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| Software Engineering with HCI |
| Assignment 1 -Program Development |
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# Introduction

In this document I shall be tackling the two distinct tasks outlined in the assignment brief. Task one being to talk about the principles of interface design, with task two being to justify selection of a HCI for a particular user group or environment.

# Task One

## Perception in HCI

### What is it?

“It’s what allows us to see and feel when using HCI” (D, 2012). What does that mean? Well it means it’s the colours, patterns, and objects that HCI uses to try and convey intuitivism. There are multiple methods and paradigms to design that alter the user’s perception of a HCI to try and improve that sense of innate knowledge about the product that sets the user at ease when using the HCI for the first time.

### Colour

Colour is an important factor in a HCI, they can convey emotion, be used to tap into cultural and biological mechanisms to influence the user. But you’ve got to know when and how to use them, some colours go well together and look really nice to the end user, making them want to continue using the product.

However when done wrong colours can completely destroy the user’s view on the product, quite literally, take figure 1 for example; figure 1. (Ling Valentine n.d.) is a perfect example of using colour completely wrong. There are too many colours and none of them go with each other. They take user’s attention away from where it needs to be to everywhere else, and the user then has to really look for the options to proceed.

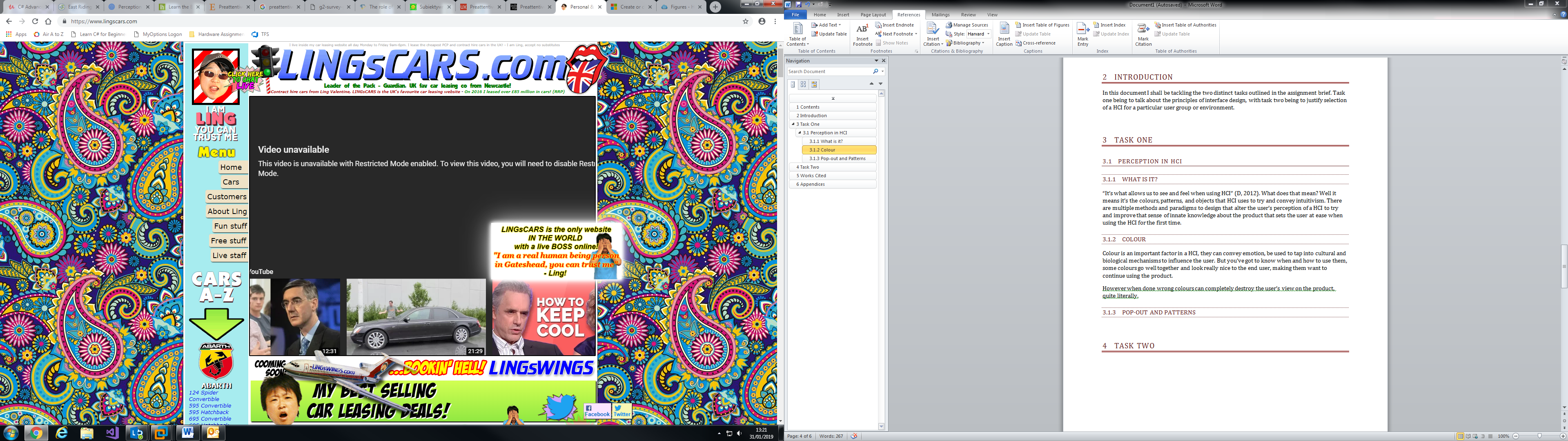


Figure 1: Ling's cars website by Ling Valentine, Ling's cars, n.d.

Why does this happen? Well it’s to do with evolutionary benefits. Albustin speaks about how “Finding the cherries among the leaves is much easier if we have colour vision” (Albustin, et al., 2010), hence why colour is so important for humans. There seems to be specific rules too which we can follow which humans seem to like. This area of study is called colour theory.

#### Colour Theory

Colour theory focuses around a concept called the “colour wheel”, you can see an example of the colour wheel in Figure 2 (TigerColor). Created by Sir Issac Newton in 1666, it’s designed so that any colours you pick from it will look good together.

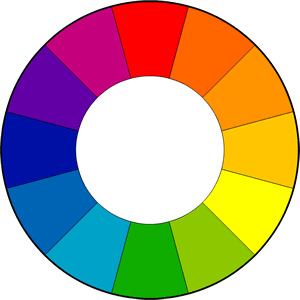


Figure 2: The Colour Wheel, by TigerColor

There are multiple different colour schemes to take from this colour wheel, Figure 3 (Mihir Patkar 2014) shows off the most popular.

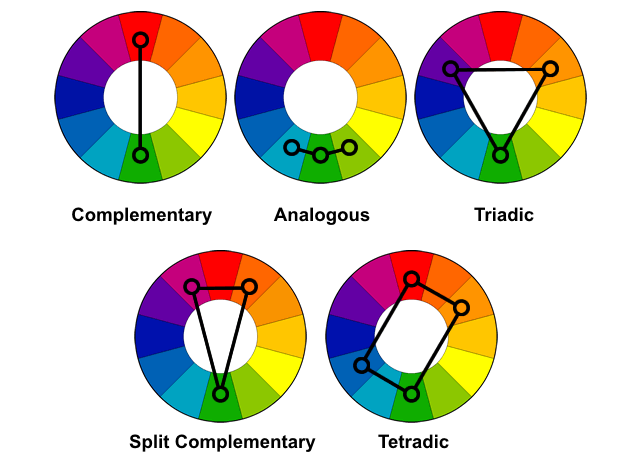


Figure 3: Different Colour Schemes on the Colour Wheel, by Mihir Patkar 2014

Complementary – These are two colours that are completely opposite in the colour wheel. These create very high contrast to stand out. Normally one colour is used as a background and the other is used as an accent colour.

Analogous – Any three colours that are next to each other are analogous, with these colour schemes it’s normally a good idea to uses tints instead of pure hues as they can be jarring. Also avoid mixing warm and cool colours. Warm and cool colours are shown in Figure 4 (Mihir Patkar 2014).

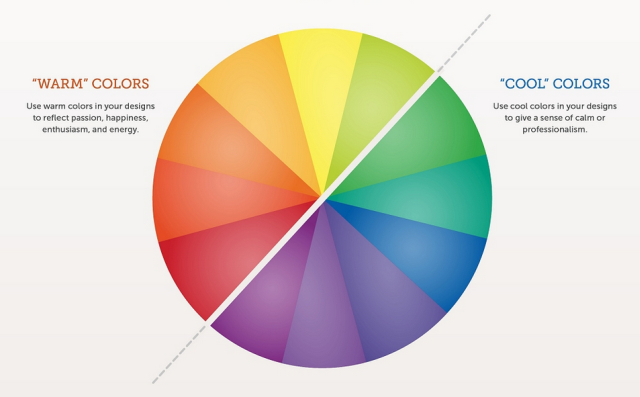


Figure 4: Warm and Cool Colours, by Mihir Patkar, 2014

Triadic – Any three colours, which are equally spaced apart on the colour wheel, are triadic. Triadic schemes are also very high contrast, and it normally used by letting one colour dominate and using the other two as accents.

Split Complementary – This scheme uses three colours, it takes one colour and then matches it with the two colours next to its complimentary colour. This scheme is great for those just starting out because it’s difficult to mess up because you get contrasting colours that aren’t as diametrically opposite as complementary colours.

Tetradic – Uses four colours in the form of two sets of complementary colours. This is the hardest scheme to balance. It offers more variety than any other scheme but if all colours are used in equal amounts then the scheme will not look balanced.

#### Colour in Culture

Colours mean different things in different cultures, so when creating HCI it’s important to take into consideration where it’s going to be used, and if anything needs to be altered for localisation purposes.

For example, Stewart (Stewart, n.d.) talks about how “Red symbolizes love and passion in many countries in North and South America, and Europe.”, and then goes on to contrast that with a point of “Red in African cultures symbolises death and grief.”. Important differences that need to be understood when creating a HCI that has the potential to be used outside of the country it was created in.

### Pop-out and Patterns

#### Pop-out

What is pop-out? Well it’s very simple really, it’s using techniques to create elements that grab your attention on the HCI, there are a few methods that you can use to do this, and they all utilise your pre-attentive processes, or in other words, what you see before you even think about it.

#### Pre-attentive Processes

##### Categories

Albustin (Albustin, et al., 2010) outlines the four categories of pre-attentive processing as: Colour; Form; Spatial position; and Motion. We can incorporate elements of these different categories in our HCI to direct the user’s attention to central points within our design. For instance if your webpage has a submit button where it’s essential it’s pressed, you could utilise any of these methods to make it stand out to be sure the user doesn’t miss it.

“Colour seems to be the most important factor when it comes to pre-attentive processing” (Albustin, et al., 2010). This should mean it’s the most effective and important to get right, so before trying to tackle any other of the categories, one should try and master colour first.

Form is very simple but also very powerful. Essentially it’s just how an object looks; if it looks different from all the objects around it, it commands attention.

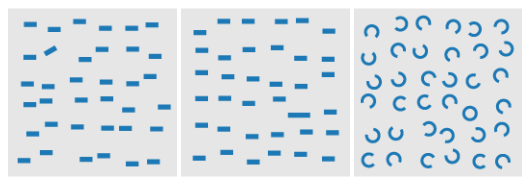


Figure 5: Orientation, Line Length / Width, Closure, by Albustin et al. 2010

Spatial position is where the element is, this includes all axes, spatial and rotational. So for example you may have three elements that have the same form, but one of them is in a different spatial position to the other two, that would be the element that demands the attention.

And finally, motion is the fourth pre-attentive category. Mainly used for animation to “highlight changes in a dataset across user-selected data axis” (Albustin, et al., 2010) motion is very intuitively processes as we deal with it every day and expect certain properties about it.

##### The Role of Pre-attentive Processes

The role of pre-attentive processes in HCI is definitely an important one, as confirmed by (Michalski & Grobelny, 2008) where they mention “The presented studies confirm that the preattentive visual processing mechanisms may play an important role and should be explicitly incorporated into the HCI field”. This shows that pre-attentive processes definitely have a part to play in intuitive HCI and should therefore be utilised wherever possible.

Its specific role though is that to attract people’s attention and form natural, intuitive links the user can understand and use very easily.

#### Patterns

Patterns are often used as a good way to indicate users that certain things have similar functionality without explicitly telling them. Using similarity, proximity, closure, and continuation we can group objects together without having to physically tell the user these objects all have similar functionality. Figure 6 (Drew D, 2012) explains and gives examples of these concepts.

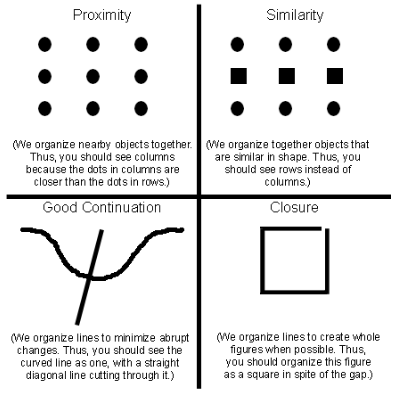


Figure 6: Types of Patterns, by Drew D, 2012

#### Illusions

Illusions are elements such as using 2D shapes to create the illusion of it being 3D. as you can see in Figure 7 (Drew D, 2012), this is quite effective and the images almost look real. Using this technique to create icons, symbols, etc. is very powerful as it lets the user combine real world common knowledge to the HCI, which will dramatically decrease learning time as they will already have an innate understanding of what the concept of the symbols may mean.

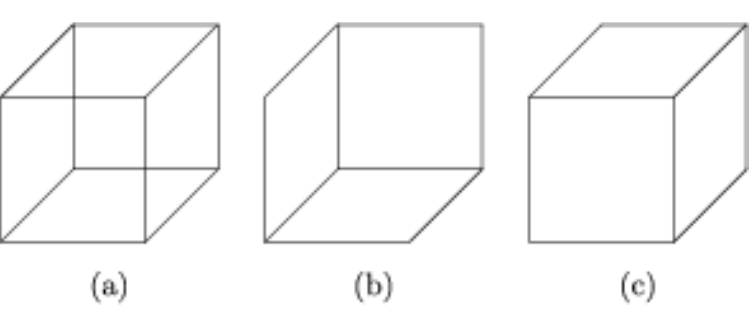


Figure 7: Using 2D Shapes to Create 3D Shapes, by Drew D, 2012

# Task Two

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# Appendices