Colour Spaces

In what follows are various notes dealing with colour spaces and conversion between them.

RGB colour space

Lists of RGB values for named colours

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Resene RGB Values List

This table is the "standard" set as used by the SGI X windows server. The values are in the range of 0 to 255 inclusive.

Contribution by Robert Rapplean, C++ program that creates an image that can be folded together to form the RGB colour cube.

Colour space

A colour space is a means of uniquely specifying a colour. There are a number of colour spaces in common usage depending on the particular industry and/or application involved. For example as humans we normally determine colour by parameters such as brightness, hue, and colourfulness. On computers it is more common to describe colour by three components, normally red, green, and blue. These are related to the excitation of red, green, and blue phosphors on a computer monitor. Another similar system geared more towards the printing industry uses cyan, magenta, and yellow to specify colour, they are related to the reflectance and absorbance of inks on paper.

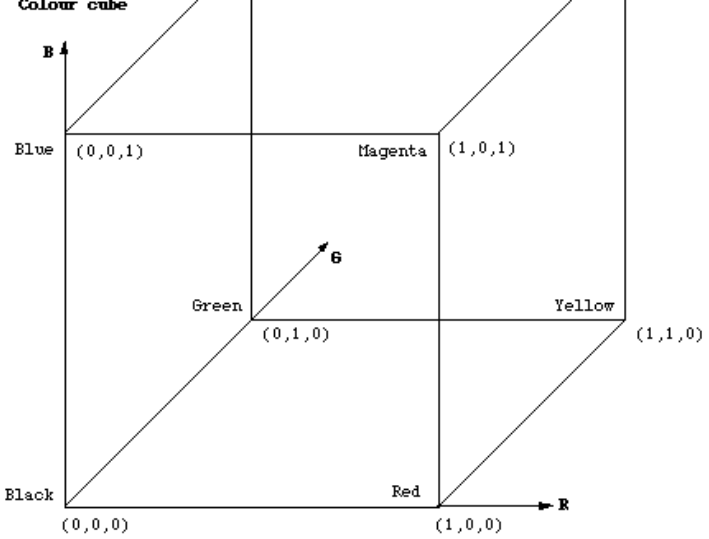
Some other major colour spaces are:

- HSL, Hue Saturation and Lightness.
- HSI, Hue Saturation and Intensity
- HSV, Hue Saturation and Value
- CIE, a colour standard from the for Commission Internationale de l'Eclairage based on brightness, hue, and colourfulness.

There are generally ways of converting (transforming) between different colour spaces although in most cases the transformation is nonlinear. Some colour spaces for example can represent colours which cannot be represented in others.

RGB colour cube

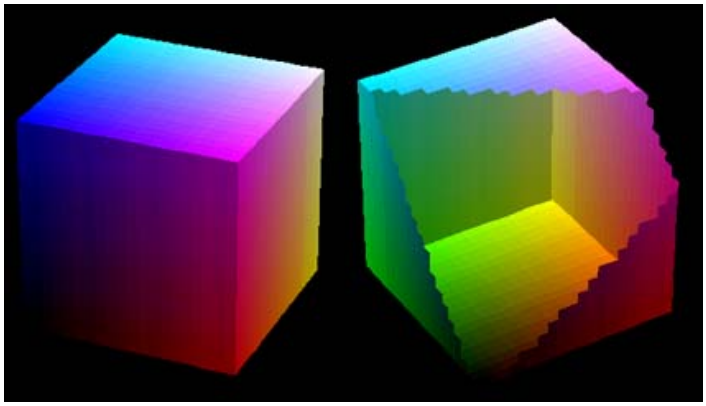
The colour space for computer based applications is often visualised by a unit cube. Each colour (red, green, blue) is assigned to one of the three orthogonal coordinate axes in 3D space. An example of such a cube is shown below along with some key colours and their coordinates.



Note:

- Along each axis of the colour cube the colours range from no contribution of that component to a fully saturated colour.
- The colour cube is solid, any point (colour) within the cube is specified by three numbers, namely, an r,g,b triple.
- The diagonal line of the cube from black (0,0,0) to white (1,1,1) represents all the greys, that is, all the red, green, and blue components are the same.
- In practice different computer hardware/software combinations will use different ranges for the colours, common ones are 0-256 and 0-65536 for each component. This is simply a linear scaling of the unit colour cube described here.
- This RGB colour space lies within our perceptual space, that is, the RGB cube is smaller and represents fewer colours than we can see.

A more "colourful" view of the shell of the colour cube is shown below.



RGB colour values for "familiar" colours.

The first set below was originally compiled by Steve Hollasch and is organised as follows: the first column is the descriptive name of the colour; the next three columns are the RGB coordinates in the 0 to 255 range as if the components were being stored in one unsigned byte; the last three columns are the RGB colour coordinates in the range of 0 to 1 inclusive.

Whites

antique_white	250	235	215	0.9804	0.9216	0.8431
azure	240	255	255	0.9412	1.0000	1.0000
bisque	255	228	196	1.0000	0.8941	0.7686
blanched_almond	255	235	205	1.0000	0.9216	0.8039
cornsilk	255	248	220	1.0000	0.9725	0.8627
eggshell	252	230	201	0.9900	0.9000	0.7900
floral_white	255	250	240	1.0000	0.9804	0.9412
gainsboro	220	220	220	0.8627	0.8627	0.8627
ghost_white	248	248	255	0.9725	0.9725	1.0000
honeydew	240	255	240	0.9412	1.0000	0.9412

mint_cream	245	255	250	0.9608	1.0000	0.9804
misty_rose	255	228	225	1.0000	0.8941	0.8824
moccasin	255	228	181	1.0000	0.8941	0.7098
navajo_white	255	222	173	1.0000	0.8706	0.6784
old_lace	253	245	230	0.9922	0.9608	0.9020
papaya_whip	255	239	213	1.0000	0.9373	0.8353
peach_puff	255	218	185	1.0000	0.8549	0.7255
seashell	255	245	238	1.0000	0.9608	0.9333
snow	255	250	250	1.0000	0.9804	0.9804
thistle	216	191	216	0.8471	0.7490	0.8471
titanium_white	252	255	240	0.9900	1.0000	0.9400
wheat	245	222	179	0.9608	0.8706	0.7020
white	255	255	255	1.0000	1.0000	1.0000
white_smoke	245	245	245	0.9608	0.9608	0.9608
zinc_white	253	248	255	0.9900	0.9700	1.0000
Greys						
cold_grey	128	138	135	0.5000	0.5400	0.5300
dim_grey	105	105	105	0.4118	0.4118	0.4118
grey	192	192	192	0.7529	0.7529	0.7529
light_grey	211	211	211	0.8275	0.8275	0.8275
slate_grey	112	128	144	0.4392	0.5020	0.5647
slate_grey_dark	47	79	79	0.1843	0.3098	0.3098
slate_grey_light	119	136	153	0.4667	0.5333	0.6000
warm_grey	128	128	105	0.5000	0.5000	0.4100
Blacks						
black	0	0	0	0.0000	0.0000	0.0000
ivory_black	41	36	33	0.1600	0.1400	0.1300
lamp_black	46	71	59	0.1800	0.2800	0.2300
Reds						
alizarin_crimson	227	38	54	0.8900	0.1500	0.2100
brick	156	102	31	0.6100	0.4000	0.1200
cadmium_red_deep	227	23	13	0.8900	0.0900	0.0500
coral	255	127	80	1.0000	0.4980	0.3137
coral_light	240	128	128	0.9412	0.5020	0.5020
deep_pink	255	20	147	1.0000	0.0784	0.5765
english_red	212	61	26	0.8300	0.2400	0.1000
firebrick	178	34	34	0.6980	0.1333	0.1333
geranium_lake	227	18	48	0.8900	0.0700	0.1900
hot_pink	255	105	180	1.0000	0.4118	0.7059
indian_red	176	23	31	0.6900	0.0900	0.1200
light_salmon	255	160	122	1.0000	0.6275	0.4784
madder_lake_deep	227	46	48	0.8900	0.1800	0.1900
maroon	176	48	96	0.6902	0.1882	0.3765
pink	255	192	203	1.0000	0.7529	0.7961
pink_light	255	182	193	1.0000	0.7137	0.7569
raspberry	135	38	87	0.5300	0.1500	0.3400
red	255	0	0	1.0000	0.0000	0.0000
rose_madder	227	54	56	0.8900	0.2100	0.2200
salmon	250	128	114	0.9804	0.5020	0.4471
tomato	255	99	71	1.0000	0.3882	0.2784
venetian_red	212	26	31	0.8300	0.1000	0.1200
Browns						
beige	163	148	128	0.6400	0.5800	0.5000
brown	128	42	42	0.5000	0.1647	0.1647
brown_madder	219	41	41	0.8600	0.1600	0.1600
brown_ochre	135	66	31	0.5300	0.2600	0.1200
burlywood	222	184	135	0.8706	0.7216	0.5294
burnt_sienna	138	54	15	0.5400	0.2100	0.0600
burnt_umber	138	51	36	0.5400	0.2000	0.1400
chocolate	210	105	30	0.8235	0.4118	0.1176
deep_ochre	115	61	26	0.4500	0.2400	0.1000
flesh	255	125	64	1.0000	0.4900	0.2500
flesh_ochre	255	87	33	1.0000	0.3400	0.1300
gold_ochre	199	120	38	0.7800	0.4700	0.1500
greenish_umber	255	61	13	1.0000	0.2400	0.0500
khaki	240	230	140	0.9412	0.9020	0.5490
khaki_dark	189	183	107	0.7412	0.7176	0.4196
light_beige	245	245	220	0.9608	0.9608	0.8627
peru	205	133	63	0.8039	0.5216	0.2471
rosy_brown	188	143	143	0.7373	0.5608	0.5608
raw_sienna	199	97	20	0.7800	0.3800	0.0800
raw_umber	115	74	18	0.4500	0.2900	0.0700
sepia	94	38	18	0.3700	0.1500	0.0700
sienna	160	82	45	0.6275	0.3216	0.1765
saddle_brown	139	69	19	0.5451	0.2706	0.0745

Oranges

cadmium_orange	255	97	3	1.0000	0.3800	0.0100
cadmium_red_light	255	3	13	1.0000	0.0100	0.0500
carrot	237	145	33	0.9300	0.5700	0.1300
dark_orange	255	140	0	1.0000	0.5490	0.0000
mars_orange	150	69	20	0.5900	0.2700	0.0800
mars_yellow	227	112	26	0.8900	0.4400	0.1000
orange	255	128	0	1.0000	0.5000	0.0000
orange_red	255	69	0	1.0000	0.2706	0.0000
yellow_ochre	227	130	23	0.8900	0.5100	0.0900

Yellows

aureoline_yellow	255	168	36	1.0000	0.6600	0.1400
banana	227	207	87	0.8900	0.8100	0.3400
cadmium_lemon	255	227	3	1.0000	0.8900	0.0100
cadmium_yellow	255	153	18	1.0000	0.6000	0.0700
gold	255	215	0	1.0000	0.8431	0.0000
goldenrod	218	165	32	0.8549	0.6471	0.1255
goldenrod_dark	184	134	11	0.7216	0.5255	0.0431
goldenrod_light	250	250	210	0.9804	0.9804	0.8235
goldenrod_pale	238	232	170	0.9333	0.9098	0.6667
light_goldenrod	238	221	130	0.9333	0.8667	0.5098
melon	227	168	105	0.8900	0.6600	0.4100
naplesyellowdeep	255	168	18	1.0000	0.6600	0.0700
yellow	255	255	0	1.0000	1.0000	0.0000
yellow_light	255	255	224	1.0000	1.0000	0.8784

Greens

chartreuse	127	255	0	0.4980	1.0000	0.0000
chromeoxidegreen	102	128	20	0.4000	0.5000	0.0800
cinnabar_green	97	179	41	0.3800	0.7000	0.1600
cobalt_green	61	145	64	0.2400	0.5700	0.2500
emerald_green	0	201	87	0.0000	0.7900	0.3400
forest_green	34	139	34	0.1333	0.5451	0.1333
green	0	255	0	0.0000	1.0000	0.0000
green_dark	0	100	0	0.0000	0.3922	0.0000
green_pale	152	251	152	0.5961	0.9843	0.5961
green_yellow	173	255	47	0.6784	1.0000	0.1843
lawn_green	124	252	0	0.4863	0.9882	0.0000
lime_green	50	205	50	0.1961	0.8039	0.1961
mint	189	252	201	0.7400	0.9900	0.7900
olive	59	94	43	0.2300	0.3700	0.1700
olive_drab	107	142	35	0.4196	0.5569	0.1373
olive_green_dark	85	107	47	0.3333	0.4196	0.1843
permanent_green	10	201	43	0.0400	0.7900	0.1700
sap_green	48	128	20	0.1900	0.5000	0.0800
sea_green	46	139	87	0.1804	0.5451	0.3412
sea_green_dark	143	188	143	0.5608	0.7373	0.5608
sea_green_medium	60	179	113	0.2353	0.7020	0.4431
sea_green_light	32	178	170	0.1255	0.6980	0.6667
spring_green	0	255	127	0.0000	1.0000	0.4980
spring_greenmedium	0	250	154	0.0000	0.9804	0.6039
terre_verte	56	94	15	0.2200	0.3700	0.0600
viridian_light	110	255	112	0.4300	1.0000	0.4400
yellow_green	154	205	50	0.6039	0.8039	0.1961

Cyans

aquamarine	127	255	212	0.4980	1.0000	0.8314
aquamarinemedium	102	205	170	0.4000	0.8039	0.6667
cyan	0	255	255	0.0000	1.0000	1.0000
cyan_white	224	255	255	0.8784	1.0000	1.0000
turquoise	64	224	208	0.2510	0.8784	0.8157
turquoise_dark	0	206	209	0.0000	0.8078	0.8196
turquoise_medium	72	209	204	0.2824	0.8196	0.8000
turquoise_pale	175	238	238	0.6863	0.9333	0.9333

Blues

alice_blue	240	248	255	0.9412	0.9725	1.0000
blue	0	0	255	0.0000	0.0000	1.0000
blue_light	173	216	230	0.6784	0.8471	0.9020
blue_medium	0	0	205	0.0000	0.0000	0.8039
cadet	95	158	160	0.3725	0.6196	0.6275
cobalt	61	89	171	0.2400	0.3500	0.6700
cornflower	100	149	237	0.3922	0.5843	0.9294
cerulean	5	184	204	0.0200	0.7200	0.8000
dodger_blue	30	144	255	0.1176	0.5647	1.0000
indigo	8	46	84	0.0300	0.1800	0.3300
manganese_blue	3	168	158	0.0100	0.6600	0.6200

slate_blue	106	90	205	0.4157	0.3529	0.8039
slate_blue_dark	72	61	139	0.2824	0.2392	0.5451
slate_blue_light	132	112	255	0.5176	0.4392	1.0000
slate_blue_medium	123	104	238	0.4824	0.4078	0.9333
sky_blue	135	206	235	0.5294	0.8078	0.9216
sky_blue_deep	0	191	255	0.0000	0.7490	1.0000
sky_blue_light	135	206	250	0.5294	0.8078	0.9804
steel_blue	70	130	180	0.2745	0.5098	0.7059
steel_blue_light	176	196	222	0.6902	0.7686	0.8706
turquoise_blue	0	199	140	0.0000	0.7800	0.5500
ultramarine	18	10	143	0.0700	0.0400	0.5600
Magentas						
blue_violet	138	43	226	0.5412	0.1686	0.8863
cobalt_violetdeep	145	33	158	0.5700	0.1300	0.6200
magenta	255	0	255	1.0000	0.0000	1.0000
orchid	218	112	214	0.8549	0.4392	0.8392
orchid_dark	153	50	204	0.6000	0.1961	0.8000
orchid_medium	186	85	211	0.7294	0.3333	0.8275
permanent_violet	219	38	69	0.8600	0.1500	0.2700
plum	221	160	221	0.8667	0.6275	0.8667
purple	160	32	240	0.6275	0.1255	0.9412
purple_medium	147	112	219	0.5765	0.4392	0.8588
ultramarine_violet	92	36	110	0.3600	0.1400	0.4300
violet	143	94	153	0.5600	0.3700	0.6000
violet_dark	148	0	211	0.5804	0.0000	0.8275
violet_red	208	32	144	0.8157	0.1255	0.5647
violet_redmedium	199	21	133	0.7804	0.0824	0.5216
violet_red_pale	219	112	147	0.8588	0.4392	0.5765

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