**INFOIP Image Processing - Assignment 2**

Figure 3 This is picture Z

## Part 1: What is shown in Image Z.

Figure 2 This is picture Y

Figure 1 This is picture X

By taking the AND of the image X and complement Y, you get the image Z. Where Z is then the difference between the dilation and erosion of A. In total, the whitespace we see on image Z is the area that has either been dilated or eroded from the original image, so basically the changes that have been imposed on it.

## Part 2: The relation between the structuring element and the distinct values.

When the kernel size is increased a clear decline in the count of distinct values can be observed. When taking the minimal value of an increasingly large kernel, it is more likely for ‘extreme’ high values to not be selected. And thus the count of distinct values in the image decreases.

Figure 4 X-axis: Square kernel size Y-axis: Distinct Values

## Part 3: Similarities and differences between the Fourier shape descriptors of Image G1, G2 and G3.

Looking at the Fourrier descriptors of the different images, a similar pattern is observed. Which was to be expected since the shapes are equal, just different sizes and rotation. G3 slightly differs from G2 and G1, where G2 and G1’s lines diverge at the end, G3’s doesn’t. We do not have an explanation for this.

## Bonus 3: Sampling at every pixel, 8th pixel, 40th pixel and 60th pixel

The descriptors show roughly the same pattern, the first three values are very large. This has to do with, in our eyes, refinement. By that we mean that the first few Fourrier descriptors describe the rough shape of the seahorse, and therefore have the most ‘weight’ to them. And so the further the Fourrier descriptors are calculated, the smaller they get on average. Because then the small details of the seahorse are being described. We can compare these descriptors by looking at the graphs, and we see similar patterns emerging, even though our sampling size increases a lot.

## Note:

After handing in our previous assignment, there were a few flaws in our code. The flaw was in the edge detection filter, we incorrectly implemented the Sobel filter. After the grading, we corrected the code and created the new image B. As is shown below:



New image B (threshold 3)

Old image B (threshold 18)