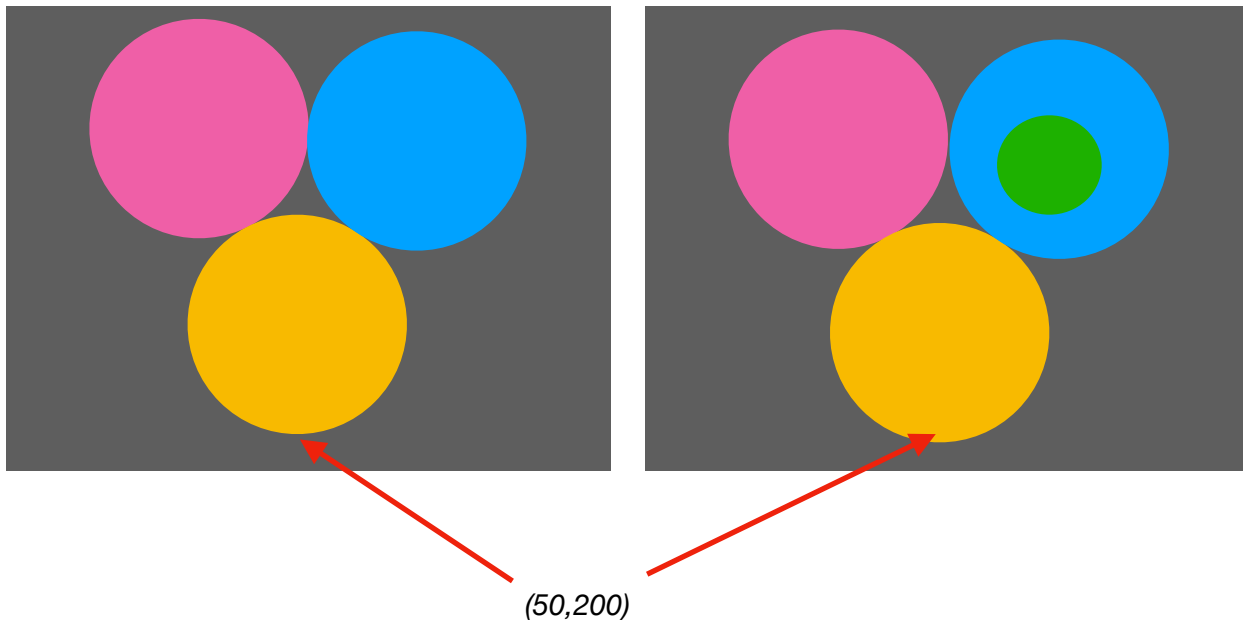


and identifying any differences

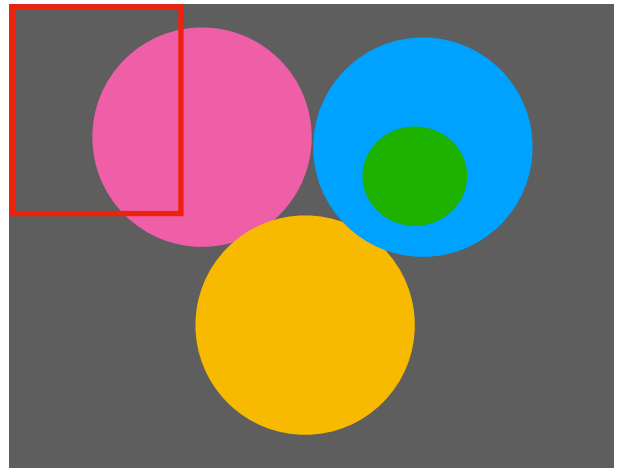
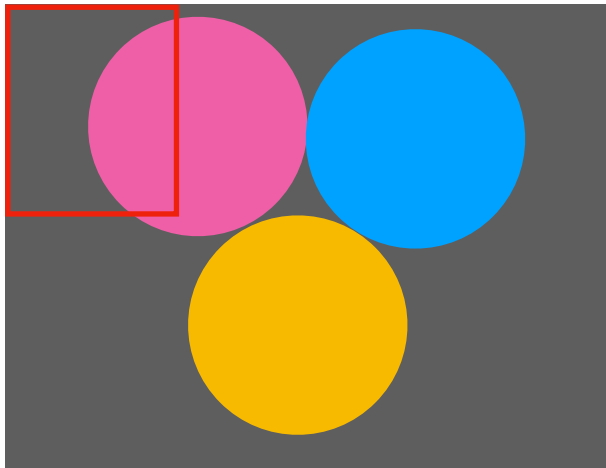


You cannot compare pixel by pixel as each pixel from each image won't necessarily represent the same thing

e.g. the image above has both objects slightly at different positions such that $(50,200)$ represent different parts in images

Since we cannot compare pixel by pixel another way to compare is to grab a region from both images and compare them based on pixel occurrences.

Mapping pixel occurrences in regions



```
Region1 = {  
    grey: 200,  
    pink: 400  
}
```

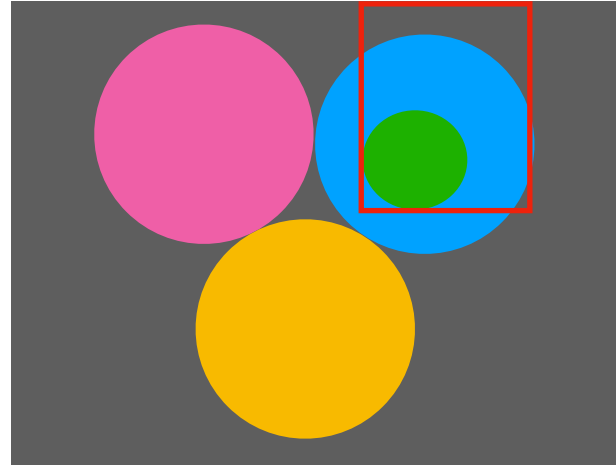
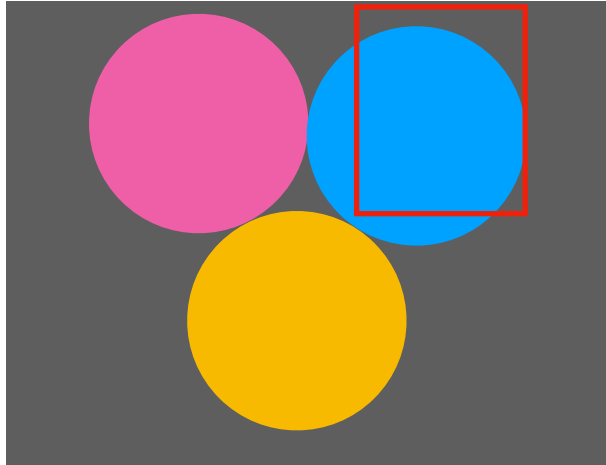
```
Region1 = {  
    grey: 100,  
    pink: 500  
}
```

50% difference in grey pixels
25% difference in pink pixels

If any of the percentage difference is greater than a given threshold then the region is considered to be changed.

Given a 90% threshold, that region has no differences

Detecting a difference using regions



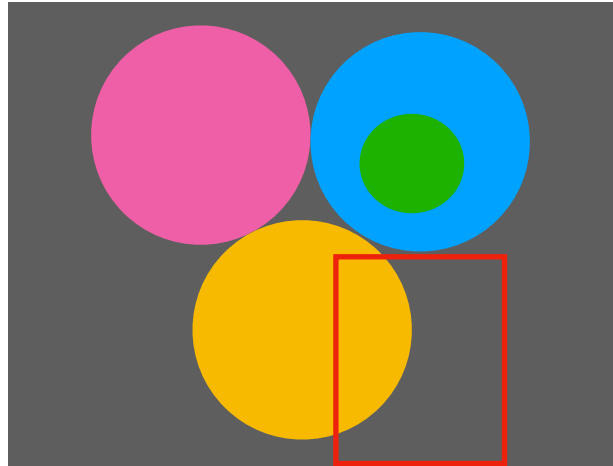
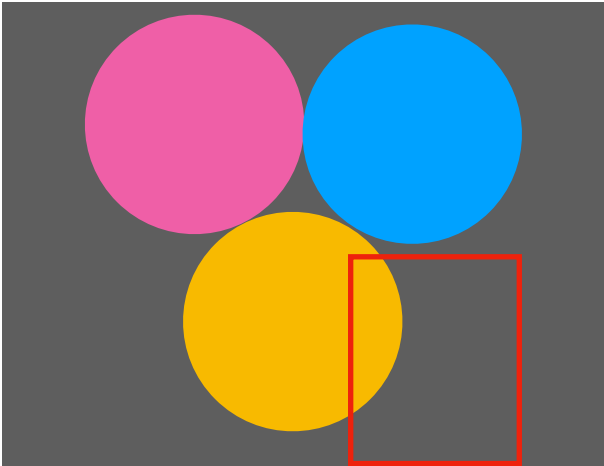
```
Region1 = {  
    grey: 100,  
    blue: 500  
}
```

```
Region2 = {  
    grey: 100,  
    blue: 200,  
    green: 300  
}
```

0% difference in grey pixels
60% difference in blue pixels
100% difference in green pixels

Due to a change being present that is greater than the given threshold of 90% we can consider this region to have changed

Dealing with random pixels/noise in regions



```
Region1 = {  
    grey: 200,  
    yellow: 400  
}
```

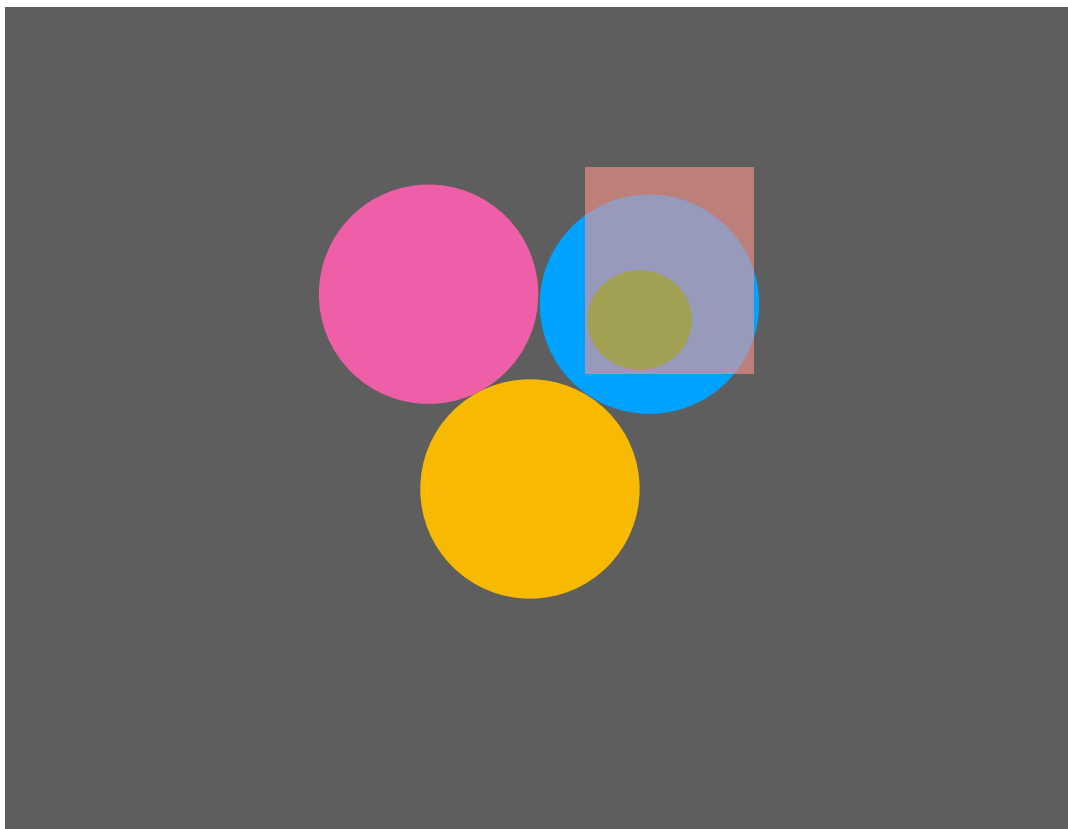
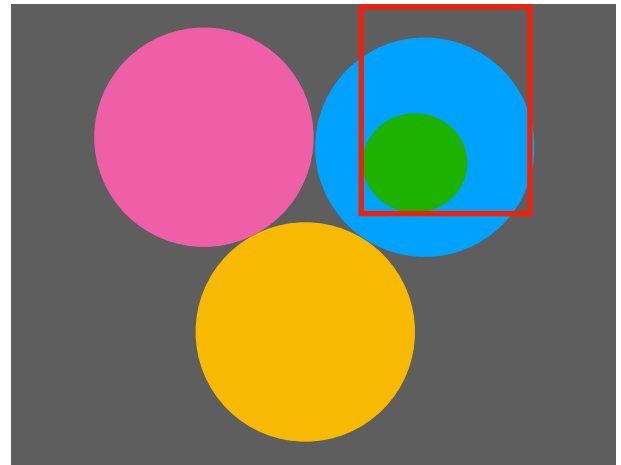
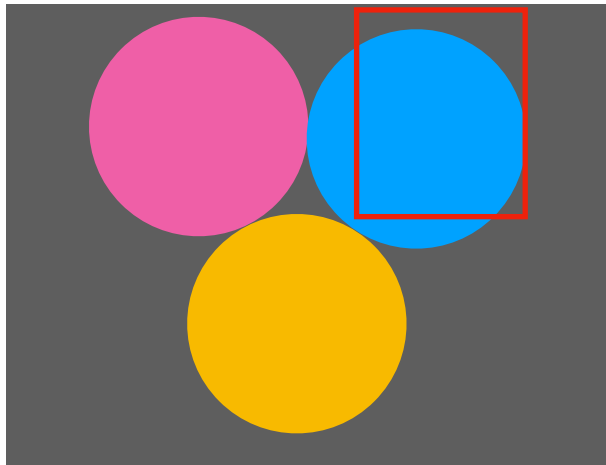
```
Region2 = {  
    grey: 100,  
    yellow: 500,  
    orange: 2  
}
```

50% difference in grey pixels
20% difference in yellow pixels
100% difference in orange pixels

100% difference in orange pixels was detected therefor this region would be considered a difference in the two images but that is not the case as the orange pixels were just noisy pixels. To deal with noisy pixels a minimum number of occurrences is required. Minimum amount is 100, since there is only 2 occurrences of orange, this region is not consider to be different

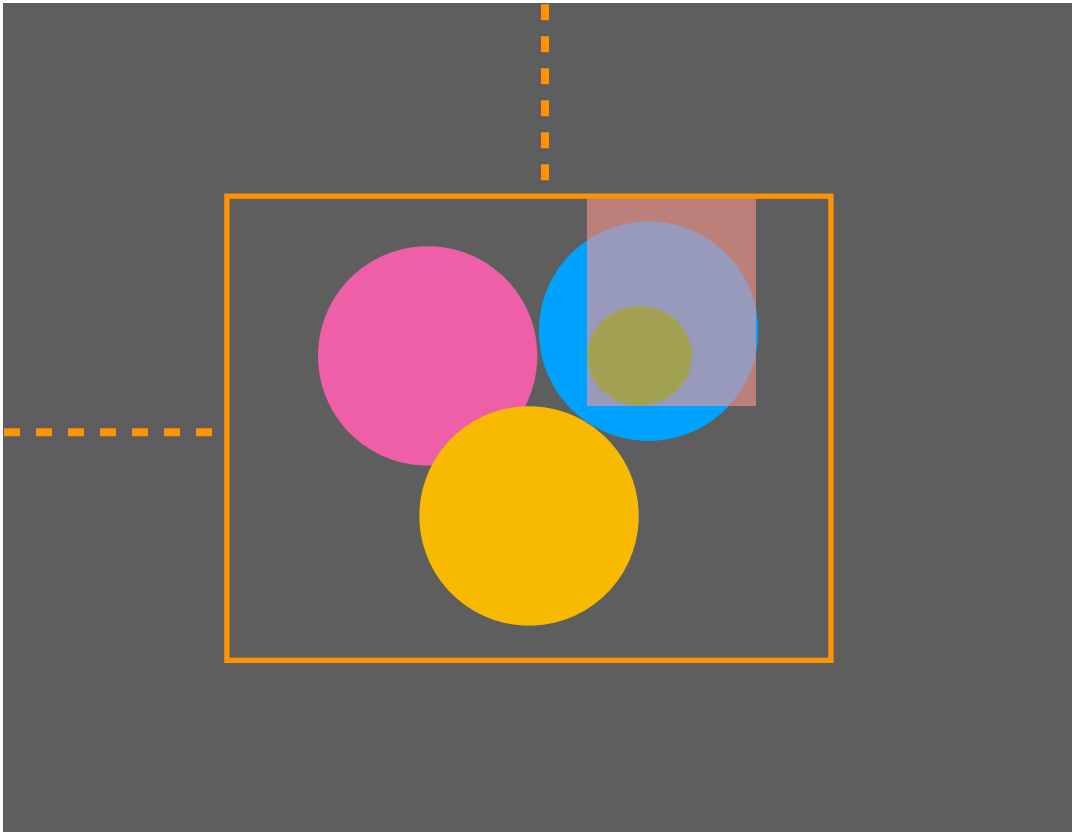
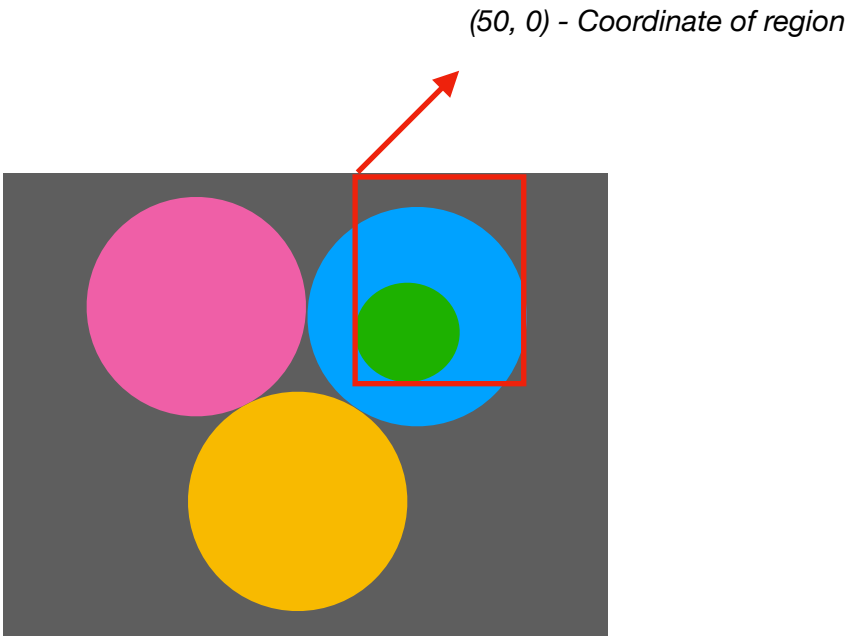
Highlighting the different regions

Any regions that is detected to be different to one another will be highlighted in the original image



Finding the location from the original image

We keep track of where we cropped the image at



Shoes at what point the image was cropped. Add the region x to where the cropped x point and add y to the cropped y point.