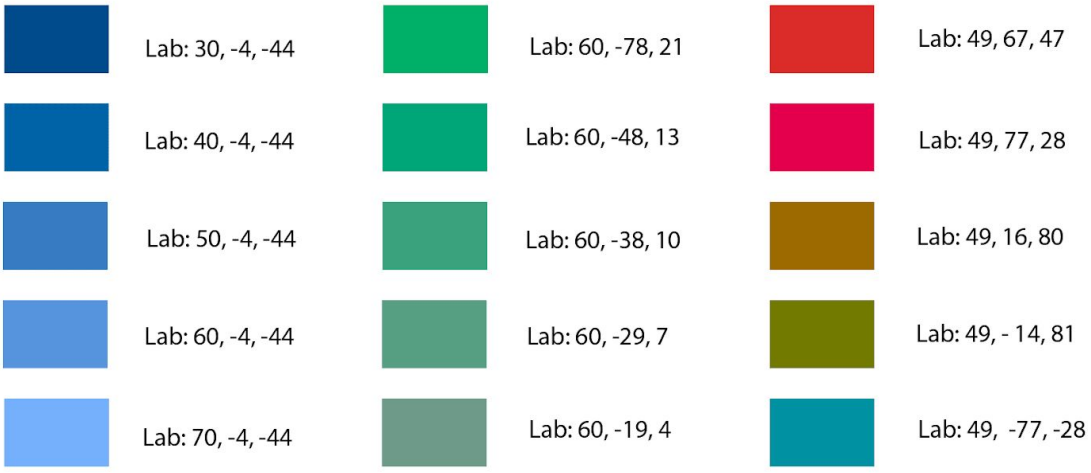
Portfolio
Colour in Interface Design
IMT 4315

Portfolio 1

Colour Vision

Task 1:



In order to change only the lightness, hue and chroma I used a formula to convert between LAB and LCh values. I needed to round up the values since photoshop only accepted whole numbers potentially loosing some accuracy. (I used three different colours as a starting point for the hue, chroma and lightness change).

The first coloumn I changed only the lightness which is easy to see since only the L(igthness) value has changed in the LAB space. No conversion needed for this.
For the second column I changed only the chroma. To do this I converted the photoshop LAB values into LCh values, changed the C(hroma) and then converted back to LAB for photoshop Note: for this column the order of the patches is not chronological.
For the third column I repeated the process above this time changing only the Hue.

Task 2:

Left to right:

RGB: 180, 39, 39 / 190, 39, 39 / 200, 38, 38 / 210, 38, 38

RGB: 69, 160, 62 / 69, 164, 62 / 69, 168, 62 / 69, 172, 62

RGB: 26, 70, 180 / 26, 70, 190 / 26, 70, 200 / 26, 70, 210

RGB: 146, 148, 16 / 174, 175, 48 / 203, 202, 73 / 232, 231, 98

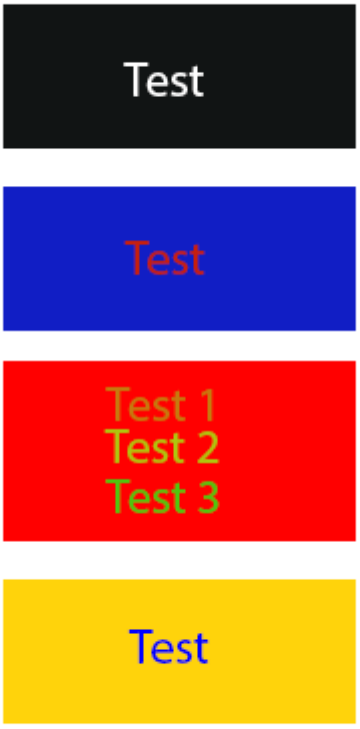
RGB: 94, 94, 94 / 97, 97, 97 / 99, 99, 99 / 101, 101, 101

Red: Changed the amount of red in the RGB, by 10 in increasing order.
Green: Changed the amount of green in the RGB, by 4 in increasing order.
Blue: Changed the amount of blue in the RGB, by 10 in increasing order.
Yellow: Changed lightness by 10.
Grey: Changed lightness, by 1.

The change in colour is hard to see, but possible on my screen. For the red, green and blue: after a 4/5 value increase there was an observable difference, but only after a 10 value increase could I truly discriminate them consistently. With whitespace in-between the colour patches it was way harder to observe the difference, even though the colour value was the same. Interestingly, it was harder to discriminate between patches with high amounts of red/green/blue. For example, it was a lot easier to see the difference between two patches of 100 and 110 red/green or blue than between 240 and 250. A longer series of patches could have revealed this more easily than above.

In the yellow and grey I changed lightness, by 10 and 1 respectively. The yellow is obviously easiest to see, but even when changing lightness by only 1 for grey it is still possible to discriminate the colours.

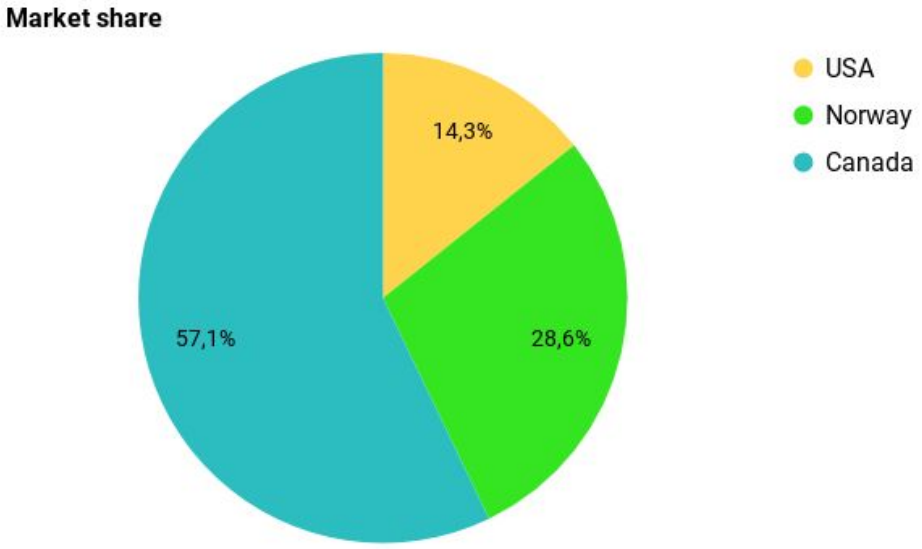
Task 3:



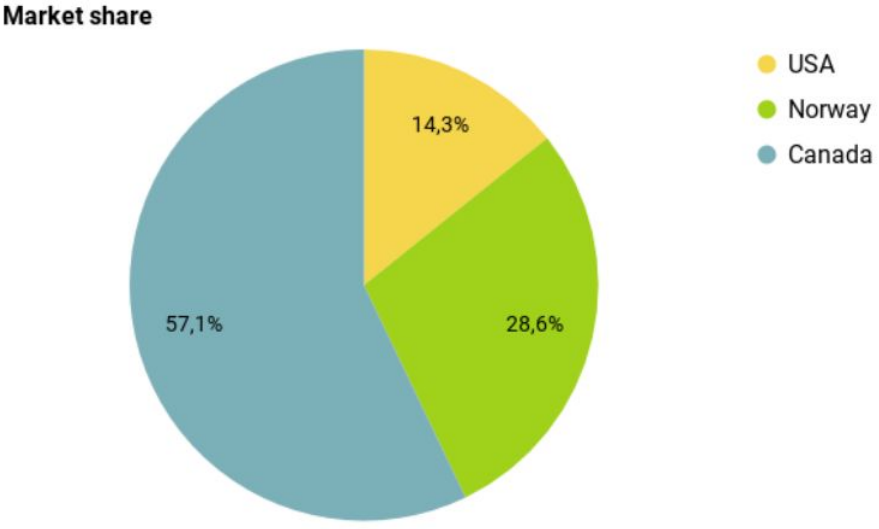
First from top: Very legible due to a maximum lightness difference between foreground and background. Smaller lightness difference equals less legibility.
Second: The red and blue are triad colours and create *okay-ish, but not great* legibility.
Third: The further away from the hue of the background the text hue is, the better the readability. Going further around the colour wheel, the legibility will start decreasing again after the green/test3.
Fourth: The blue and yellow are *complementary* colours. Fore- and background are opposite on the colour wheel and creates good legibility due to it's contrast.

Task 4:
Of the anomalous colour vision deficiencies I choose “protanomaly” for this task. I then created an information graphic in excel where the colours could be discriminated by both normal colour vision (trichromatic vision) and protanomaly colour vision.

A) The information graphic seen with normal colour vision



B) The same information graphic for someone with Protanomaly (simulation from http://www.color-blindness.com/coblis-color-blindness-simulator/)



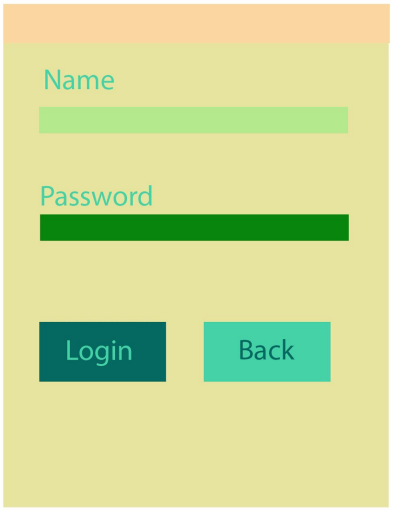
In both cases the graph appears fairly similar, and colours are easily discriminable from one another, but for protanomalous viewers the colours appears a bit paler than to the normal vision.

Portfolio 2

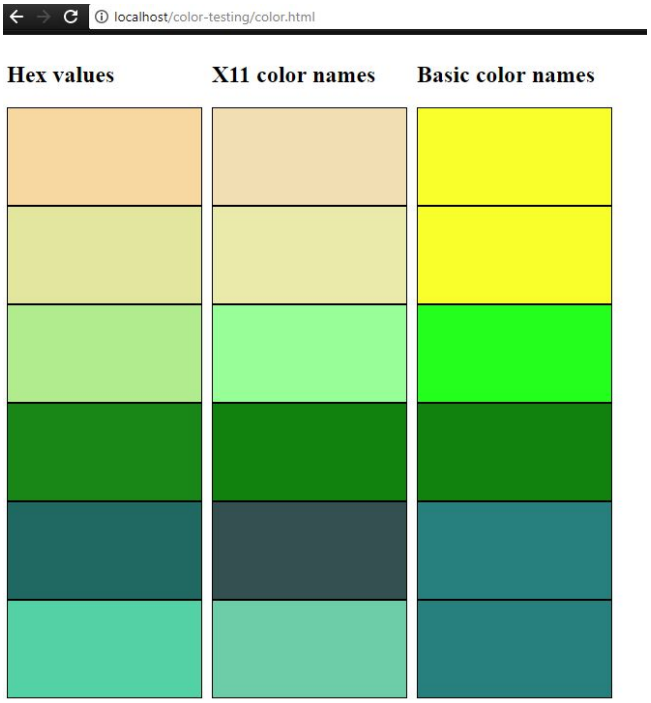
Colour Mixing

Task 1:
6 randomly generated sRGB colours used in a design.

- RGB: 251, 214, 160
- RGB: 230, 228, 159
- RGB: 180, 233, 142
- RGB: 8, 133, 12
- RGB: 6, 105, 98
- RGB: 70, 210, 167



Task 2: (see all colour values in CSS pic below)



Colour values of webpage above (typo: row means column, and refers to the columns in the picture above):

```
/* first row */
#box1 {
    background-color: #fbd6a0;
}
#box2 {
    background-color: #e6e49f;
}
#box3 {
    background-color: #b4e98e;
}
#box4 {
    background-color: #88850c;
}

#box5 {
    background-color: #056962;
}
#box6 {
    background-color: #46d2a7;
}

/* second row */
#box7 {
    background-color: wheat;
}
#box8 {
    background-color: PaleGoldenRod ;
}
#box9 {
    background-color: PaleGreen;
}
#box10 {
    background-color: Green;
}
#box11 {
    background-color: DarkSlateGray;
}
#box12 {
    background-color: MediumAquaMarine;
}

/* third row */
#box13 {
    background-color: yellow;
}
#box14 {
    background-color: yellow ;
}
#box15 {
    background-color: lime;
}
#box16 {
    background-color: Green;
}
#box17 {
    background-color: teal;
}
#box18 {
    background-color: teal;
}
```

For this task I made a basic website using HTML and CSS, the markup for which you can see above. To select X11 colours and HTML Basic colours I had no choice but to go by eye since both of these colour spaces is extremely limited and it was challenging to find colours that would match the corresponding sRGB colours that I had generated. Some of the colours matched poorly, but others was fairly similar. This task was an interesting look into the history/evolution of the web and computers, and how there used to be a lot of limitations in the past that hindered colour display on screens and the web, and the designer's choices.

Task 3:

```
#box1 {
    background-color: lch(89 37 71);
}
#box2 {
    background-color: lch(90 36.6 101);
}
#box3 {
    background-color: lch(86 55.1 135);
}
#box4 {
    background-color: lch(46 95.9 146.4);
}
#box5 {
    background-color: lch(37 46.5 188.6);
}
#box6 {
    background-color: lch(73 74.1 176.1);
}
```

To show the (HTML/CSS4) mark-up I would use to display the LCh versions of the colours I first converted the sRGB values I had randomly generated in the first task to LAB in photoshop. I then used a formula to convert the LAB values to LCh. The web is still evolving and currently browser utilizes CSS3 so right now the mark-up above will not work in any of the browsers, but it will in future implementations, and hopefully help solve the problem of representing colours on the web in different browsers and on different screens.

Task 6:
RAL names for the colours:

- RAL 140-2
- RAL 250-1
- none
- RAL 190 40 30
- none
- none

To convert the sRGB values to RAL I used the tool at: http://www.e-paint.co.uk/Convert_RGB.asp. The RAL colour space system is quite small and the few colours made it hard to find a match for the colour in the sRGB space. There are many RAL system and the RAL system that matched my colours, didn't use colour names, but numbering instead. Some of the colours did not have matching RAL colours and are listed as none, I could have perhaps found the closest match by eye instead.

Task 7:
Alternative names from http://chir.ag/projects/name-that-color/#6195ED:

- Corvette
- Zombie
- Yellow Green
- Japanese Laurel
- Watercourse
- Shamrock

Task 8:
My own names that are more appealing and marketable (same order as above):

- Golden Wheat
- Pale Gold
- Mint Green
- Lush Green
- Deep Sea
- Frosty Green

To create my own names that would be more marketable I mainly went with names that would be seen as positive. Names like Golden and Lush are obvious positive words and make the colours much more appealing. I also looked at other colour names to see what names was commonly used and conventional. I tried to stay away from these other names to create something that was unique and made sense to me. Colour names, like a lot of things, is very subjective. Any human has their own experiences and culture that shape how they see, not only the colours, but also their names and associations between the name and colour. These names make a lot of sense to me, but maybe not to others.

Portfolio 3

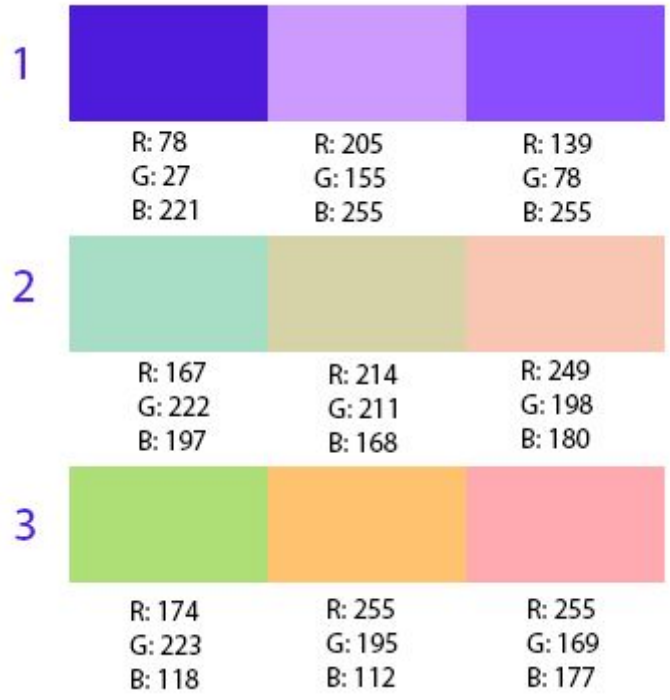
Colour Harmony

Task 1:

Three randomly generated RGB colour values:

1: 78, 27, 221
2: 167, 222, 197
3: 174, 223, 118

Task 2 and 3:
The left patches are the generated colours, 1 to 3 mirroring task 1.

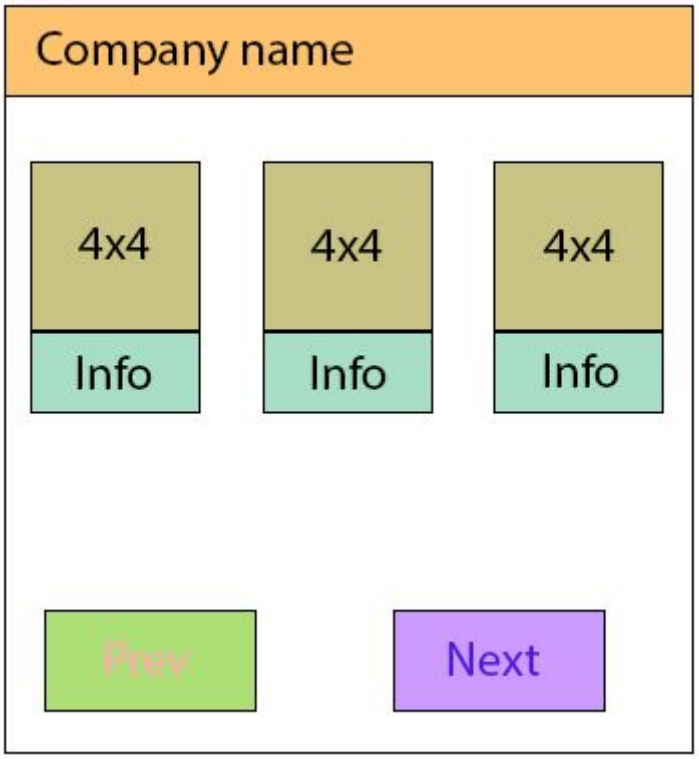


By converting RGB to LAB, to LCh, and back, as described in earlier tasks, I:

1: Changed the lightness only.
2: Changed the hue only.
3: Changed the hue only.

By changing only one of the colour's property the colours seem to harmonize quite well. Harmony is though subjective. To me, these palettes seem to harmonize well, save *maybe* the middle palette, which I think is due to the fact that the colours themselves, individually, is not appealing to me, affecting the overall harmony. Another thing to note is that the colours in the palette is aligned side by side. With some white space in-between the percieved harmony might look different.

Task 4:



With more space in-between the colours that harmonized in the palette, they don't harmonize as well anymore. Spacial area affects the *perceived* harmony. Harmony seems to depend to an extent on the harmonizing colours beeing seen as a pair/together. If there is space and other colours in-between the harmonizing effect might be lost. It's not enough to have harmonizing colours. How they are arranged, e.g. in a design, also matters for how the harmonizing is percieved.

Another observation: The colours that harmonized due to only a difference in lightness worked best as text/background combination. If the lightness difference is small this effect is diminished of course.

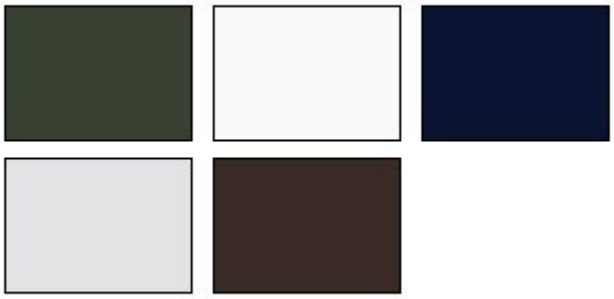
Task 5:

To achieve disharmony I changed many of the colour's properties. I made them darker or lighter, and I also changed both the hue and the chroma. By separating the new colour from the original one in more ways than one, it seemed to create disharmony. The colours had "nothing in common". Also, since personal preference plays a role in the perceiving of harmony, the fact that some of these colours, especially the bottom right, seem quite bad looking to me, it might also play a role in the end result, that these colours seem disharmonious to me.

Portfolio 4

Colour Palette

Task 1:



From top left to bottom right:

- RGB: 56, 64, 49
- RGB: 250, 250, 250
- RGB: 11, 19, 51
- RGB: 227, 227, 229
- RGB: 59, 43, 38

I based this palette on the real life theme, “norwegian winter”, and used triad colours to make it via the adobe kuler online tool. I wanted to capture both the snow of the winter, the dark nights and often grey weather as well as dark wood of traditional norwegian huts and the green spruce trees that survives through the winter. Many different palettes can be created that would fit the theme of norwegian winter. This is what *I* associate with norwegian winter, but it is of course subjective what colours we “choose to see”. I imagine a use case for this palette could be for a tourist company in Norway, maybe trying to attract skiers, although in retrospect of creation it might not be light and “cheerful” enough.

Task 2:

Original image:

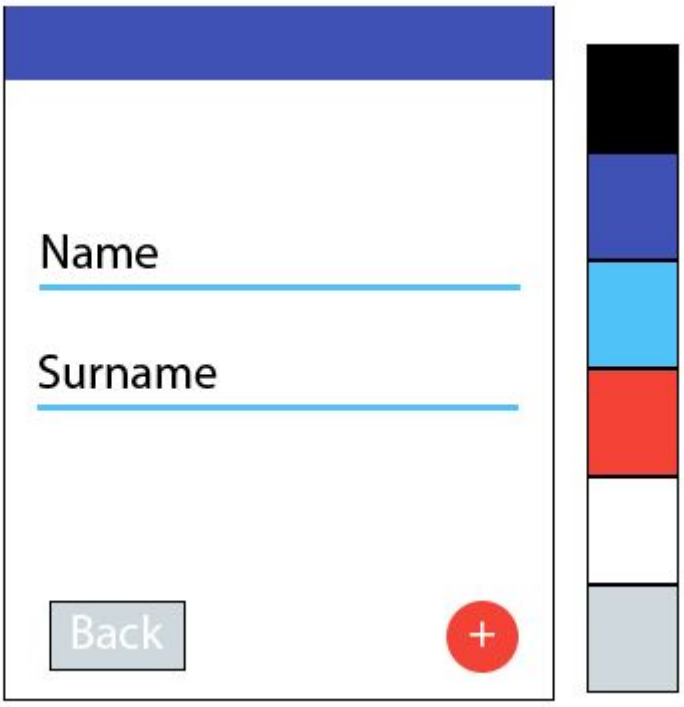
Colour palette extracted from image:

From left to right:

- RGB: 254, 241, 101
- RGB: 136, 228, 253
- RGB: 254, 47, 7
- RGB: 242, 248, 248
- RGB: 254, 251, 244
- RGB: 98, 247, 228

I used the photoshop colour picker to select/extract colours. This allowed me to hand pick which colour to use in the palette instead of automate the process and rely on the softwares decision making. I extracted the colours that the viewer (me) most easily can see in the picture and that best represents the picture. Every pictures has a lot of colours, but you see the most dominant colours when you look at the picture - you group colours together into chunks. A colour palette rarely has this many colours so maybe I could have removed from the palette two of the least visible colours of the image. Fewer colours could have made the palette more “focused”, and better represented the picture.

Task 3:



From top to bottom:

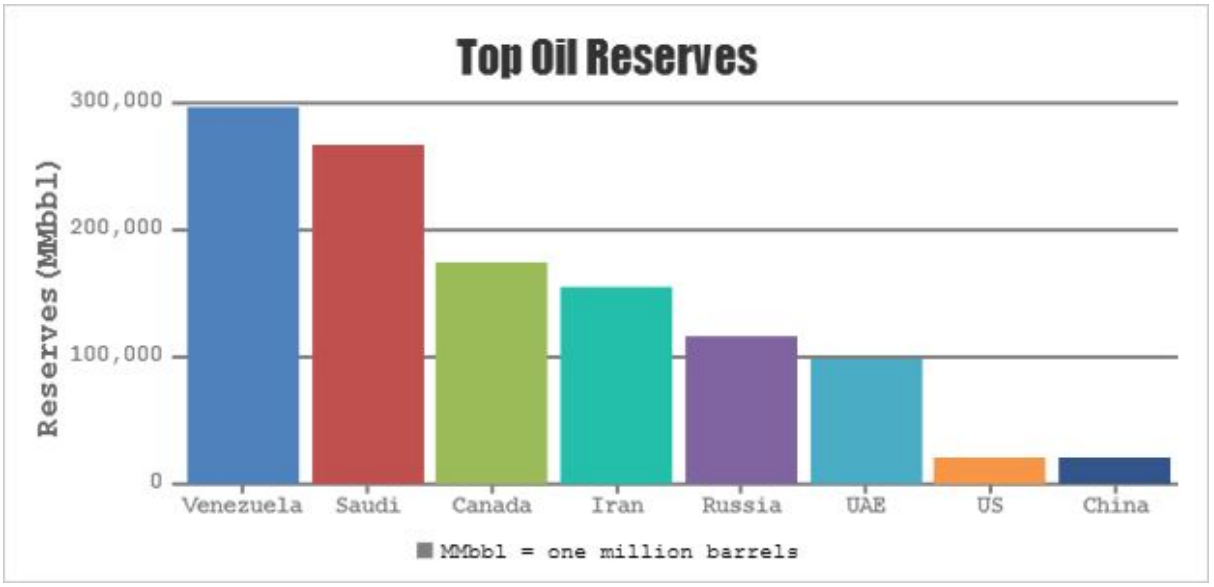
- RGB: 0, 0, 0
- RGB: 63, 81, 181
- RGB: 79, 195, 247
- RGB: 244, 67, 54
- RGB: 255, 255, 255
- RGB: 207, 216, 220

I used android palette/goggle material design. Colour palette used on the right. Like in the previous task I think I used to many colours in my palette, making it lack direction a little.

Portfolio 5

Semantic and Affective use of colour

Task 1:
As an example of good colour coding in an information graphic I found this:



http://blog.visme.co/wp-content/uploads/2016/02/html5_column_chart.png

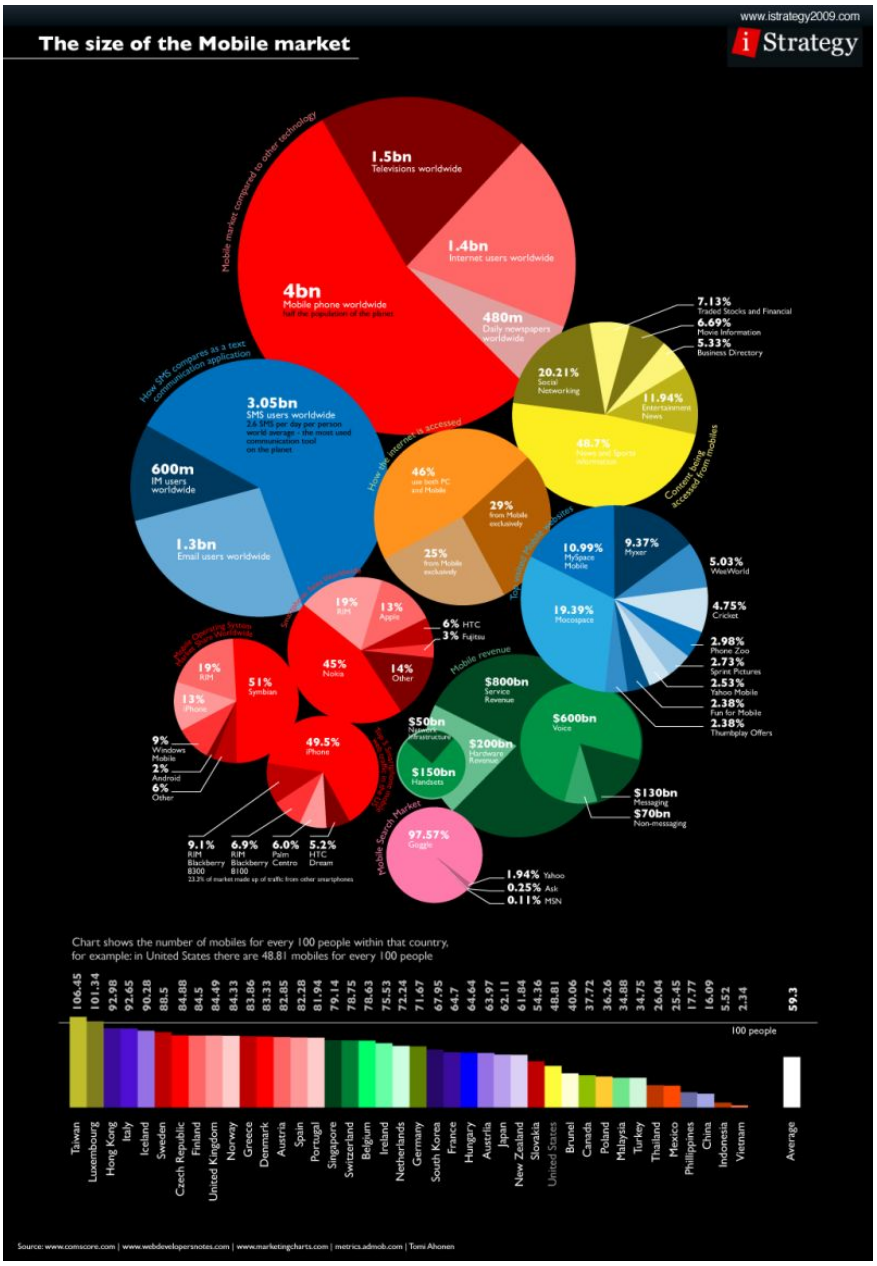
I consider this a good use of colour coding because:

a. Each bar has its own distinct colour.
b. The palette is not analagous, so its easy to separate colours.
c. The colours is just used to enhance, not convey the entire meaning by itself.
d. Bars (text could be better) has good contrast and are clearly visible.

Improvement:

e. Could be better with some simple patterns on bars aswell.

As an example of a bad information graphic I found this:



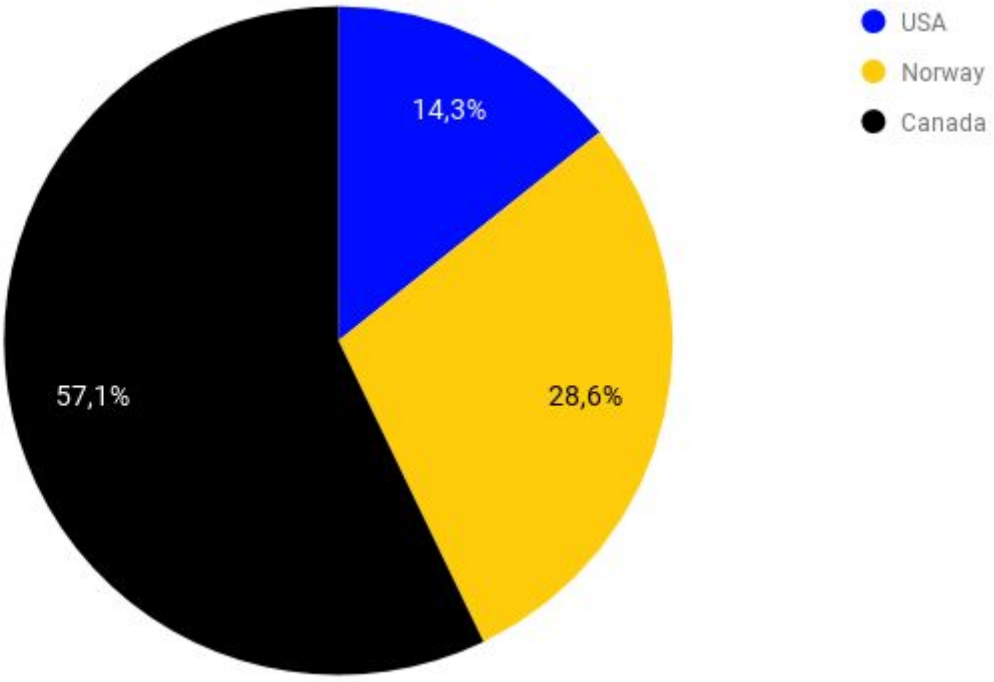
https://gizmodo.com/5489036/cellphone-overshare

I consider this a bad use of colour coding because:

a. Both bars in bottom chart and in the pie charts use analagous colours, making them hard to separate.
b. Different pie charts also share the same colour palettes - making them seem related/grouped together even though they are in fact not.
c. Although contrast is mostly good, the titles for each pie chart has the same colour as the pie charts, this makes it hard to read some of them.

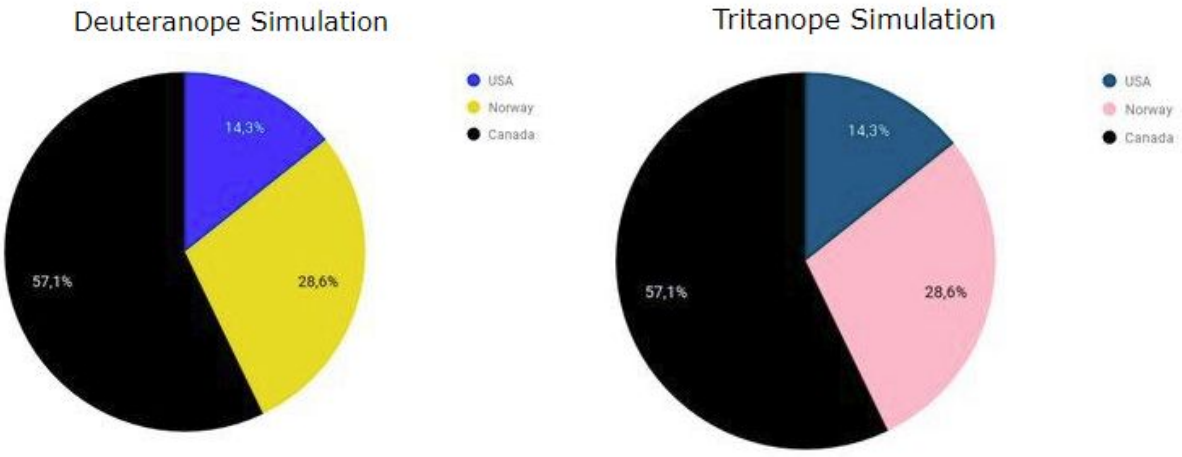
(This graphic has a variety of other problems too, like way too much information and too small of a font.)

Task 2:



I used excel to create the chart, and “Adobe CC color” to create complementary colours that contrasted well, and was easilly discriminable from eachother, so that each “pie slice” was easy to separate from the rest. Furthermore, I took into account accessibility and made sure that each slice, and key, was possible to see for those with, Deuteranope, Protanope or Tritanope colour vision.

Using vischeck, to them, the info graphics looks like this (protanope looks like the deuteranope simulation):



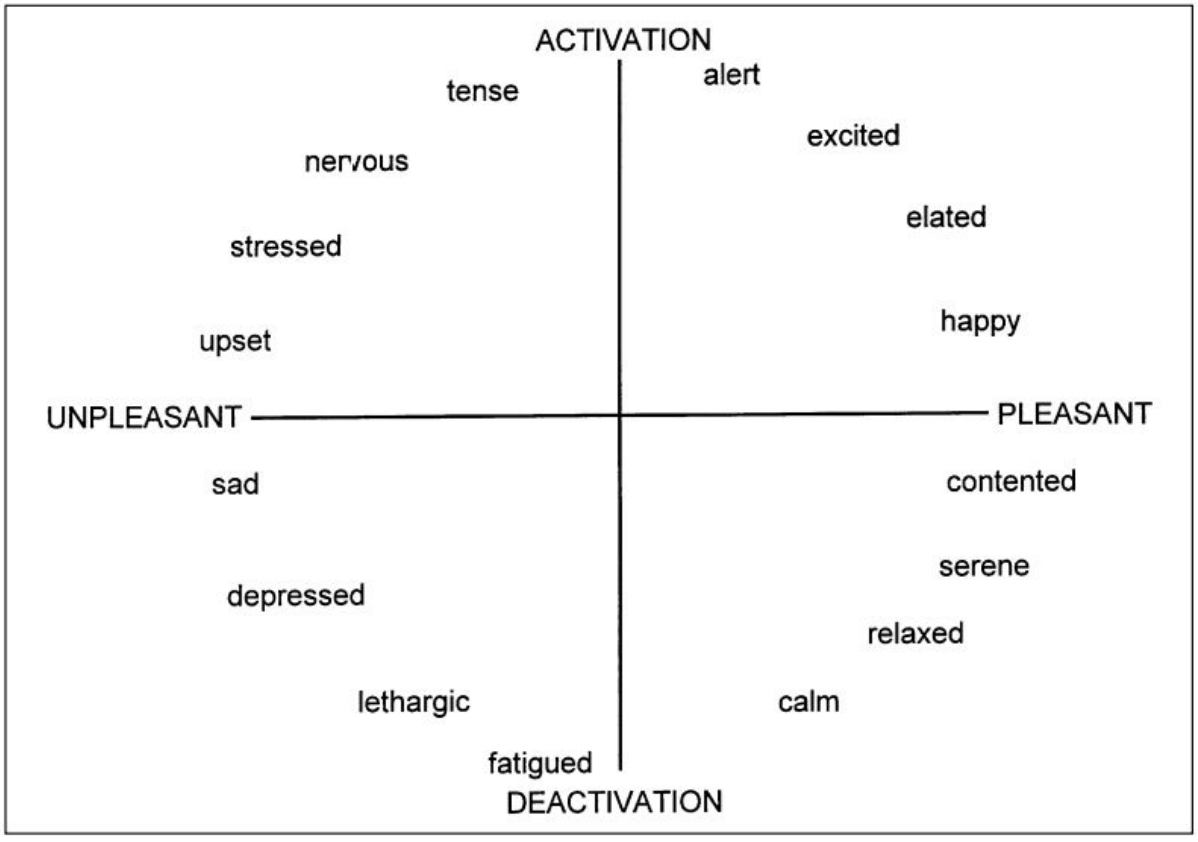
I wouldn't personally say that these colours are pleasing, so in retrospect, even though the graphs sections is easily discriminable and clear, the experience of the user should also count for whether this is a good info graphic or not. In that regard, the info graphic could be improved.

Task 3:
Select a particular use case for a web page (or other media product). Choose an appropriate multi-dimensional scale of emotion that is relevant to the use case, and a colour palette that associates colours with the emotional scale dimensions. Apply the palette in a design.

Use case: A dating website/app.

Emotional scale: Feldman-Barrett and Russell's two-dimensional scale of active/inactive and pleasant/ unpleasant emotions.

Picture of the scale:



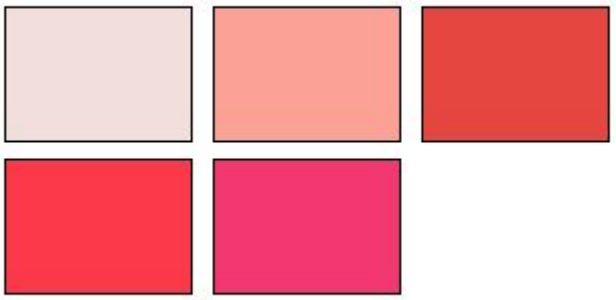
Picture and scale from: Feldman-Barrett, L., Russell, J.A. (1998), "Independence and bipolarity in the structure of current affect", Journal of Personality and Social Psychology, Vol. 74 No.4, pp.967-84.

I imagined a 2D colour space overlaping the 2D emotion scale, where the x-axis (pleasantness) determined the hue. At max unpleasant we had blue and at pleasant we had red with purple/pink in the middle. I used these colours because of own views on the emotion of colours. (Red is often associated with love and with excitment for me for example. Emotion is very subjective and i did not find a palette/research that match the scale. Similarly because of how I see vivid colours as more active (alive, clickable) the y-axis (activation) determined the chroma/vividness. At max deactivation (around fatigued) the colour had low chroma, while at at max activation the colour had high chroma.

On this scale, for this use case, a dating website/app, we want to appeal to the emotions that fall between the activation and pleasant axis, and avoid emotions that are seen as unpleasant or inactive. Dating falls underneath “activated pleasant”. That is, the users *actively* seek love and experience *pleasant* emotions doing so.
The emotions rated at the “activated pleasant” part of the scale are:
ALERT, EXCITED, HAPPY and ELATED.

With this use case in mind I created a palette by creating colours from their position on the scale. This gave me pink to red hue for all the emotions I wanted to represent, while the colours varied in chroma from high to medium.

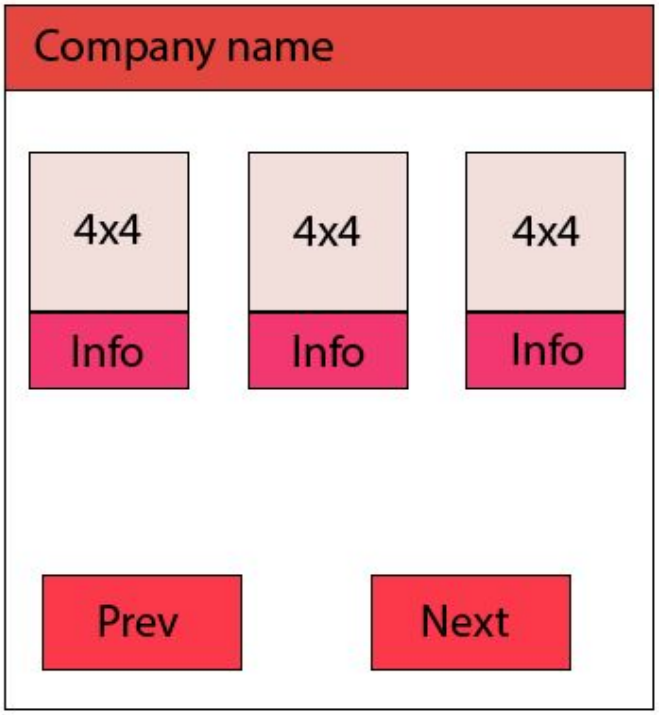
Self-made palette:



From top left to bottom right:

- RGB: 242, 222, 218
- RGB: 252, 161, 150
- RGB: 229, 70, 63
- RGB: 252, 57, 44
- RGB: 242, 55, 113

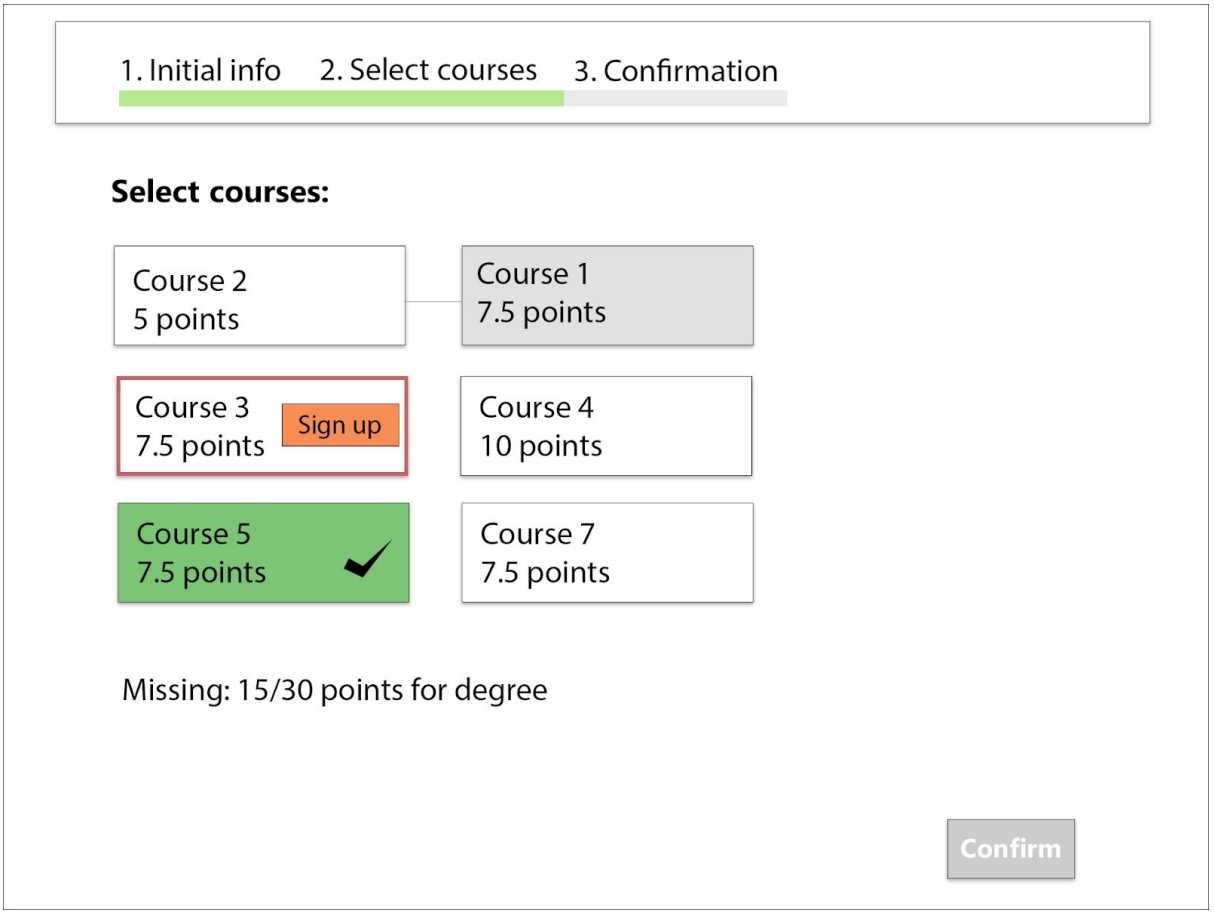
The colours of the palette used in a design.



Portfolio 6

Interaction Design

Task 1:
For this task I used the use case: Course finder that allows user to select a series of courses leading to a chosen qualification.



Affordance:
Affordance is the actions that can be performed by the user as long as he knows they are there (percieved actions). We can use colour to show what actions is possible, but also what actions are *not* possible, even though you might expect it to be. For example: you expect to be able to perform a “click action” on a button, but sometimes this is not desired. In the design above one can see this in action. Both one of the courses and the bottom right confirm button is signaling that they are un-clickable/selectable by the use of the colour grey. A vivid colour signals that something is “alive”. It signals that something can be interacted with. Grey used here on the other hand signals the opposite, that the confirm button and the course cannot be interacted with, by seeming “dead”. Furthermore the colour orange is used on the sign up button. This vivid colour shows that the button can be interacted with, but to a larger extent because it draws the eyes of the user to it, thus enabling this action, to sign up, to be more easily *percieved,* an action must be *percieved* to be an affordance. Orange is a very eye catching colour that can be used to draw the eyes attention. As long as, which is the case here, it is used sparingly and deliberately.

Feedback:
When the user clicks on one of the courses he is given feedback in the form of a red outline. This that tells him that the course is currently focused/selected. This is because the colour a) outlines only one of the courses and b) because it outlines the last item the user clicked. The top progressbar that shows the steps uses green to give the user feedback about where in the process he or she is. Lastly, the colour green is also used, together with a checkmark, to show the user that the course has been signed up for.

Aiding navigation:
At the top of a page the user can see the steps he is required to take to complete the process. To acheive this a progressbar was made. Colour was used to visually show how far into the process the user is, and how much there is left. This aids navigation because the user understand exactly where he/she is in the process and where he/she is going next.