Numerical Method
Project Report

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Build:

```
: javac Merge
: java Merge img1.jpg img2.jpg img3.jpg filename
where filename is the expected output name (no need to type in the file
type)
(all images should be located in the same location as Merge.java file)
```

Goal: Combine images with the same background into one.

Main Idea:

Basically, we teach computer how to distinguish between objects and background so that it can combine images by using the differences of RGB value across pixels from different images.

Running Time: N^2 , where N = total number of pixels in images

Constraint: Number of input images is equal or greater than 3.

Process:

1. Get color code for R,G, and B of each pixel of the images.
2. For easy understanding, let's say we're combining 3 images, A, B and C.
   - For each iteration, make one image to be the main, then find distance from the main to the rest of the remaining images. (compare pixel to pixel)
   - Keep each distance value in the list.
   - Repeat this by making another image as the main.
3. Once done with all the pixels, find maximum distance value from the list. The max distance means that is where the object is in the image.
4. Then compare it to the range that we set as default
5. Once we got the maximum value, there are 2 cases to be considered of:
   - If the pixels are in similar color, we find average to get the most common color

- If there is one pixel that its distance exceeds the range when compared to one sample from the similar color group of pixels, we choose that pixel to be in the output image.
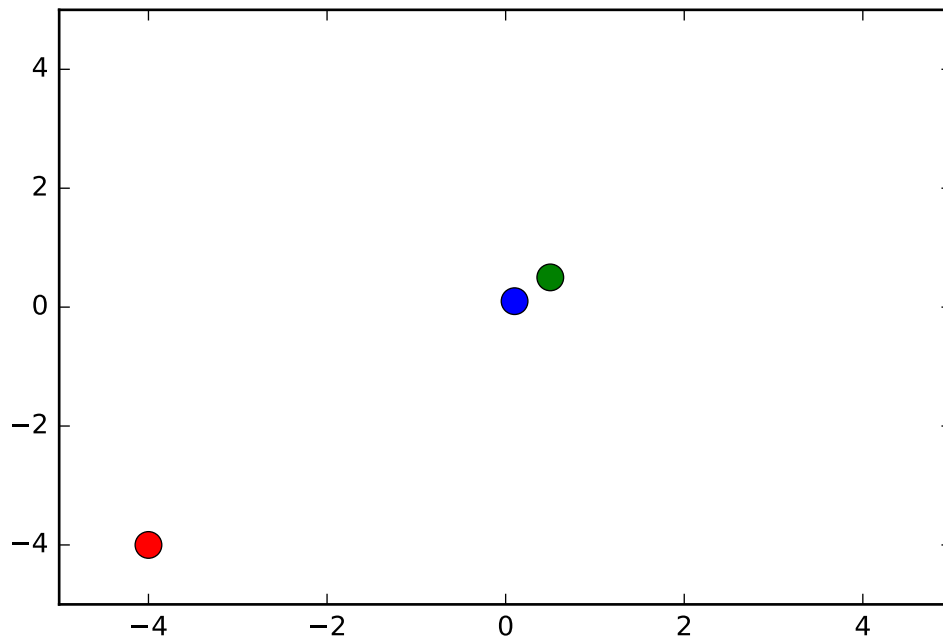
As you can see in the figure above, blue and green dots are in the same area. This means that these 2 dots are the background (similar color). While the red dot is the object as it is far away from the rest.