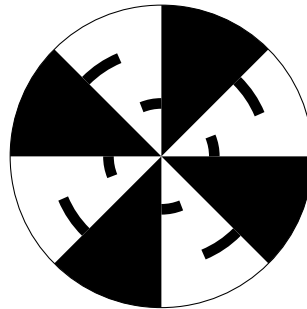


Creative Computing II
Colour Vision
Wednesday 13th October 2010

This lab sheet introduces some aspects of the perception and interpretation of colour.

1. This part of the lab involves constructing a *Processing* sketch to simulate Benham's disk.

- (a) Write a *Processing* sketch to display the following image:



Make an effort to make your sketch code as simple as possible, with as few as possible repeated sections of code.

- (b) Adapt your sketch from part 1a to animate it, rotating the image about the centre of the circular design.
- (c) Further adapt your sketch to allow keyboard input to increase or decrease rotation speed, and to change the direction of the rotation.
- (d) Run your sketch and look at it. Describe what you see. What happens when the rotation gets faster? Slower? In the opposite direction?

At some rotation speeds, you might observe fairly faint blue and orange fringes to the circular bands. The effect is not very strong; you might not see anything at all, but if you do, you should observe the opposite colours (blue / orange). With a real, physical disk, the effect is much more striking: clear bands of colour appear when the disk is rotating quickly. In the past, I have seen real disks at the Science Museum in Kensington and at the Palais de la découverte in Paris. The difference between the screen-based version and the physical version is that a digital screen has a fixed refresh rate, normally 60Hz or 70Hz – and no amount of extra computer speed will be able to fill in the gaps. It would appear that the effect causing Pattern-Induced Flicker Colours depends on a more analogue stimulus than can be provided by a digital screen.

2. This part of the lab involves writing a sketch to illustrate cognitive effects in perception.

- (a) Write a *Processing* sketch to display a grid of words, where the word in each space on the grid is randomly chosen to be one of “ONE”, “TWO” and “THREE”.
- (b) Adapt your sketch so that each word is drawn in one of four colours: red, green, blue and black, again chosen randomly. Check that the choice of word

is not correlated with the choice of colour (you may need to run your sketch several times).

- (c) Run your sketch, and (quietly) read out loud in separate runs of your sketch
 - i. each of the words displayed;
 - ii. the colour of each of the displayed words.
- (d) Alter your sketch to use the words “RED”, “GREEN”, “BLUE” and “BLACK” instead of “ONE”, “TWO” and “THREE”. How many literal ‘3’s do you have to alter to ‘4’s in your code?

See the ‘Stroop effect’ sketch linked from the course website.

- (e) Redo part 2c with your new sketch. What do you notice?

You are likely to have found this task much more difficult than part 2c: what seems to happen is that the cognitive processing of the words naming colours (automatically reading them) interferes with the naming of the colours.

3. This part of the lab encourages you to write a sketch to summarize and communicate what you have learnt about the structure and makeup of the eye.

- (a) Write a sketch demonstrating or communicating in some way aspects of your understanding of how the components of the eye are arranged, or how the eye acts to process light signals.

One possibility is to generate a schematic 3d model for the eye, with types of cells distributed spatially in a similar way to in the real eye (but obviously not to scale). See the ‘eye schematic’ sketch on the course website.

- (b) Write (in no more than one page of A4 paper) a description of how your sketch works, which points it illustrates, and how well you think it does so.

(This part of the lab resembles closely the structure and general level of a coursework component for this course)

Further Reading:

- Sacks, O., *An Anthropologist on Mars*, Knopf (1995)
- Zeki, S., *A Vision of the Brain*, Oxford University Press (1993)