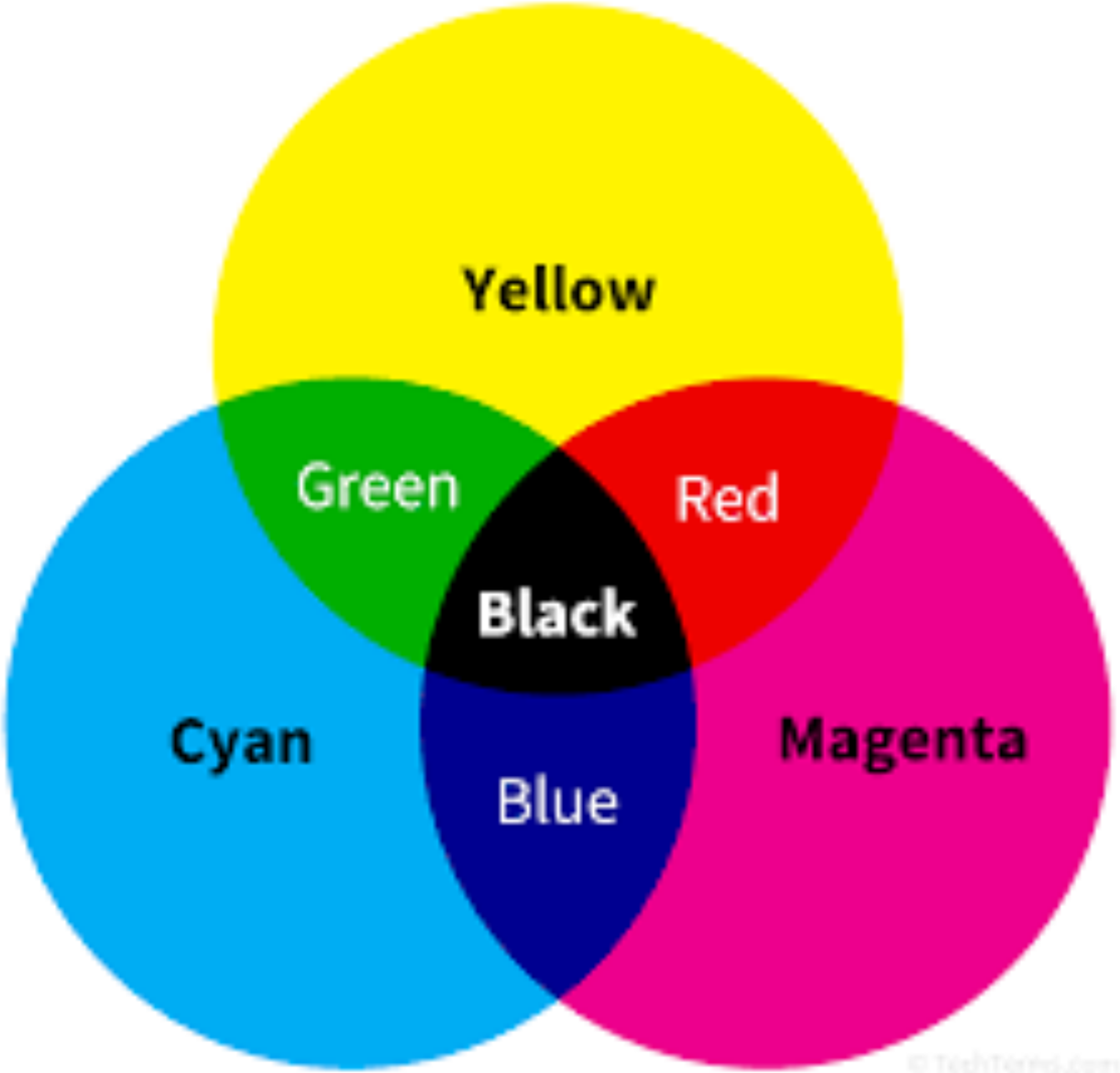
What would you call this color?

Colors have cultural, emotional and biological significance.


Forever



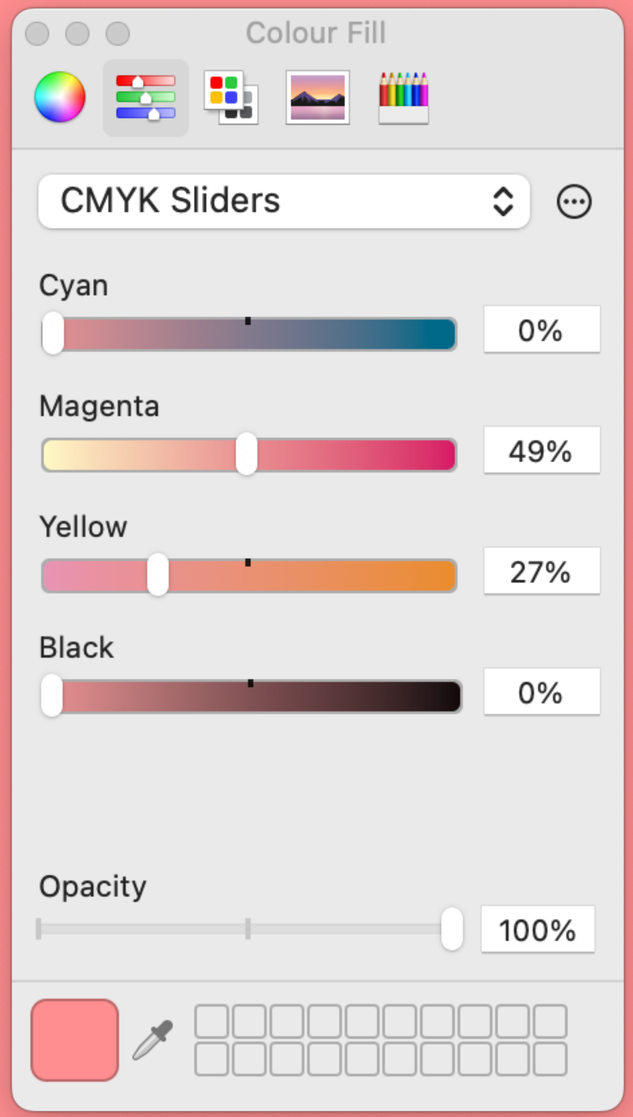
REPRESENTING COLOR
for print

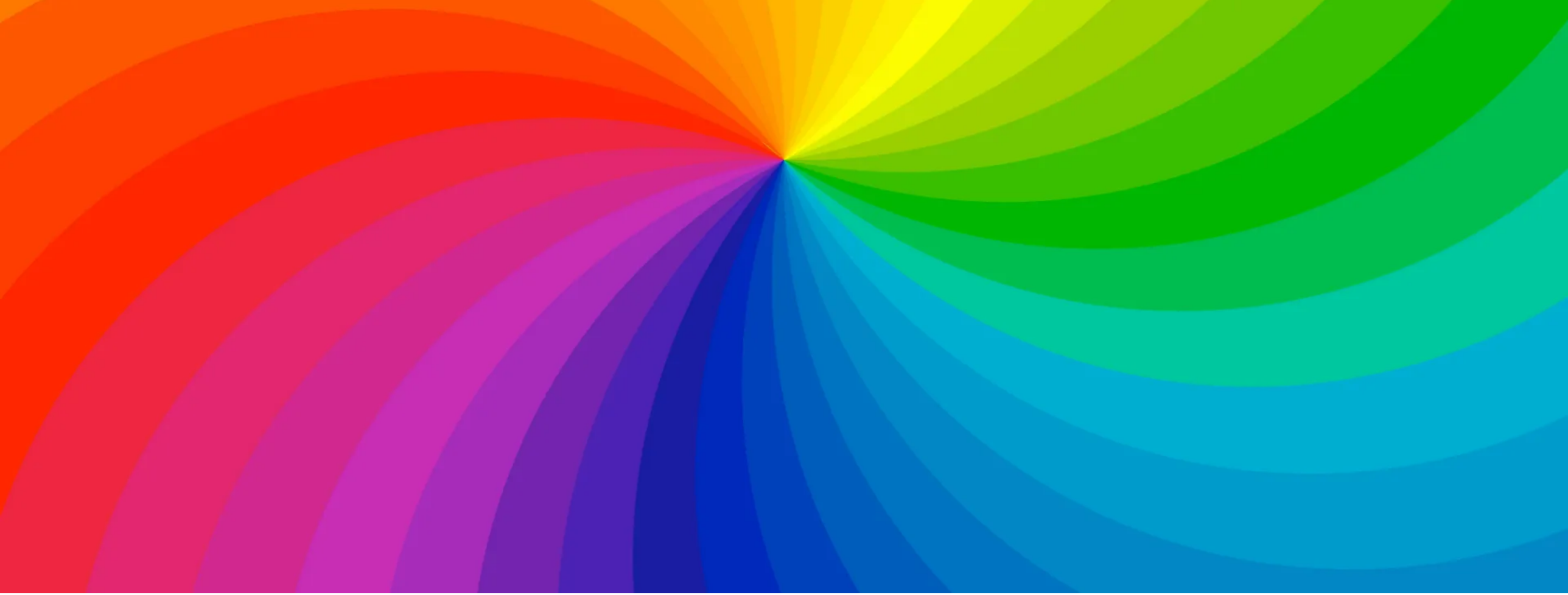

Yellow
Green
Red
Black
Cyan
Blue
Magenta

CMYK

Cyan Magenta Yellow Key

The primary colours for print are different from the primary colours for digital screens.





REPRESENTING COLOR

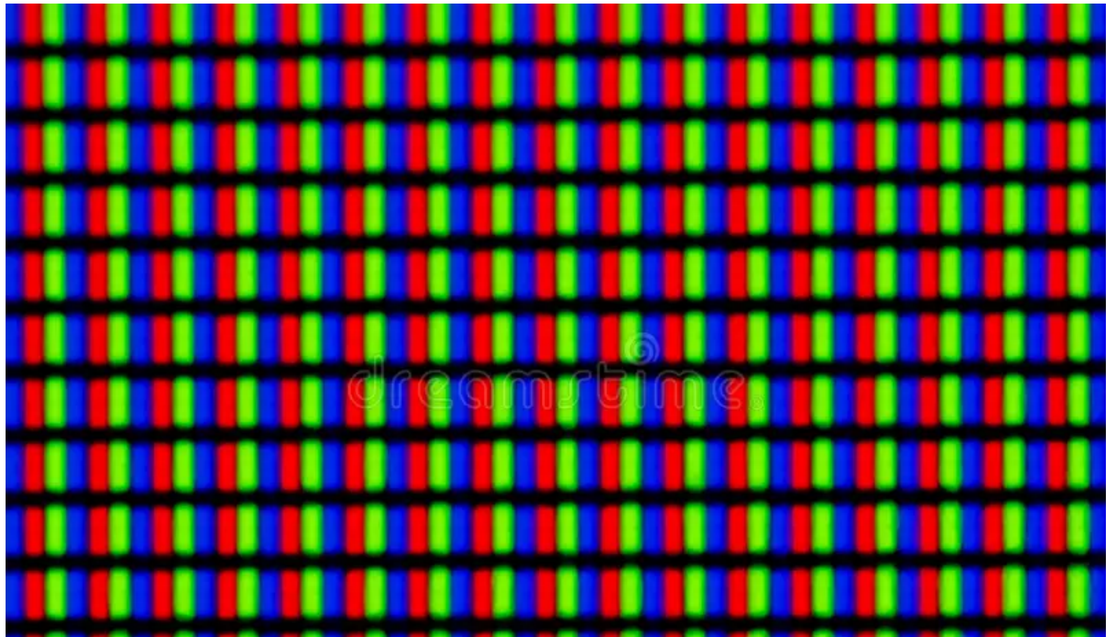
on screens

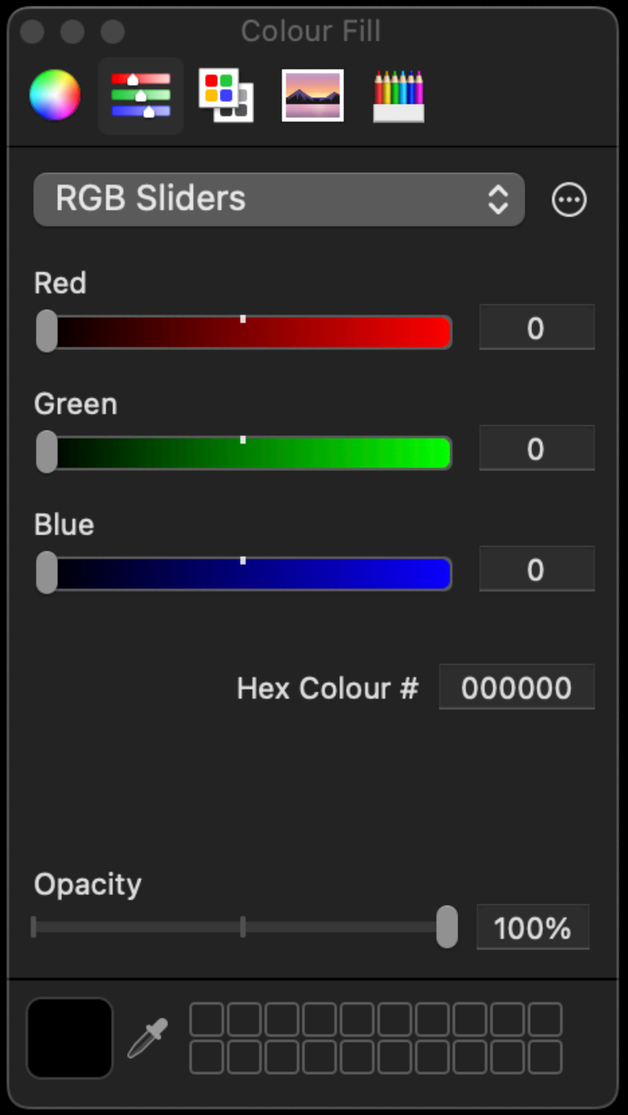
RGB

Red Green Blue

0-255
Decimal

00-FF
Hexadecimal

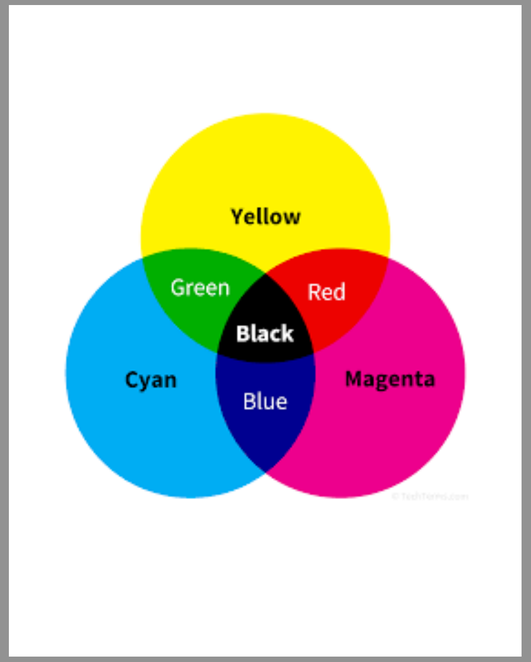




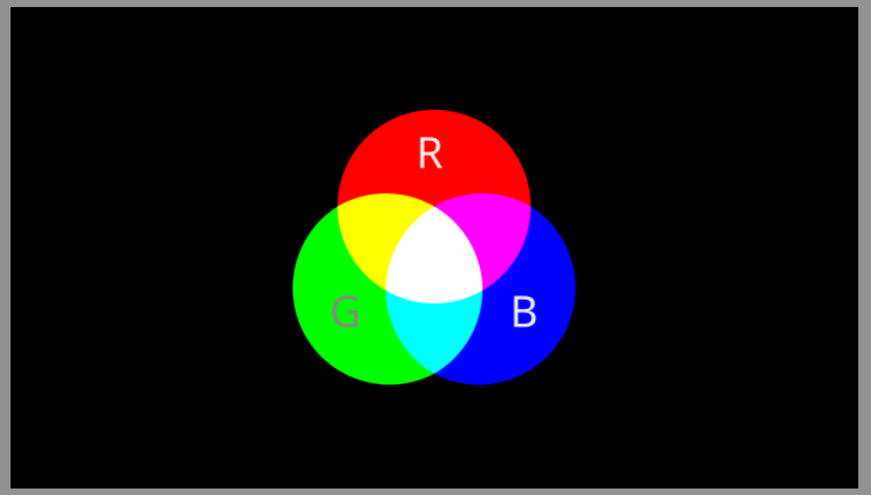
CMYK
subtractive

RGB
additive

CMYK
subtractive



RGB
additive

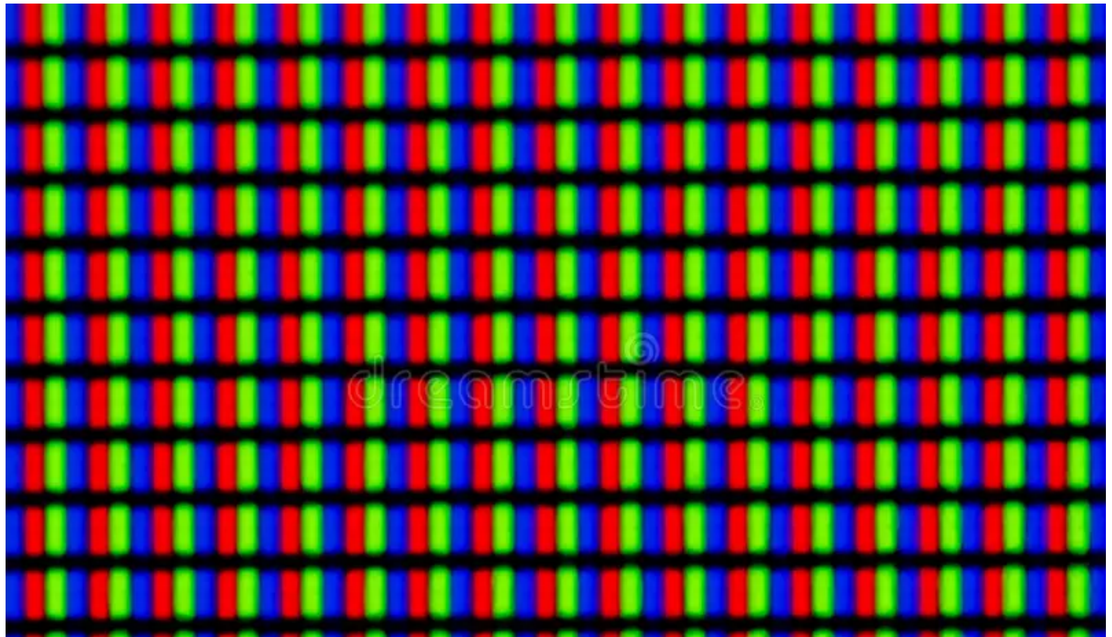


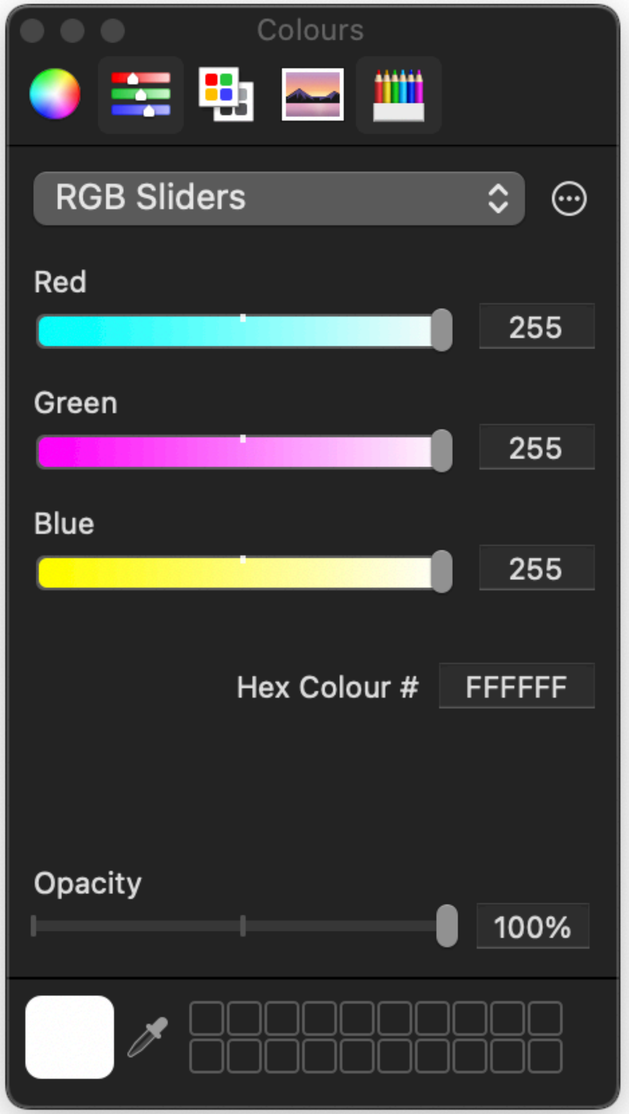
RGB

Red Green Blue

0-255 Decimal

00-FF Hexadecimal



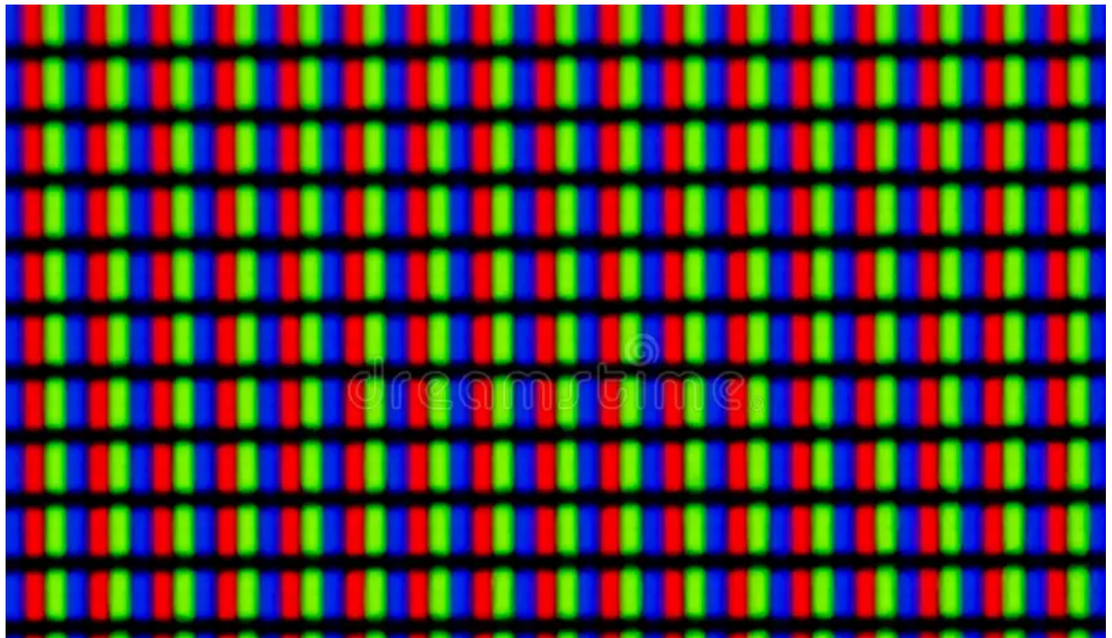


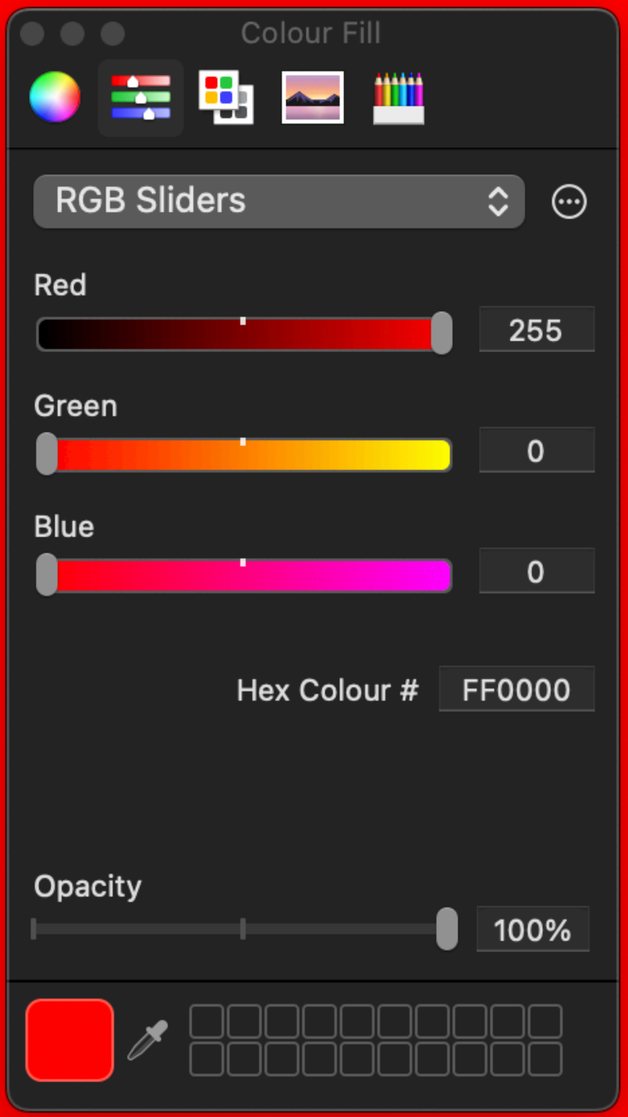
RGB

Red Green Blue

0-255
Decimal

00-FF
Hexadecimal



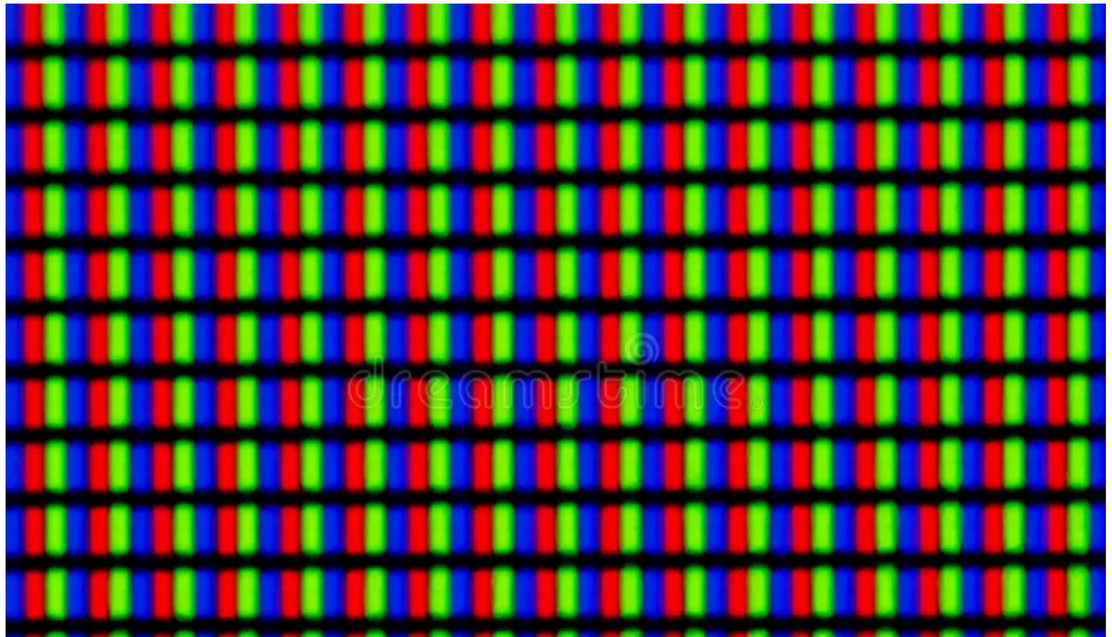


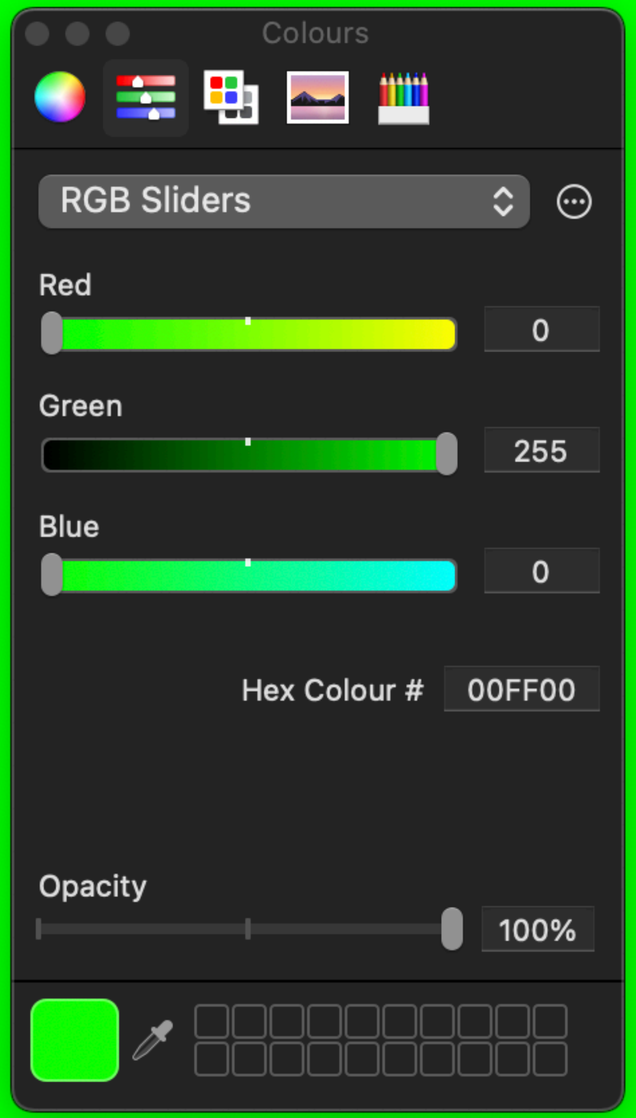
RGB

Red Green Blue

0-255
Decimal

00-FF
Hexadecimal



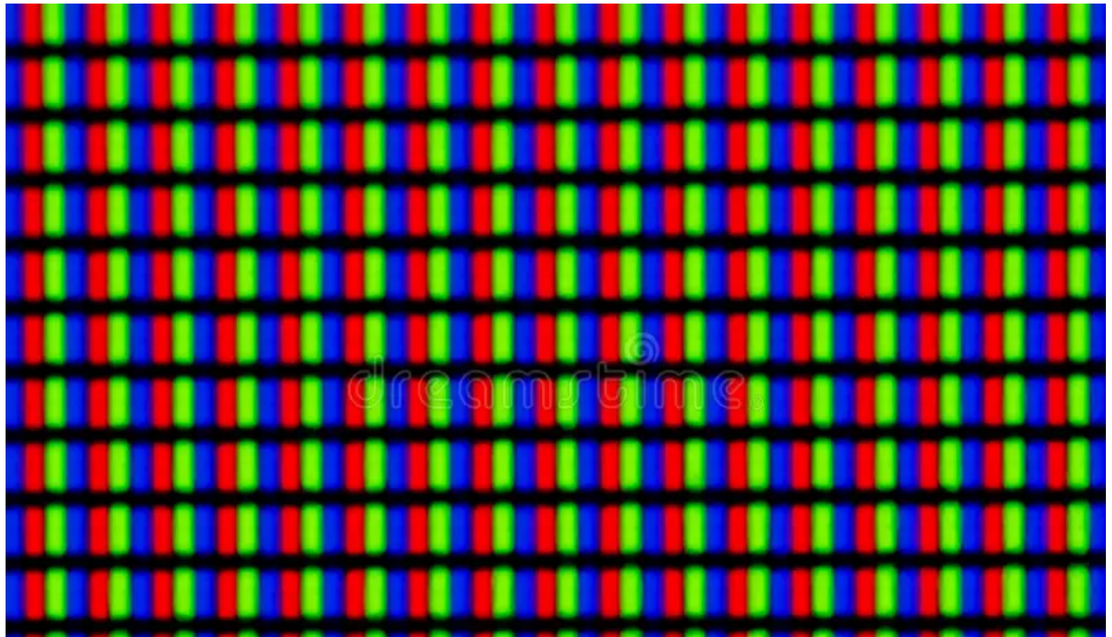


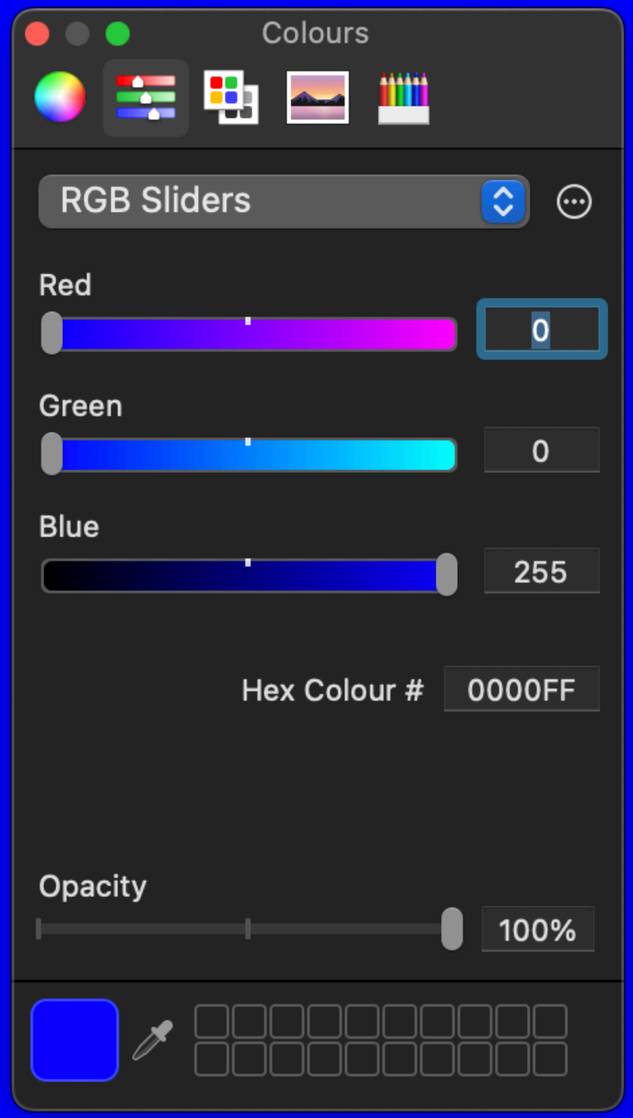
RGB

Red Green Blue

0-255
Decimal

00-FF
Hexadecimal



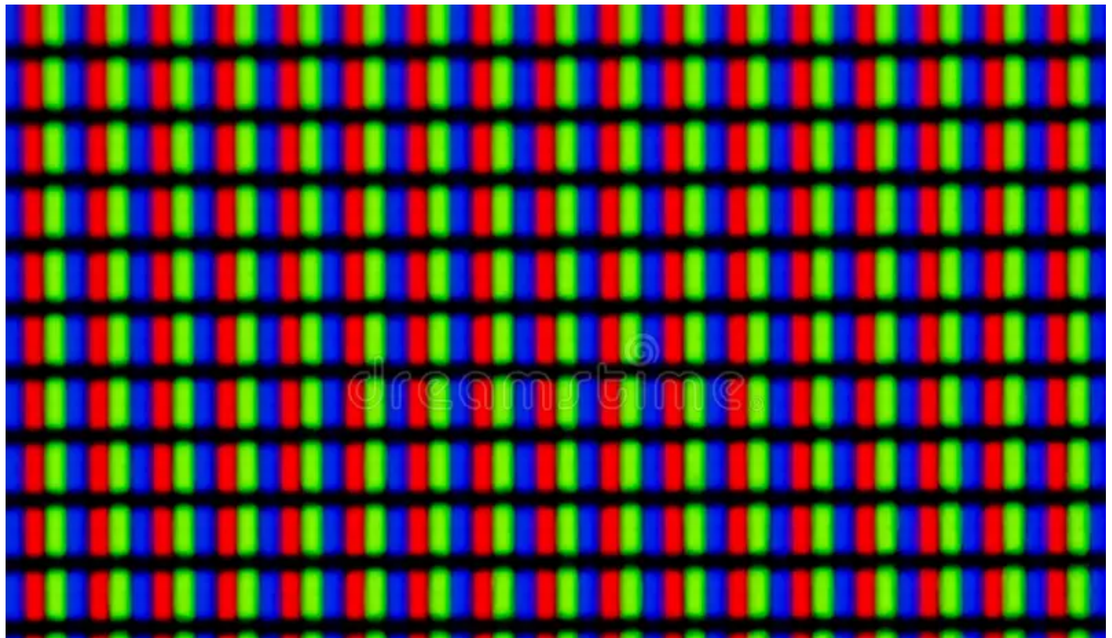


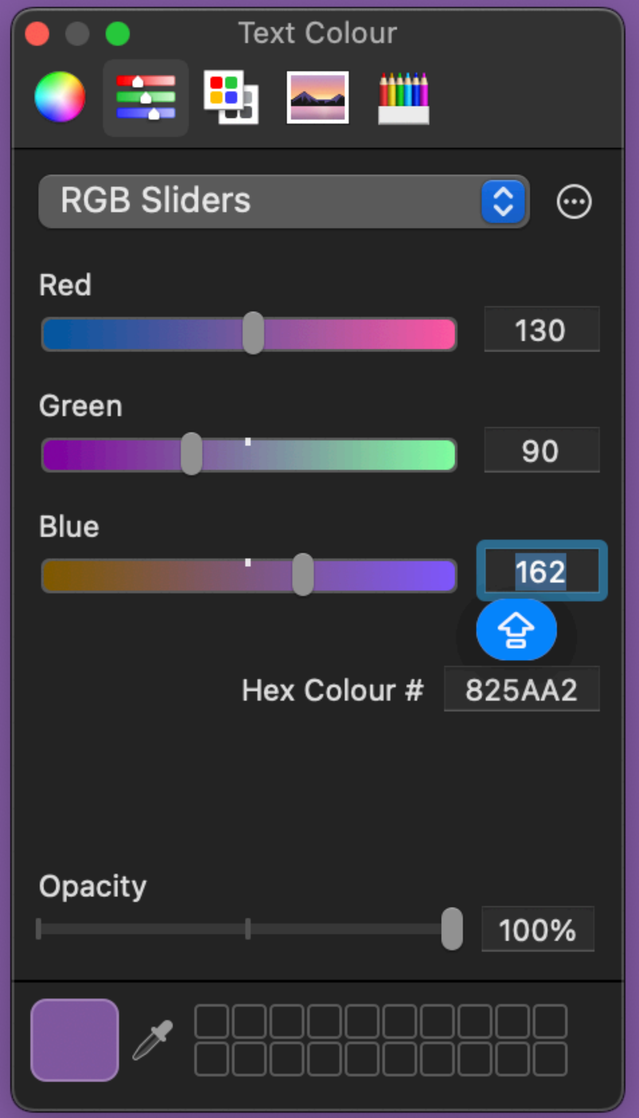
RGB

Red Green Blue

0-255
Decimal

00-FF
Hexadecimal





Hexcodle

A chocolate for
the best score in
the next 3 minutes!

Hex to Decimal

00	0	20	32	40	64	60	96	80	128	A0	160	C0	192	E0	224
01	1	21	33	41	65	61	97	81	129	A1	161	C1	193	E1	225
02	2	22	34	42	66	62	98	82	130	A2	162	C2	194	E2	226
03	3	23	35	43	67	63	99	83	131	A3	163	C3	195	E3	227
04	4	24	36	44	68	64	100	84	132	A4	164	C4	196	E4	228
05	5	25	37	45	69	65	101	85	133	A5	165	C5	197	E5	229
06	6	26	38	46	70	66	102	86	134	A6	166	C6	198	E6	230
07	7	27	39	47	71	67	103	87	135	A7	167	C7	199	E7	231
08	8	28	40	48	72	68	104	88	136	A8	168	C8	200	E8	232
09	9	29	41	49	73	69	105	89	137	A9	169	C9	201	E9	233
0A	10	2A	42	4A	74	6A	106	8A	138	AA	170	CA	202	EA	234
0B	11	2B	43	4B	75	6B	107	8B	139	AB	171	CB	203	EB	235
0C	12	2C	44	4C	76	6C	108	8C	140	AC	172	CC	204	EC	236
0D	13	2D	45	4D	77	6D	109	8D	141	AD	173	CD	205	ED	237
0E	14	2E	46	4E	78	6E	110	8E	142	AE	174	CE	206	EE	238
0F	15	2F	47	4F	79	6F	111	8F	143	AF	175	CF	207	EF	239
10	16	30	48	50	80	70	112	90	144	B0	176	D0	208	F0	240
11	17	31	49	51	81	71	113	91	145	B1	177	D1	209	F1	241
12	18	32	50	52	82	72	114	92	146	B2	178	D2	210	F2	242
13	19	33	51	53	83	73	115	93	147	B3	179	D3	211	F3	243
14	20	34	52	54	84	74	116	94	148	B4	180	D4	212	F4	244
15	21	35	53	55	85	75	117	95	149	B5	181	D5	213	F5	245
16	22	36	54	56	86	76	118	96	150	B6	182	D6	214	F6	246
17	23	37	55	57	87	77	119	97	151	B7	183	D7	215	F7	247
18	24	38	56	58	88	78	120	98	152	B8	184	D8	216	F8	248
19	25	39	57	59	89	79	121	99	153	B9	185	D9	217	F9	249
1A	26	3A	58	5A	90	7A	122	9A	154	BA	186	DA	218	FA	250
1B	27	3B	59	5B	91	7B	123	9B	155	BB	187	DB	219	FB	251
1C	28	3C	60	5C	92	7C	124	9C	156	BC	188	DC	220	FC	252
1D	29	3D	61	5D	93	7D	125	9D	157	BD	189	DD	221	FD	253
1E	30	3E	62	5E	94	7E	126	9E	158	BE	190	DE	222	FE	254
1F	31	3F	63	5F	95	7F	127	9F	159	BF	191	DF	223	FF	255

Can we represent color in a human friendly (or friendlier) way?

red

orange

rose

yellow

magenta

chartreuse

violet

Sure!

green

blue

springgreen

azure

cyan

red

orange

rose

yellow

magenta

These will even work in Figma!

chartreuse

violet

green

blue

springgreen

azure

cyan

red

orange

rose

yellow

magenta

These will even work in Figma!

chartreuse

violet

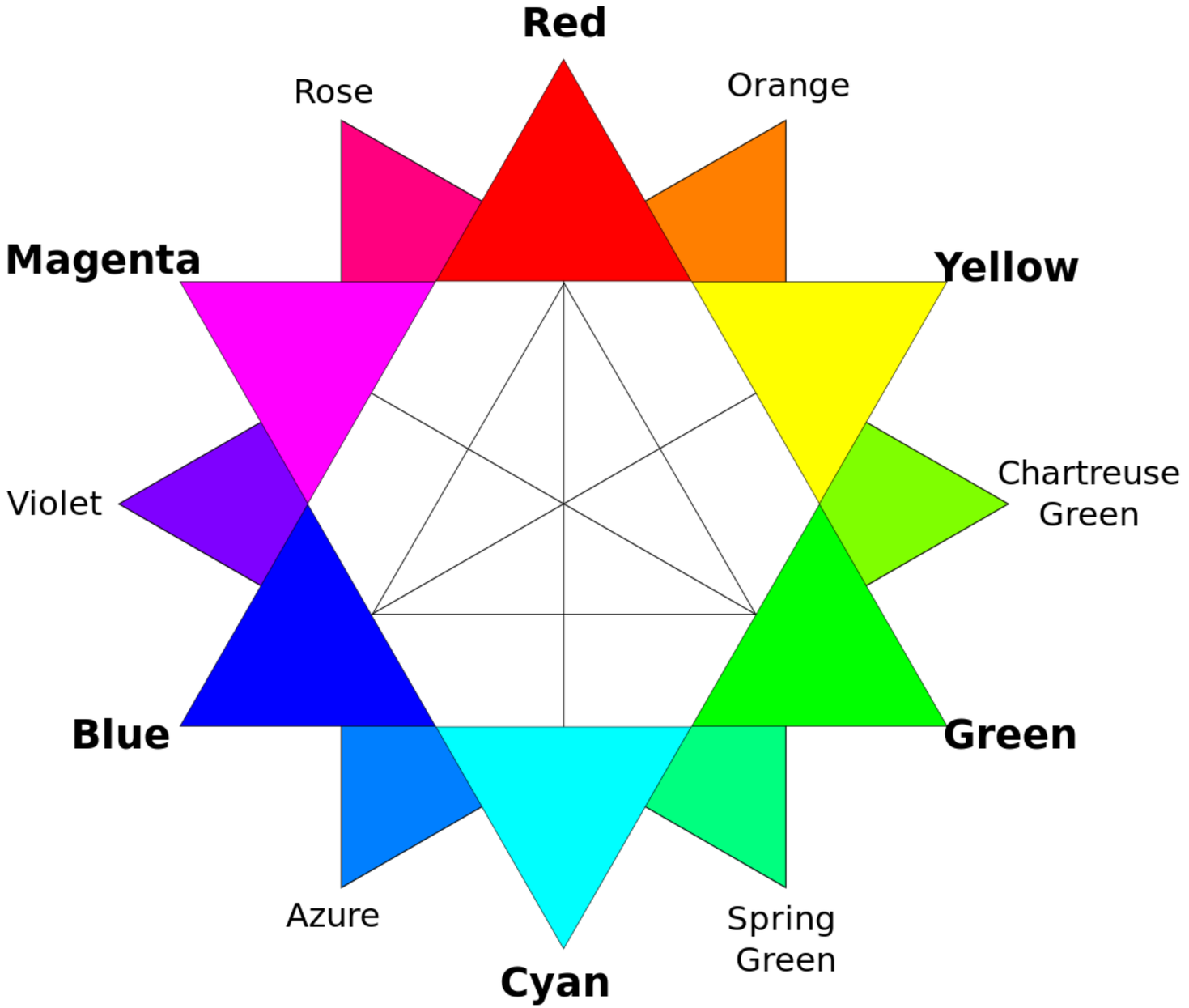
green

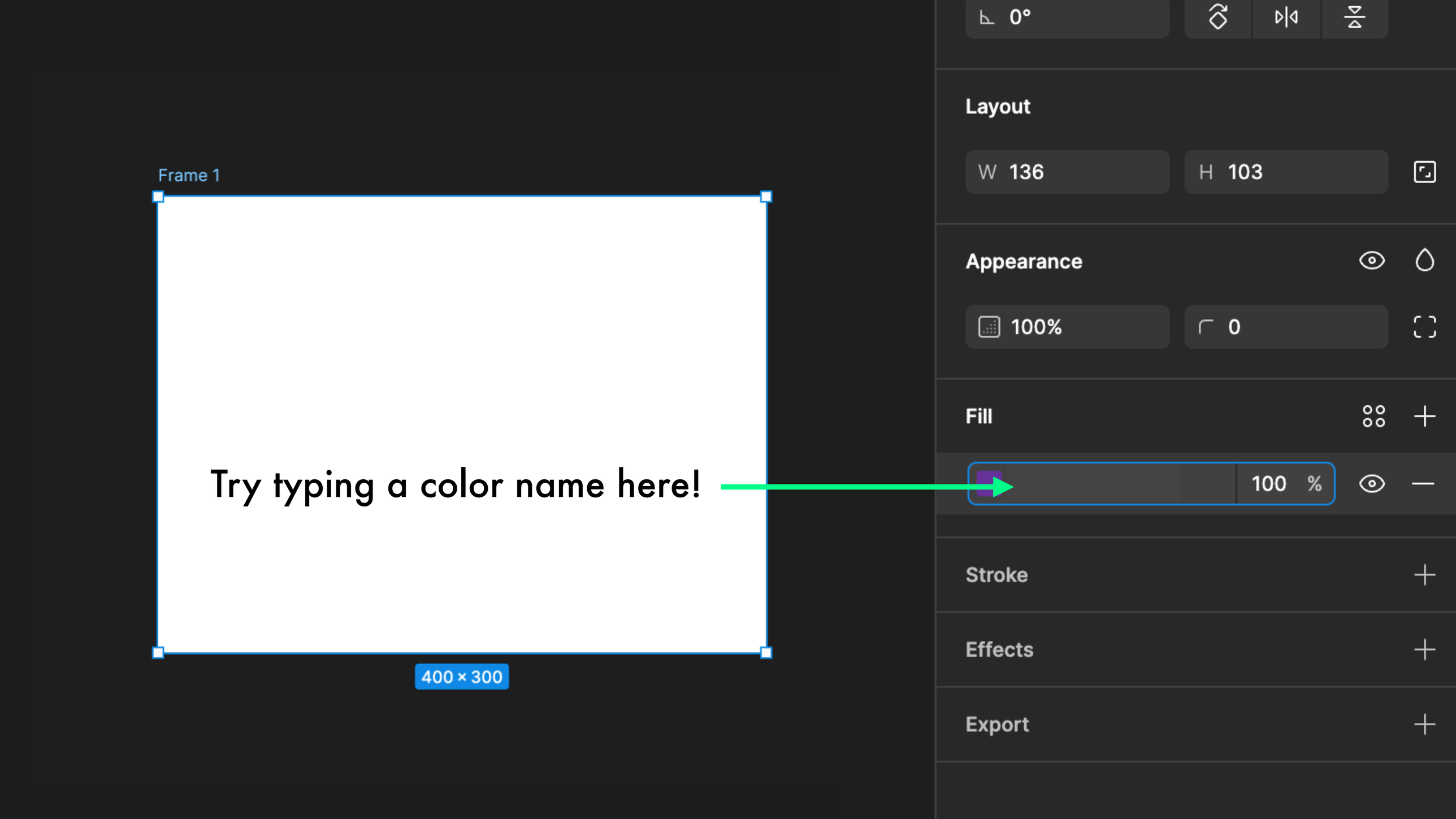
blue

springgreen

azure

cyan

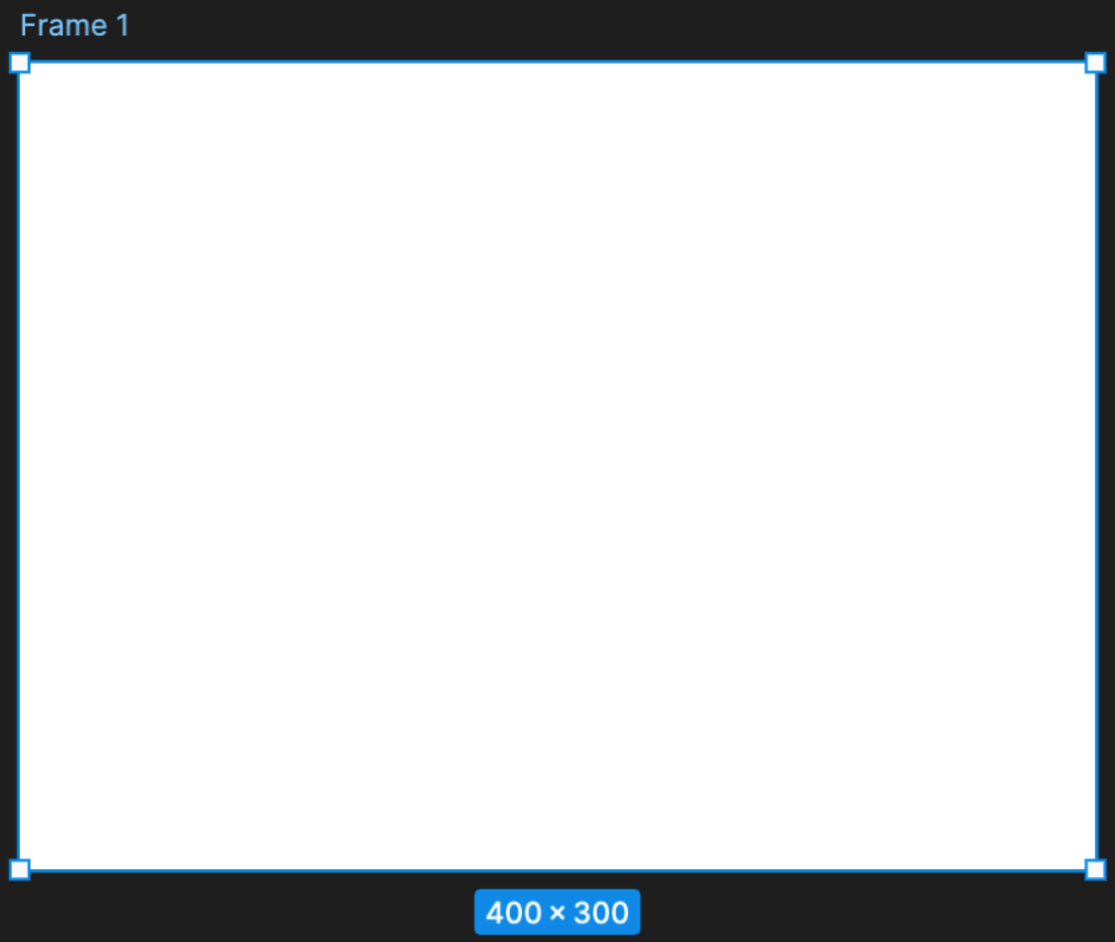

Red
Rose
Orange
Magenta
Yellow
Violet
Chartreuse
Green
Blue
Green
Azure
Spring
Green
Cyan


Frame 1
Try typing a color name here!
400 × 300
0°
Layout
W 136
H 103
Appearance
100%
0
Fill
100 %
Stroke
Effects
Export

There are a limited number of named colours in HTML/CSS.

These are also supported by Figma.

rebeccapurple



0°

Layout

W 136

H 103

Appearance

100%

0

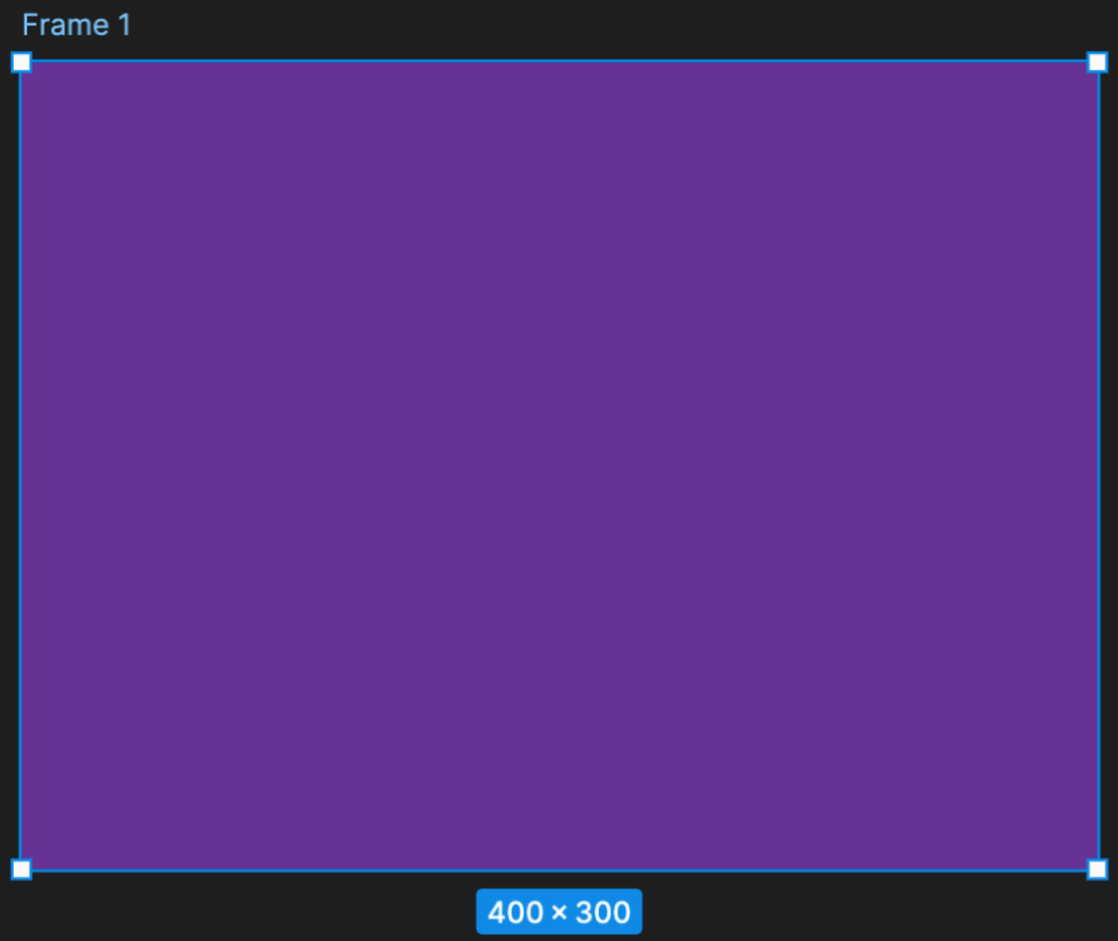
Fill

rebeccapurple 100 %

Stroke

Effects

Export



0°

Layout

W 136

H 103

Appearance

100%

0

Fill

rebeccapurple 100 %

Stroke

Effects

Export

rebeccapurple #663399

Eric A. Meyer is a well known CSS advocate who wrote a number of books and made a lot of teaching material around CSS. His daughter Rebecca Meyer tragically died of a brain tumor on her sixth birthday. The CSS WG proposed adding “beccapurple” to the named colours list in her honor. Meyer suggested that it should instead be rebeccapurple.

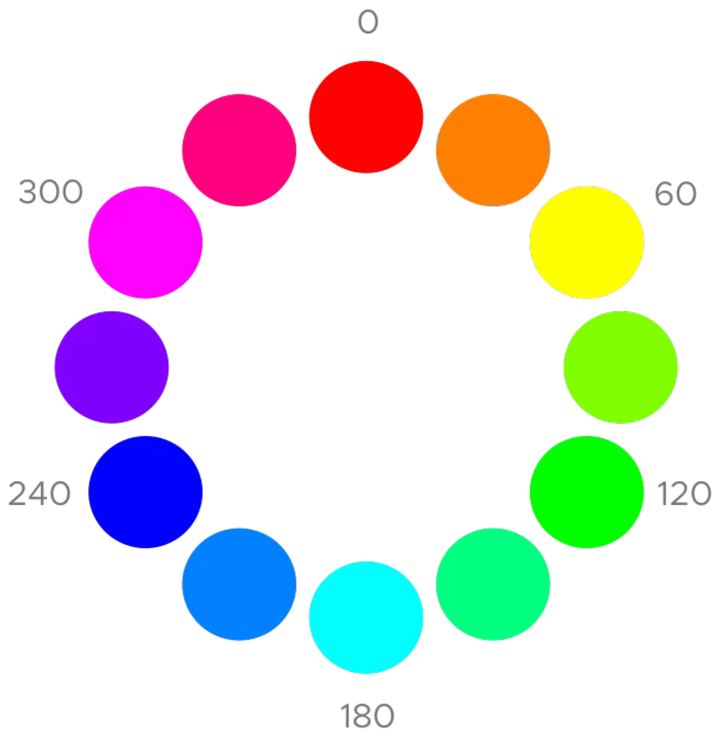
“A couple of weeks before she died, Rebecca informed us that she was about to be a big girl of six years old, and Becca was a baby name. Once she turned six, she wanted everyone (not just me) to call her Rebecca, not Becca.”

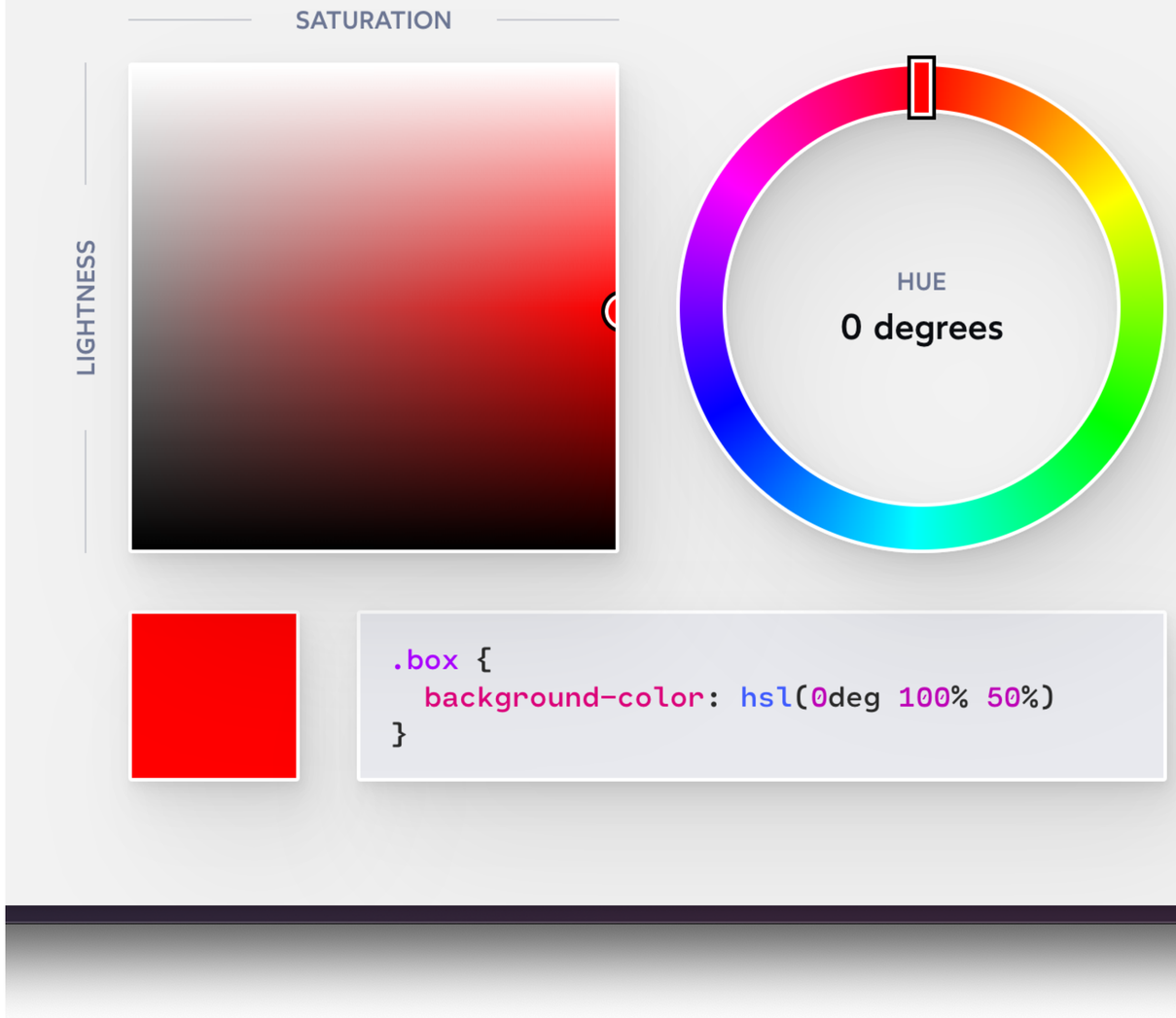
What if I want to find a color that is like pink, but a bit lighter?

Lightpink does not exist.

HSL

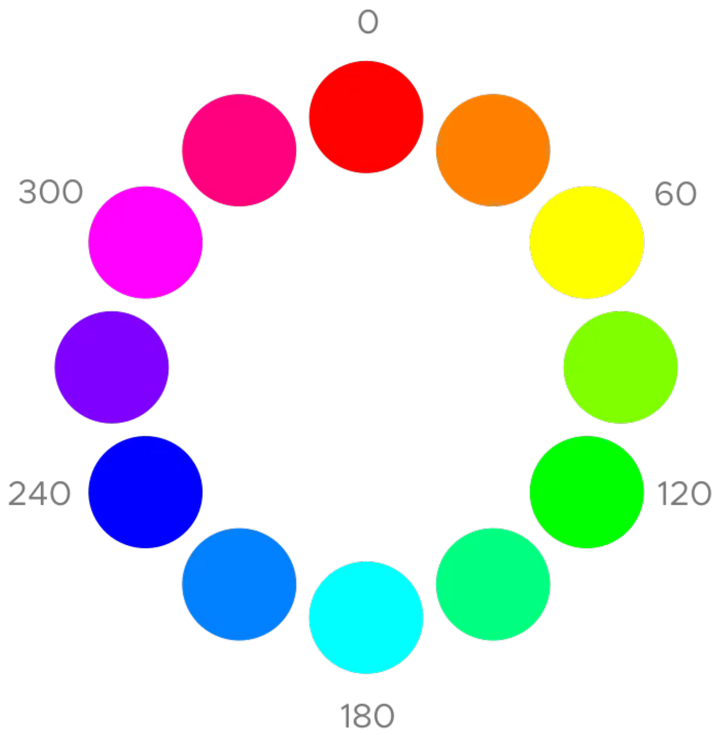
Hue Saturation Lightness

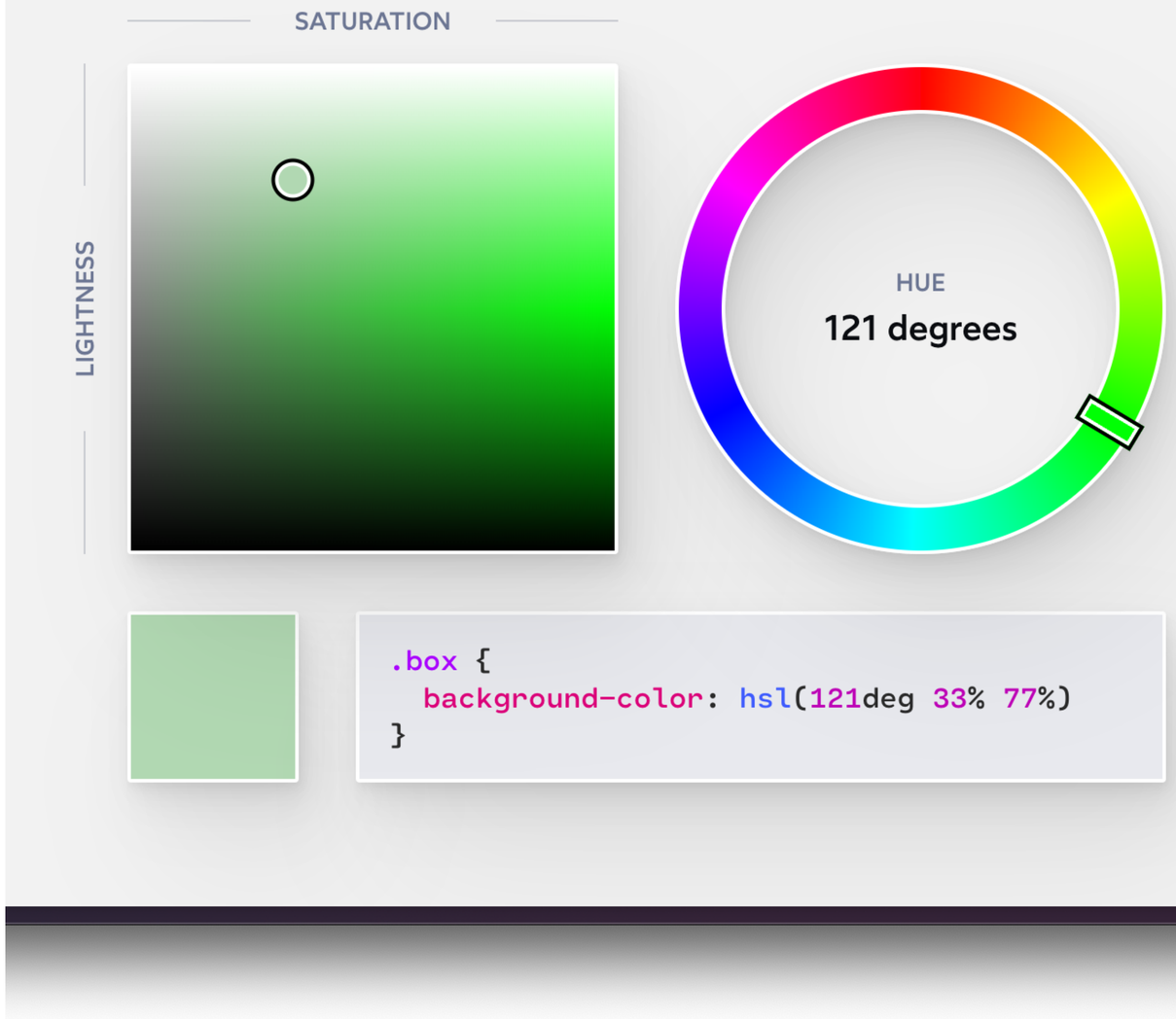


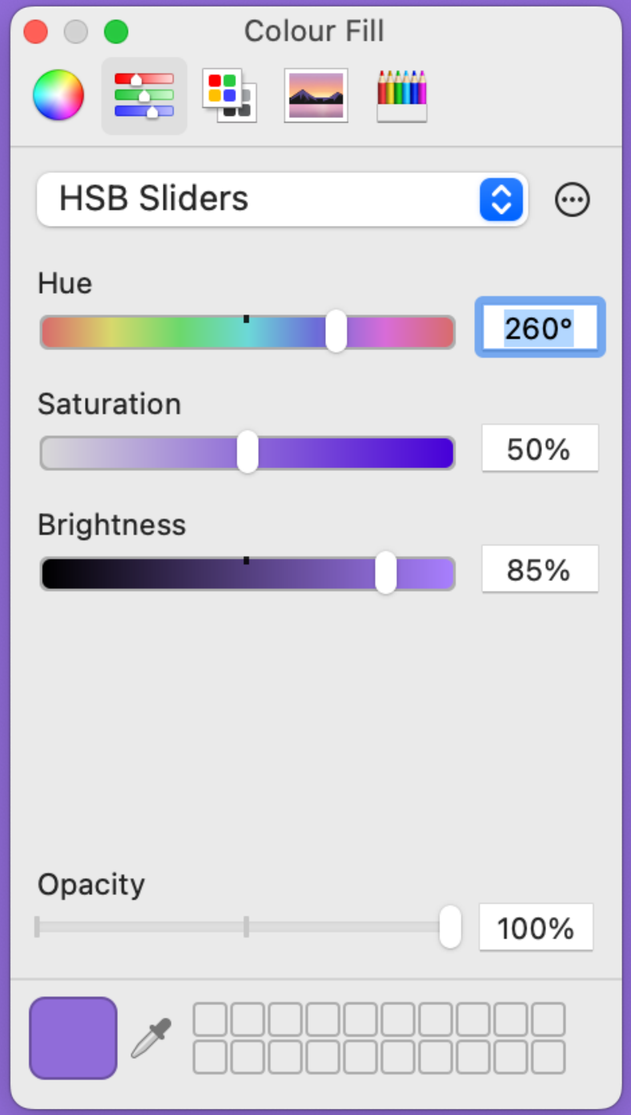


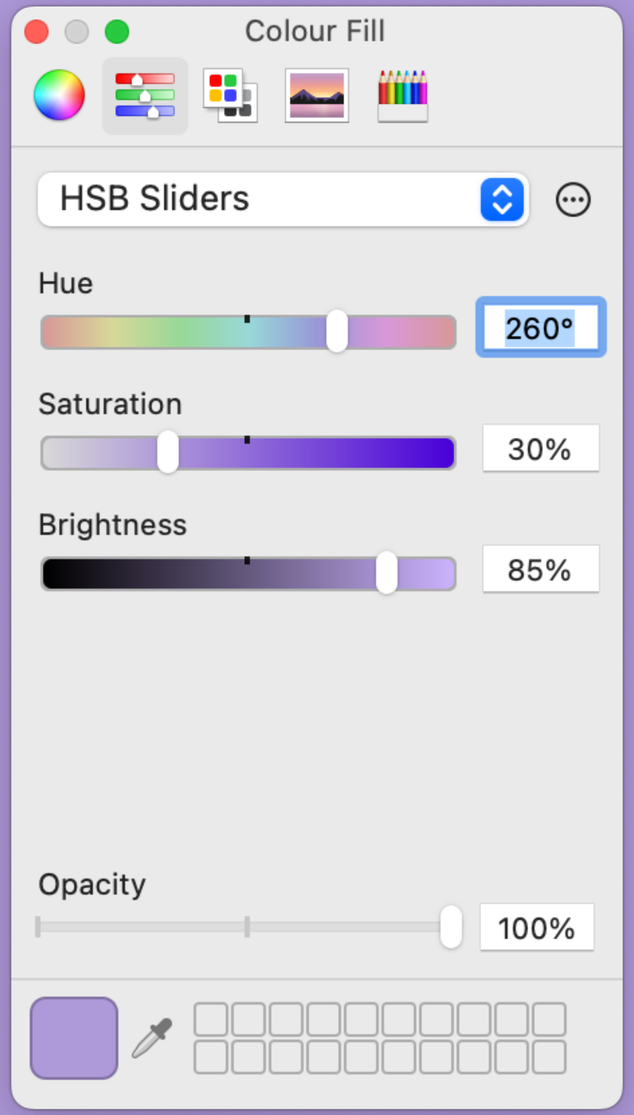
HSL

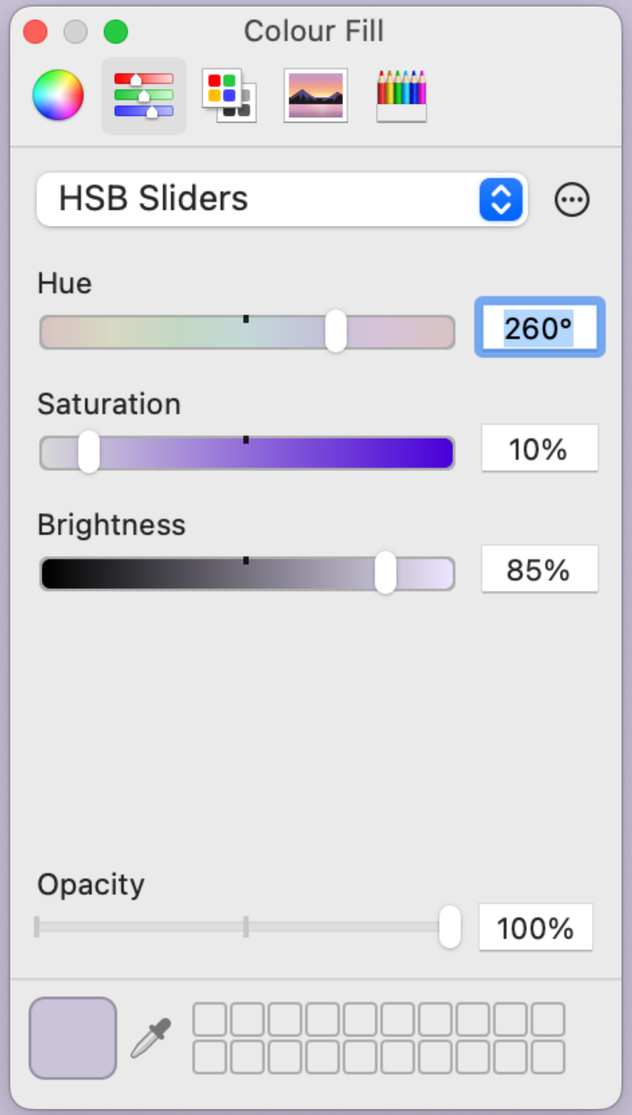
Hue Saturation Lightness

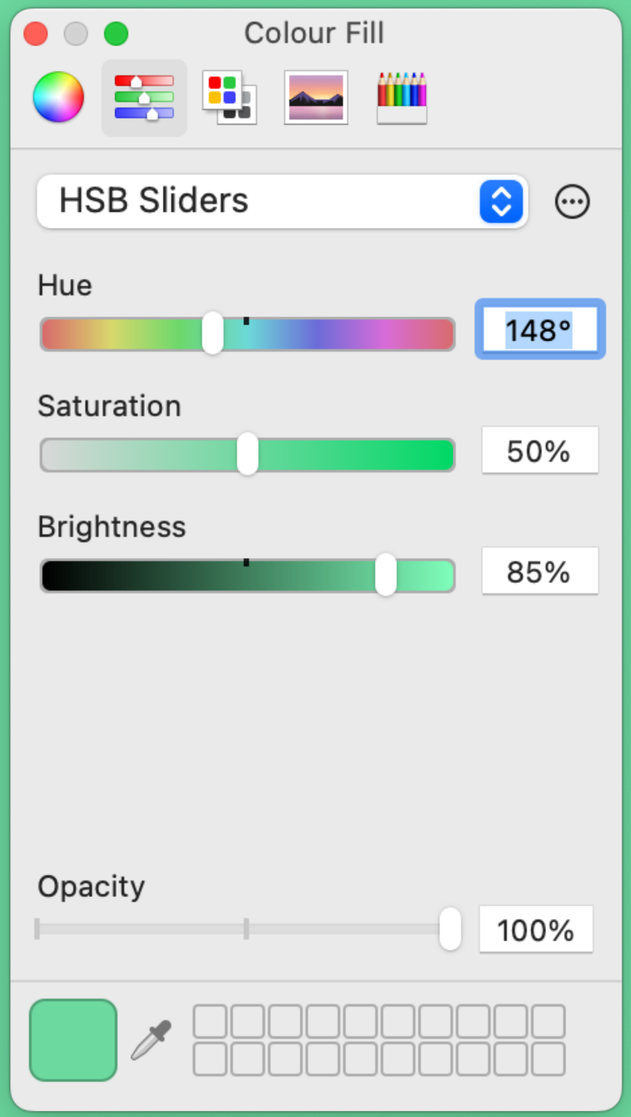


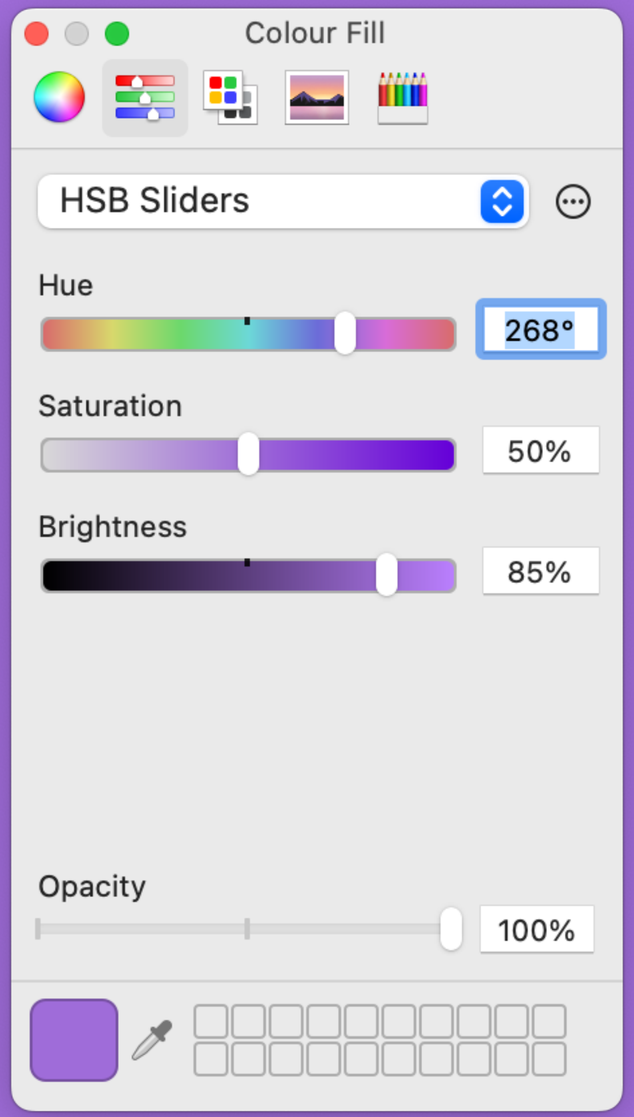


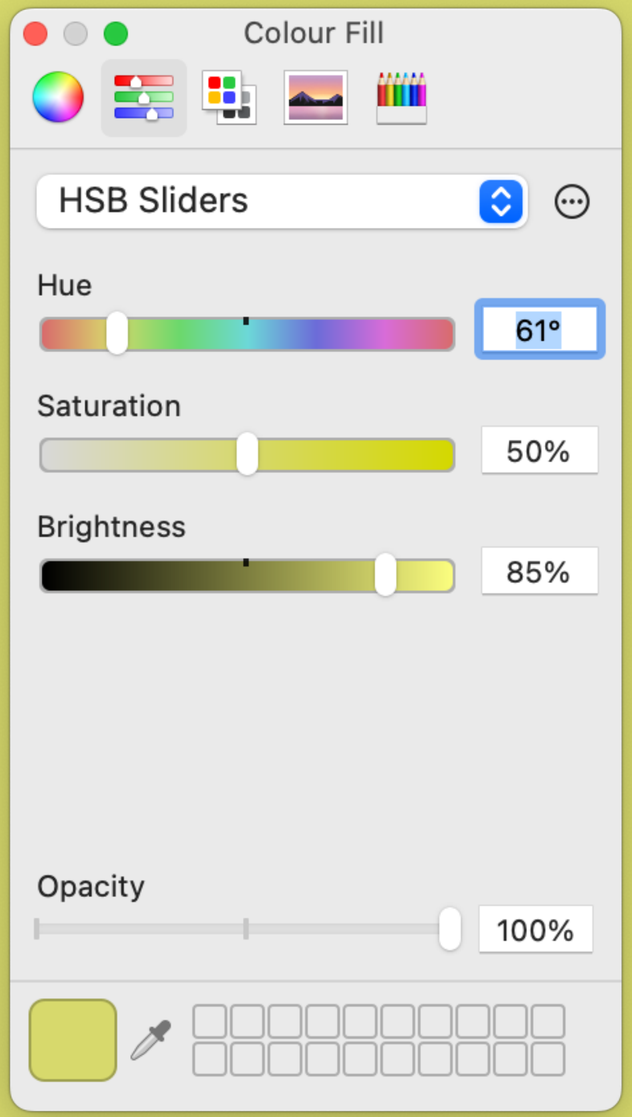

Colour Fill
HSB Sliders
Hue
260°
Saturation
50%
Brightness
85%
Opacity
100%


Colour Fill
HSB Sliders
Hue
260°
Saturation
30%
Brightness
85%
Opacity
100%


Colour Fill
HSB Sliders
Hue
260°
Saturation
10%
Brightness
85%
Opacity
100%


Colour Fill
HSB Sliders
Hue
148°
Saturation
50%
Brightness
85%
Opacity
100%


Colour Fill
HSB Sliders
Hue
268°
Saturation
50%
Brightness
85%
Opacity
100%


Colour Fill
HSB Sliders
Hue
61°
Saturation
50%
Brightness
85%
Opacity
100%

OKLAB and OKLCH

Comparing Oklab to HSV

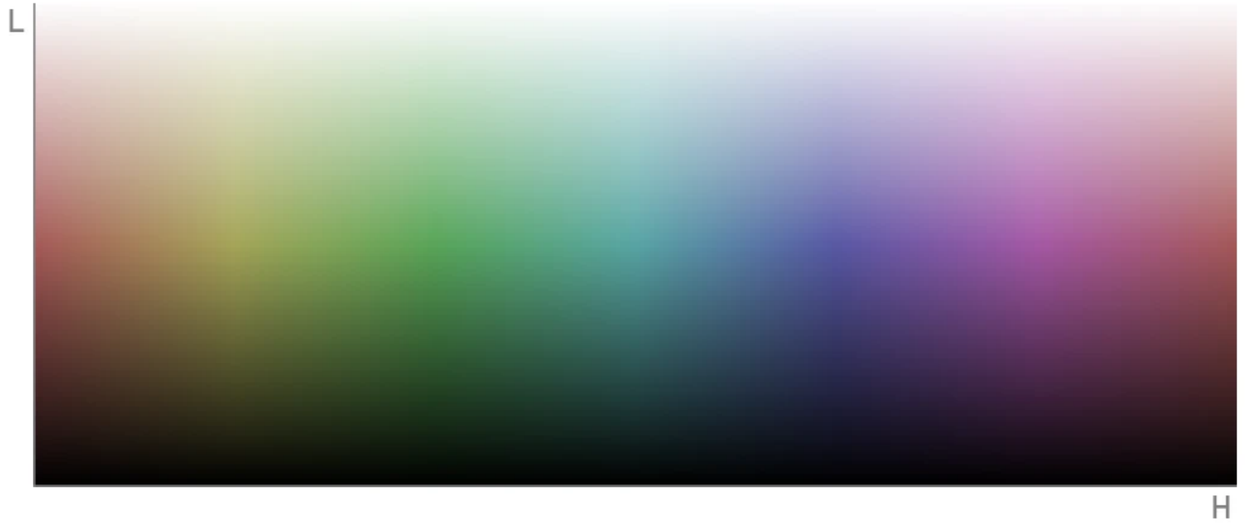
Here's an Oklab color gradient with varying hue and constant lightness and chroma.

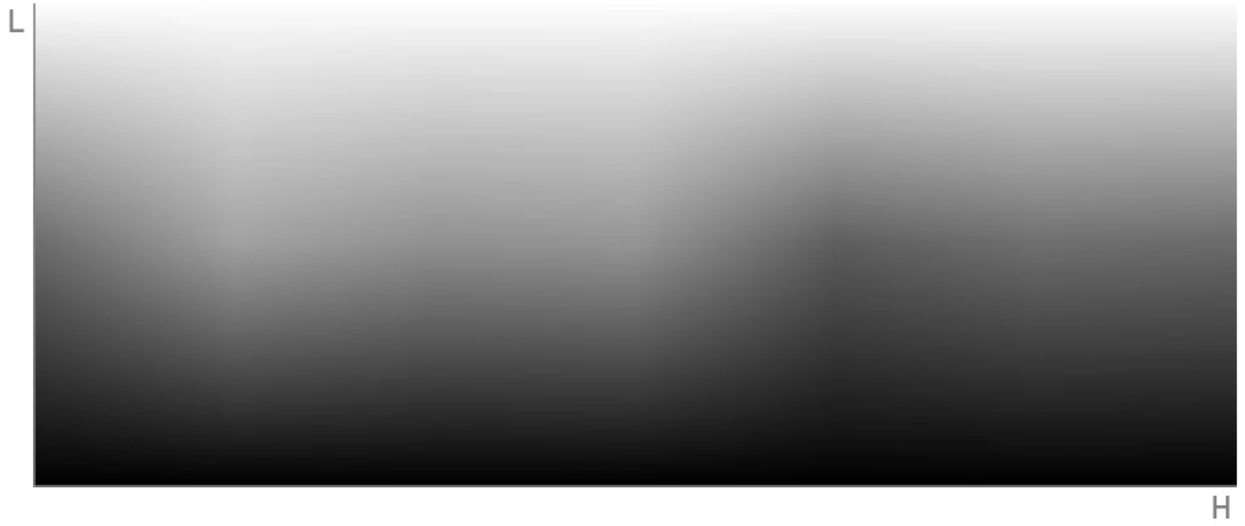
Compare this to a similar plot of a HSV color gradient with varying hue and constant value and saturation (HSV using the sRGB color space).

The gradient is quite uneven and there are clear differences in lightness for different hues. Yellow, magenta and cyan appear much lighter than red and blue.

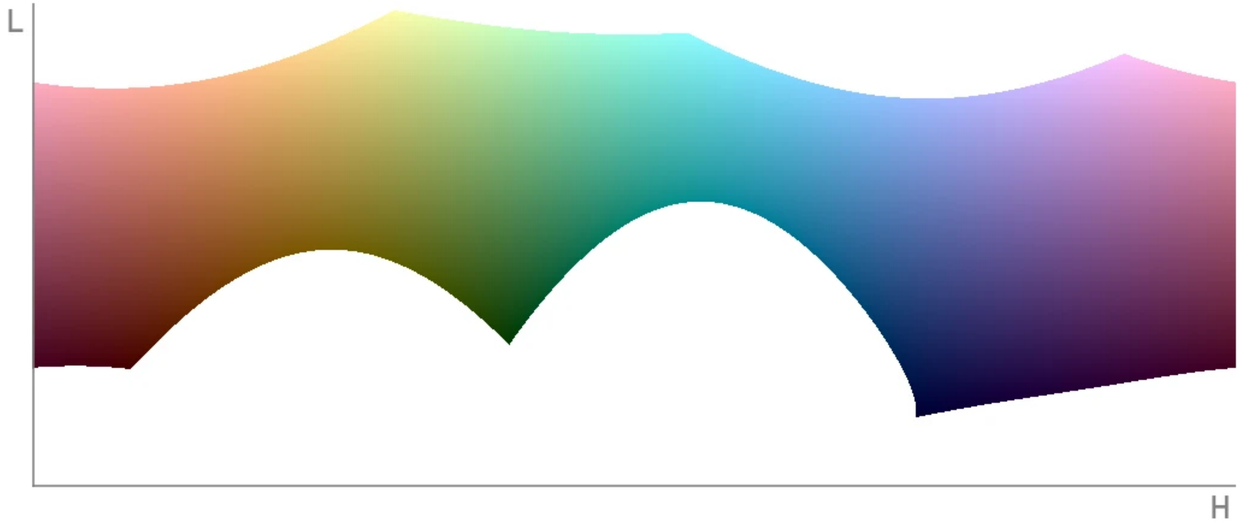
Here is lightness of the HSV plot, as predicted by Oklab:

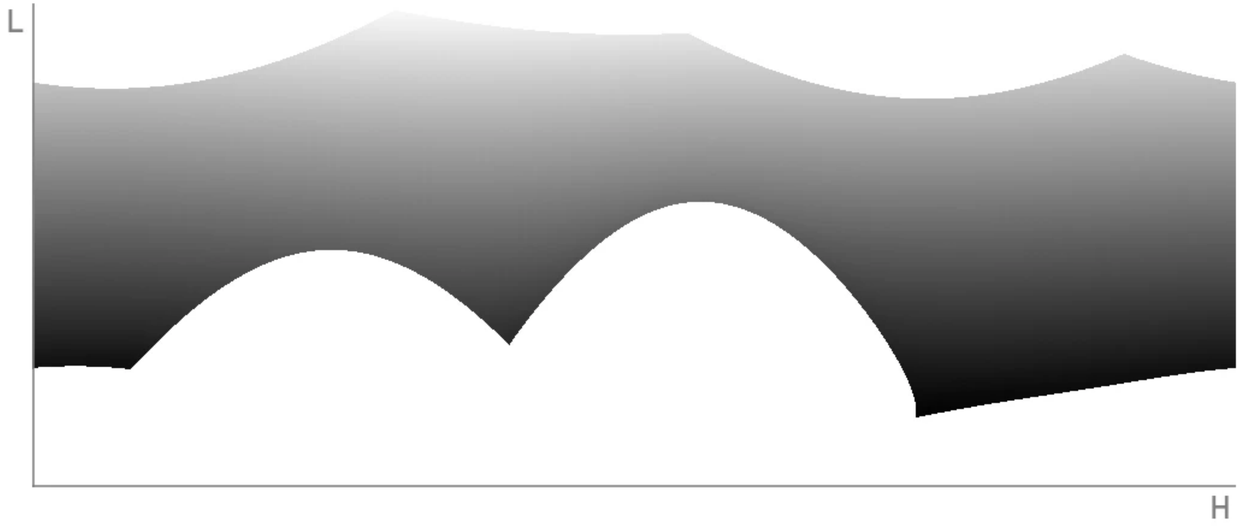
HSL





OKLCH

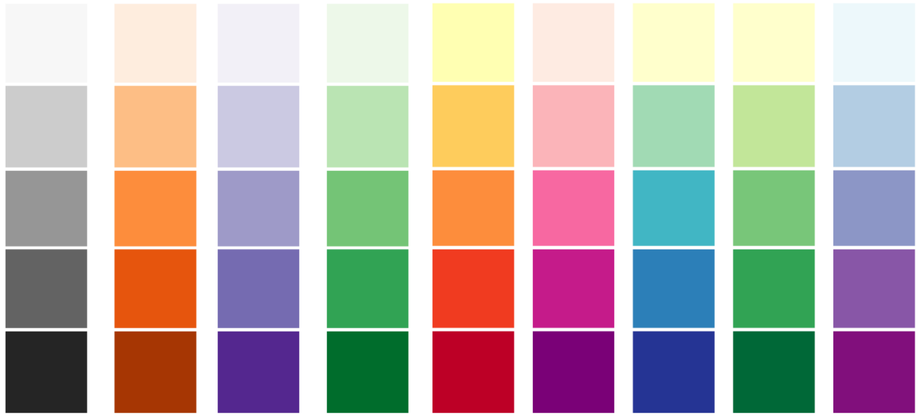




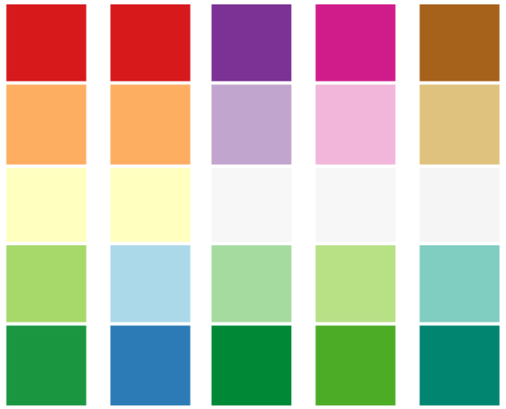
Color Schemes for Data

Qualitative

Sequential

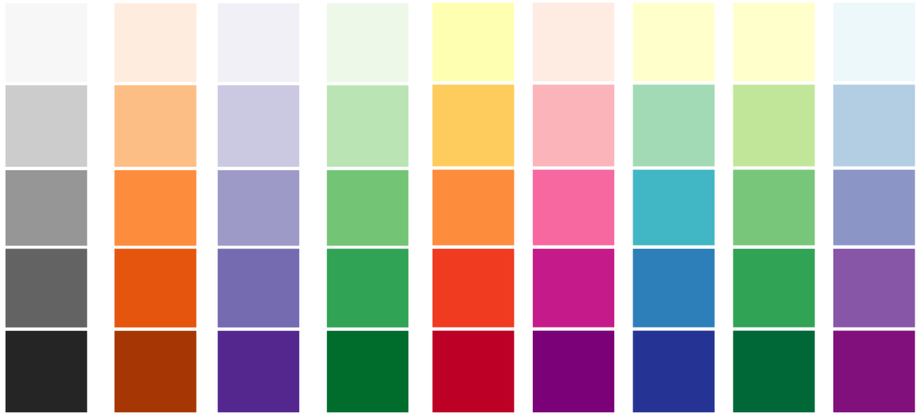


Diverging



Qualitative

Sequential



Diverging

When would you use each of these color schemes?

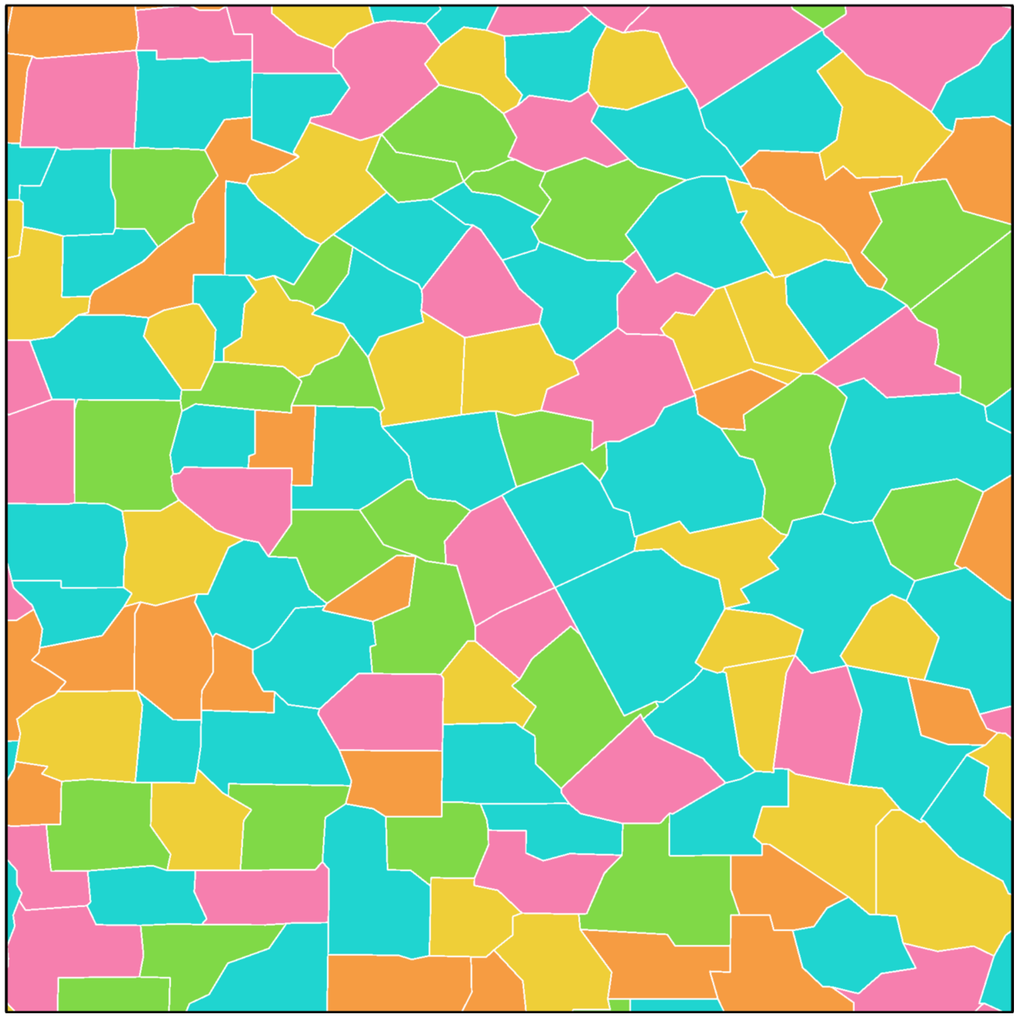
Color in cartography

- Blue color for the depiction of water surfaces.
- Green color for the depiction of vegetation.
- Brown color for rock surfaces.
- Yellow color for dry land surfaces.

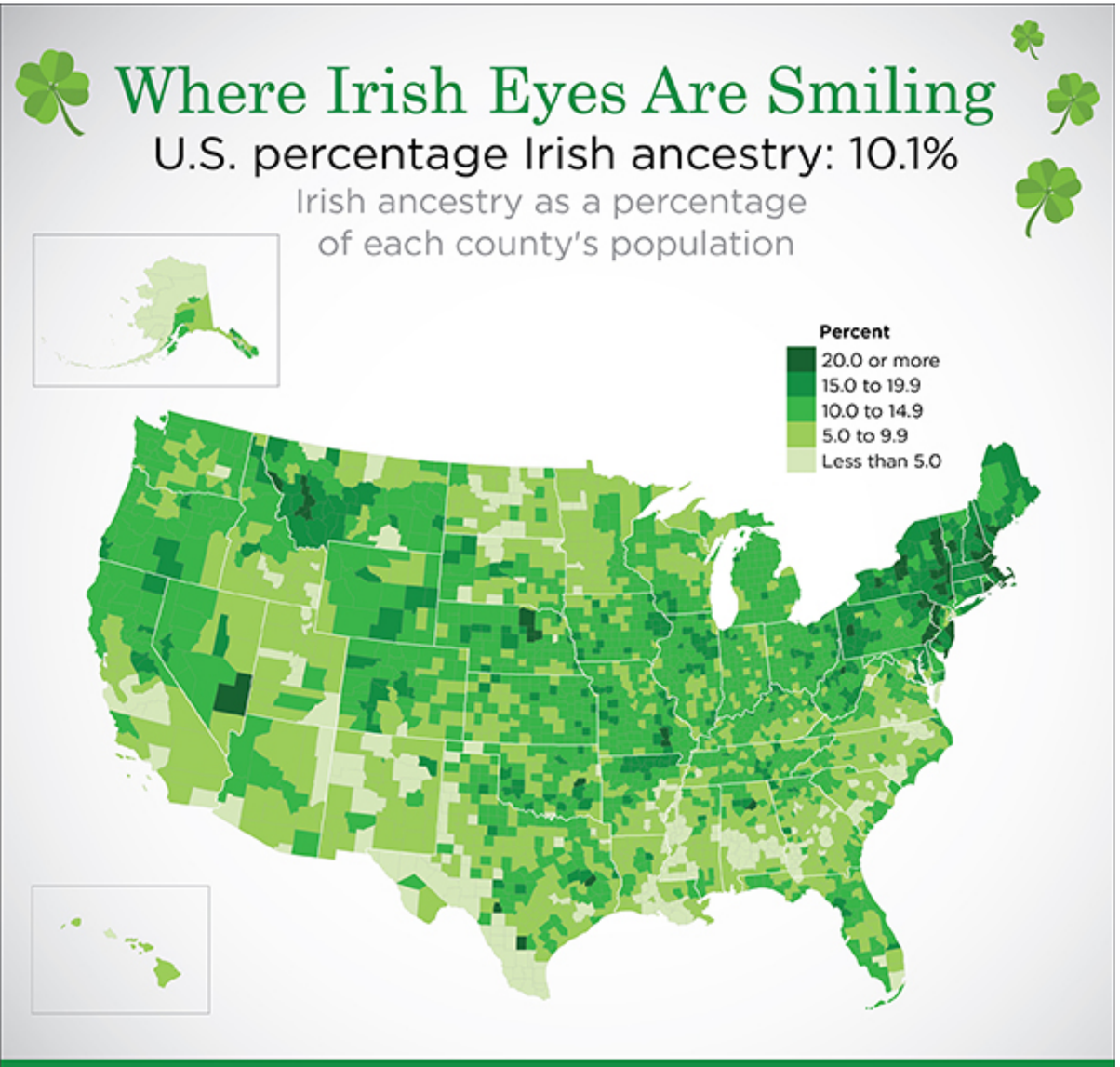
Qualitative Sequential Diverging

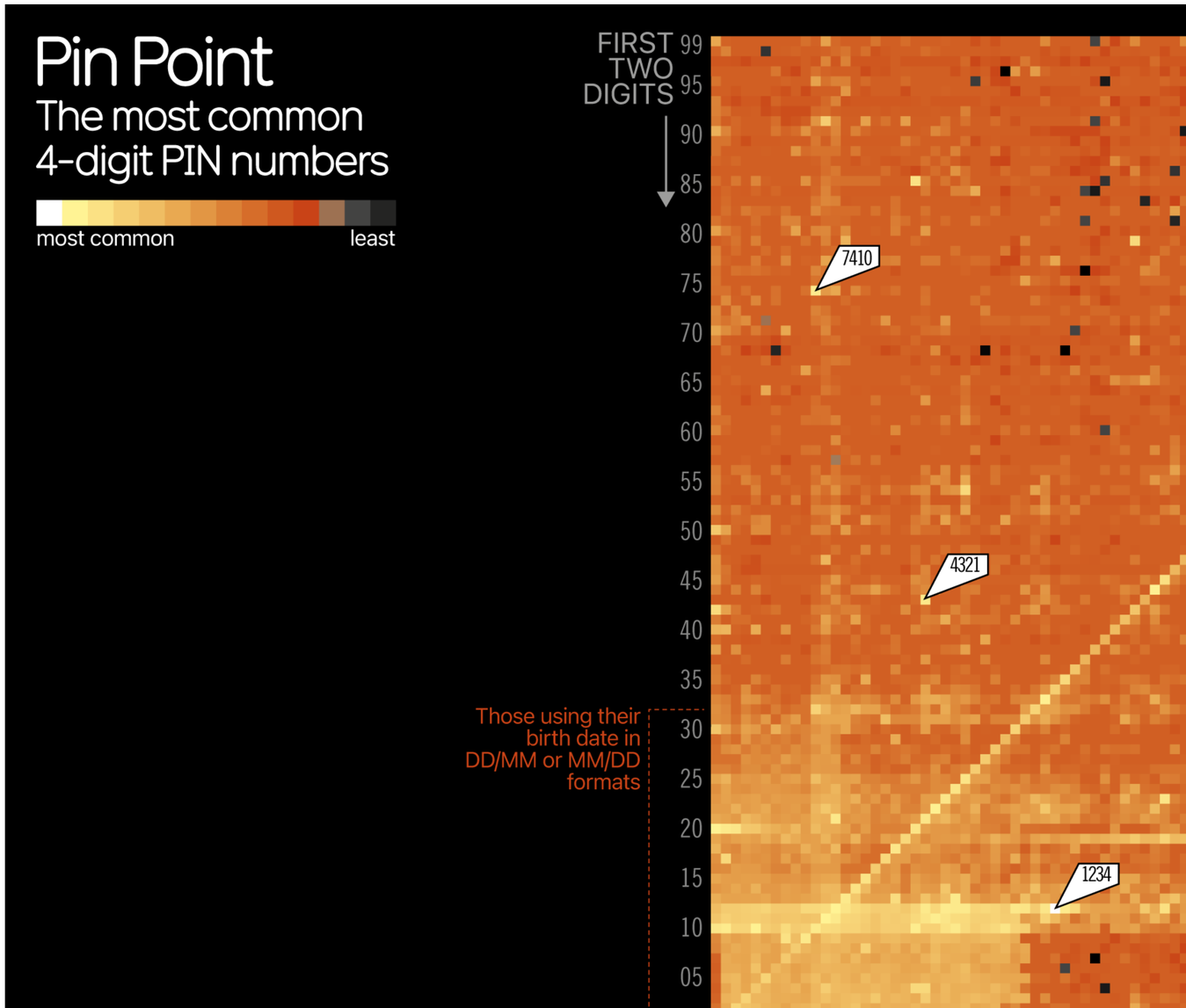
Most Popular
Kind of **Dessert**

- Ice Cream Cake
- Cookies
- Cupcakes
- Brownies
- Frozen Yogurt

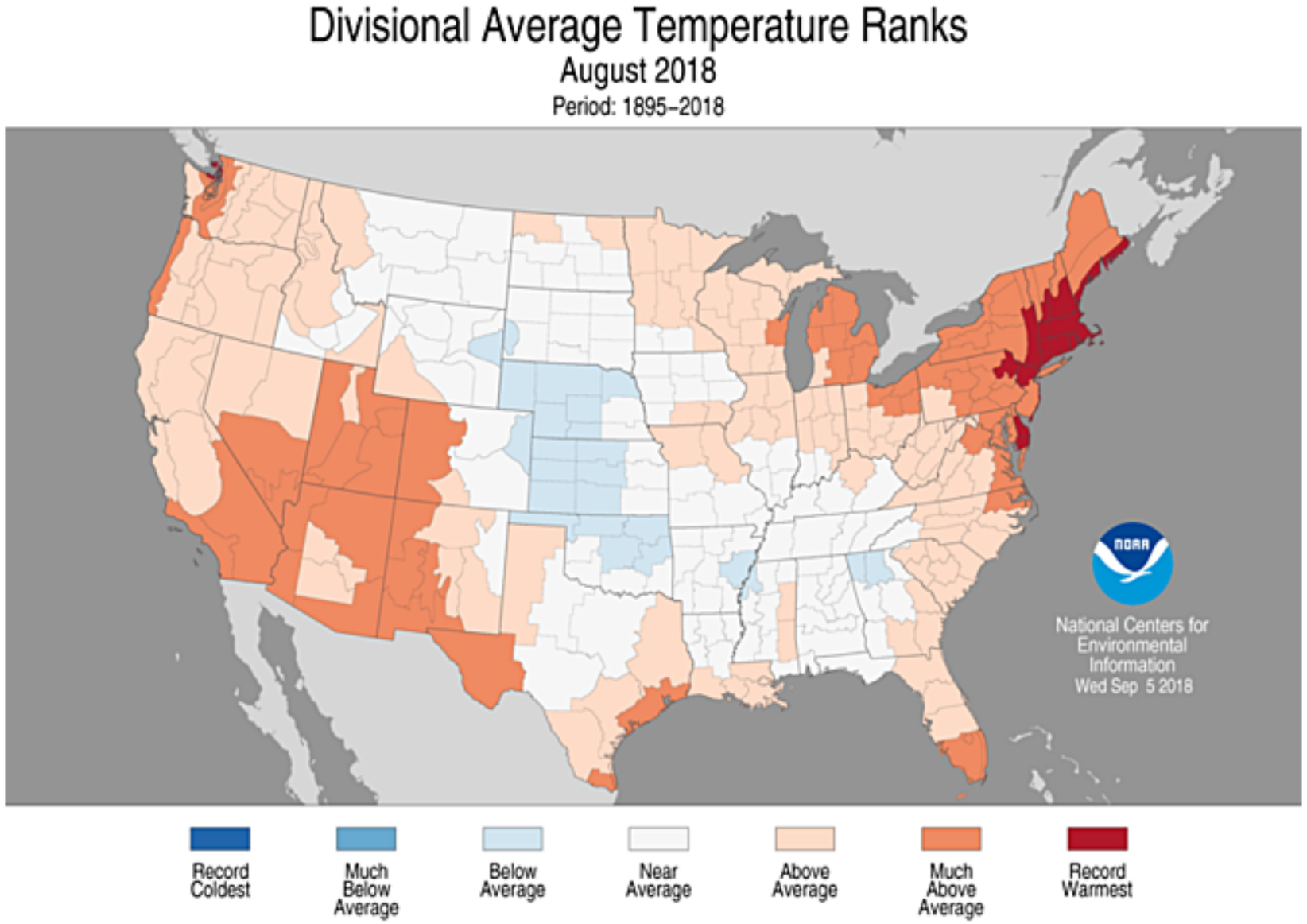


Qualitative **Sequential** Diverging





Qualitative Sequential **Diverging**



David Rumsey Map Collection

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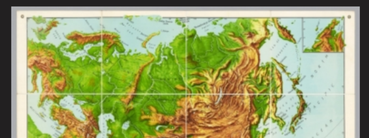

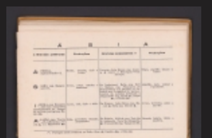

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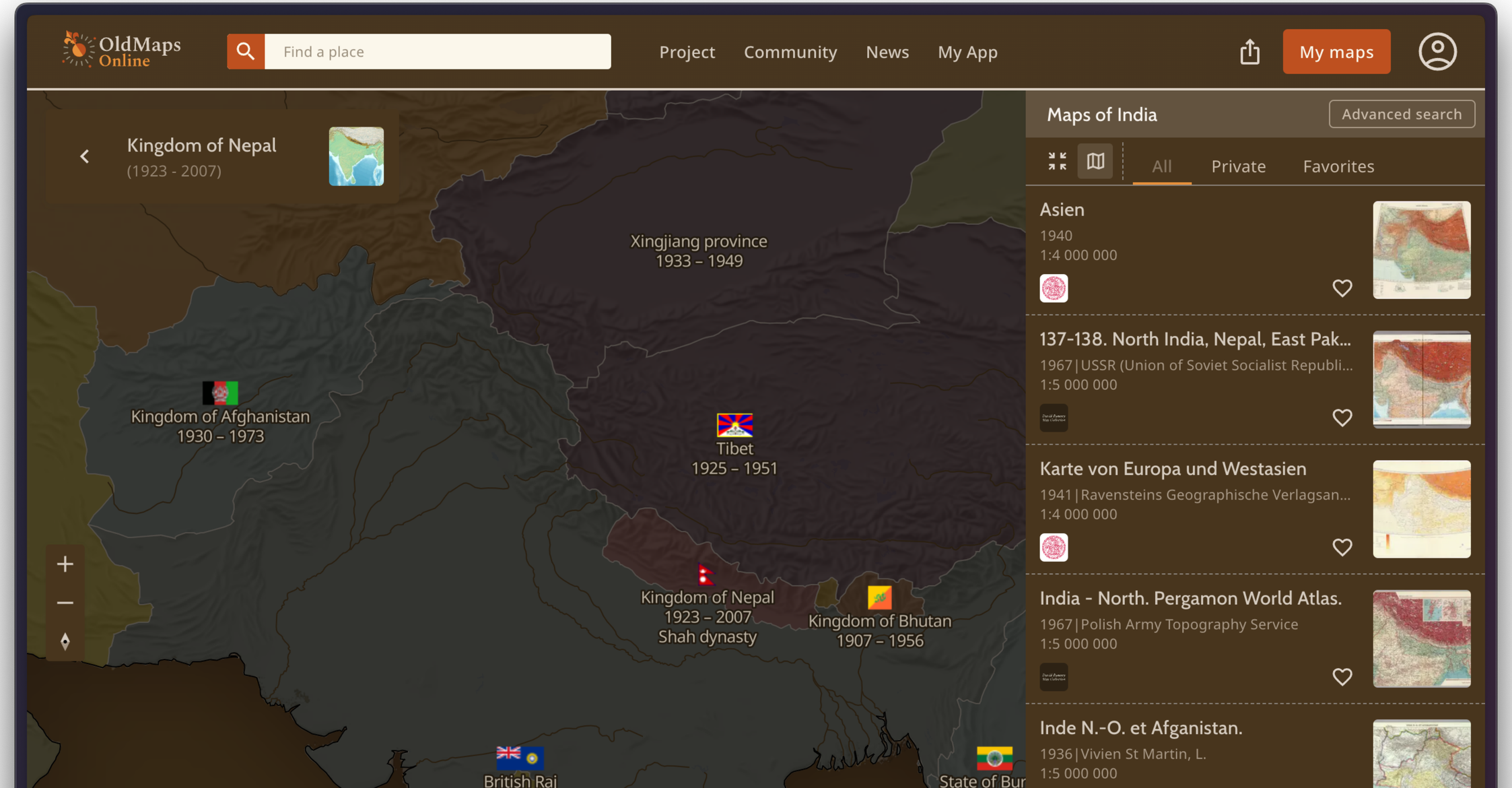

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SUPERIOR MAP OF
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SCALE OF KILOMETRES
National Capitals
Administrative Centers
International Boundaries
International Boundaries
Canals
ATLANTIC OCEAN
ARCTIC OCEAN
PACIFIC OCEAN
INDIAN OCEAN
GREENLAND
GREENLAND SEA
NORWEGIAN SEA
BARENTS SEA
KARA SEA
EAST SIBERIAN SEA
BERING SEA
SEA OF OKHOTSK
SEA OF JAPAN
EAST CHINA SEA
SOUTH CHINA SEA
PHILIPPINE SEA
ARABIAN SEA
BAY OF BENGAL
ANDAMAN SEA
CORAL SEA
TASMAN SEA
ARAFURA SEA
UNITED STATES
UNION OF SOVIET SOCIALIST REPUBLICS
MONGOLIA
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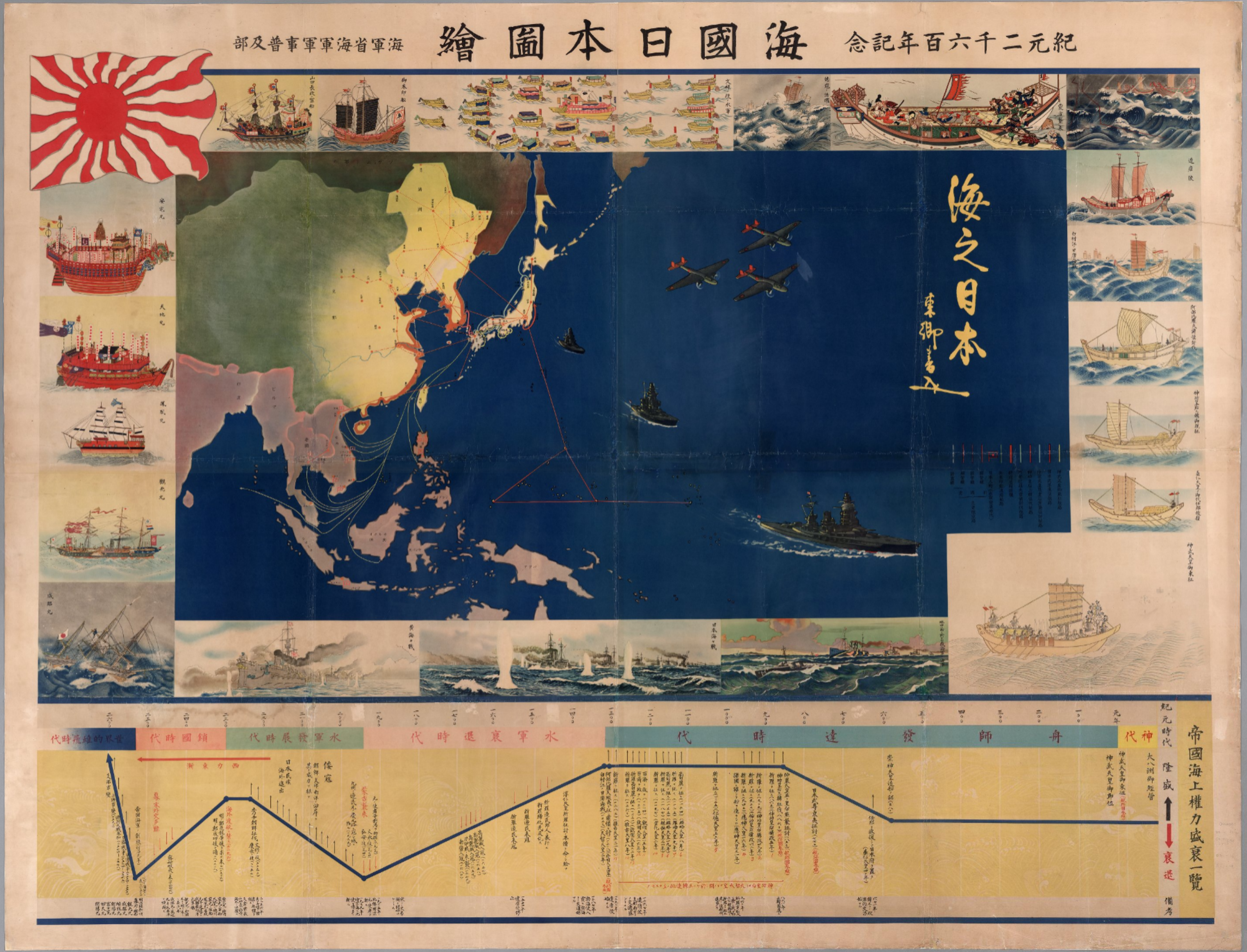
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備考

2001 –

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1992 –

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2004 – 202

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People's Republic
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1972 –

Republic of India
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Myanmar
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ltanate of Oman
1995 –

Manuṣyaloka (मनुष्यलोक) (Cosmological Diagram - The World of Mortals.)

Jain painting, circa 1850

This large painting consists of a map-like rendering of the middle world, one of three worlds that comprise the Jain universe. Located between the celestial realm and the lower world of the damned, this middle world is where mortals and all sentient beings live and is the place from which liberation becomes possible.

https://solidlight-inc.com/mapping-visitor-emotions/

Color in cartography

- Blue color for the depiction of water surfaces.
- Green color for the depiction of vegetation.
- Brown color for rock surfaces.
- Yellow color for dry land surfaces.

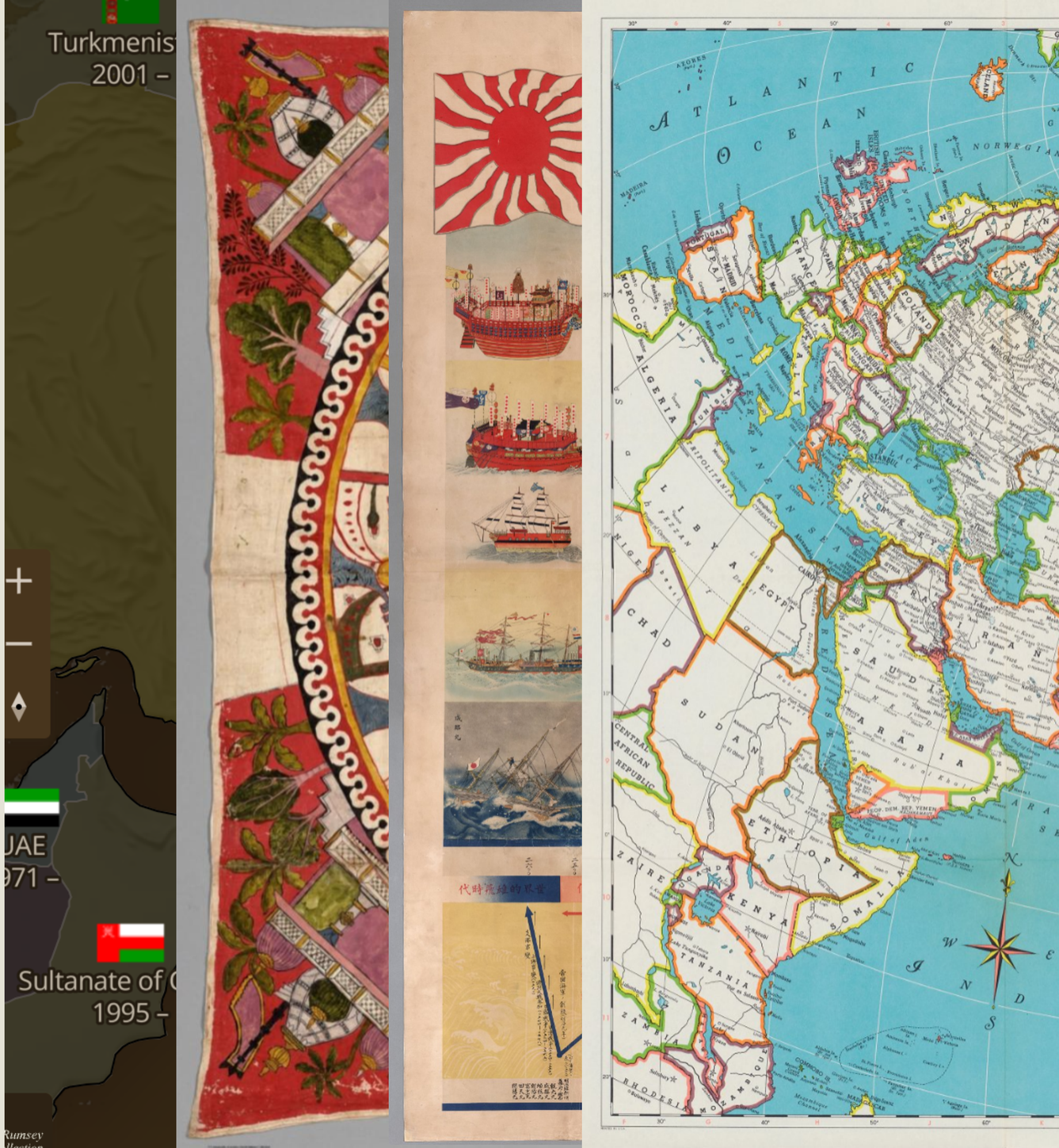
All of this is convention though and is not set in stone.

Exercise - Style a Map

Gather reference images for maps with color schemes that you like.

Extract this to a palette of colours.

Next, we will try and use Mapbox to create a map of another place in a similiar style.



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