Task 3 (Edge Detection)

In this task, you will find the edges of an image.

Load the image

```
clock = im2double(load(fullfile("./","clock.mat")).clock);
```

Create 3 different kernels, sobel, prewitt, scharr and normalize them

```
sobel = double(fspecial('sobel'))'./4;
```

```
sobel = 3×3
    0.2500         0   -0.2500
    0.5000         0   -0.5000
    0.2500         0   -0.2500
```

```
prewitt = double(fspecial('prewitt'))'./3;
```

```
prewitt = 3×3
    0.3333         0   -0.3333
    0.3333         0   -0.3333
    0.3333         0   -0.3333
```

```
a = 3;
b = 10;
scharr = [3.0 10.0 3.0; 0.0 0.0 0.0; -3.0 -10.0 -3.0]'./16;
```

```
scharr = 3×3
    0.1875         0   -0.1875
    0.6250         0   -0.6250
    0.1875         0   -0.1875
```

filter with sobel

```
sobel_filtered = imfilter(clock,sobel);
imshow(sobel_filtered)
```

filter with prewitt

```
prewitt_filtered = imfilter(clock,prewitt);
imshow(prewitt_filtered)
```

filter with scharr

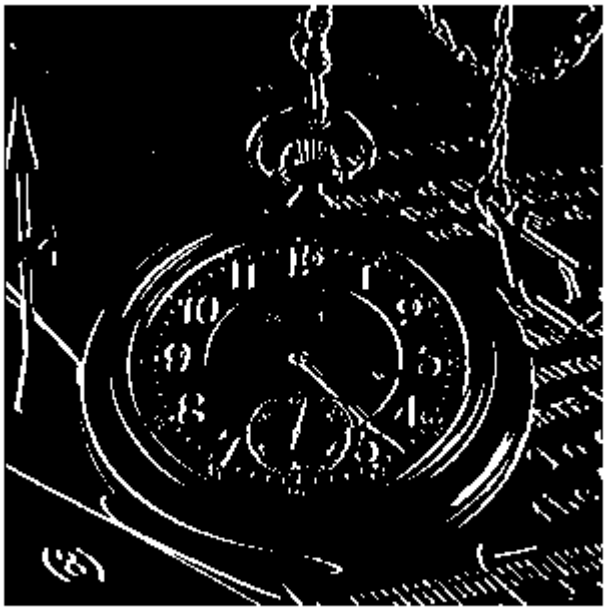
```
scharr_filtered = imfilter(clock,scharr);
imshow(scharr_filtered)
```

Notably the sobel filter is best at perserving smaller details such as the text below the clock

Part 2, threshold

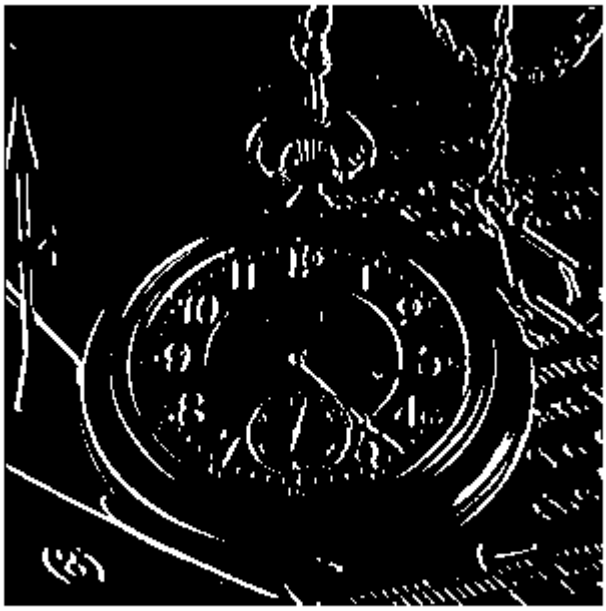
First I threshold the scharr result

```
scharr_th = scharr_filtered > (max(scharr_filtered(:)-mean(scharr_filtered(:))))*.1+mean(scharr
imshow(scharr_th)
```



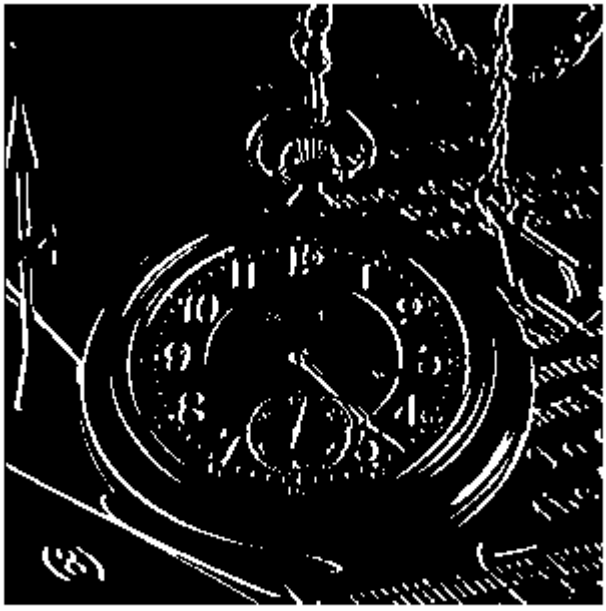
Thresholding the prewitt results

```
prewitt_th = prewitt_filtered > (max(prewitt_filtered(:)-mean(prewitt_filtered(:))))*.1+mean(pr
imshow(prewitt_th)
```



Thresholding the sobel results

```
sobel_th = sobel_filtered > (max(sobel_filtered(:)-mean(sobel_filtered(:))))*.1+mean(sobel_filt
imshow(sobel_th)
```



Here I used some trial an error to get them to look good, the main take away from this task is that depending on the technique used the threshold will chang a lot. Therefor a relative measure is better than an absolut value. We can also see that all of the edge detectors produce similar results when looking at the thresholded images.