Assignment 02

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Part 0: Input Images

image1.png

image2.png

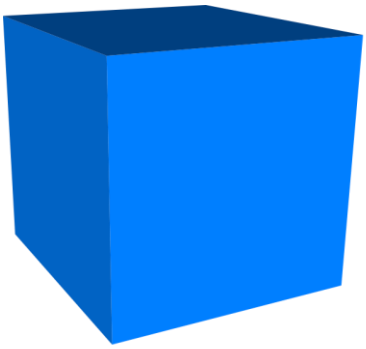
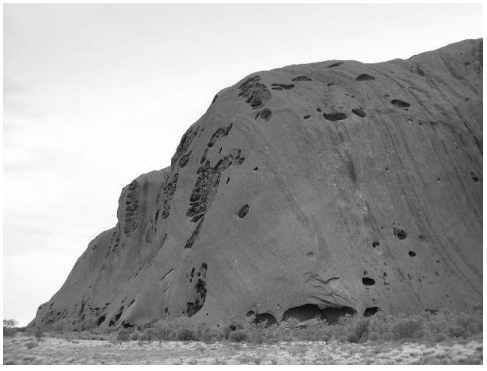


image3.png

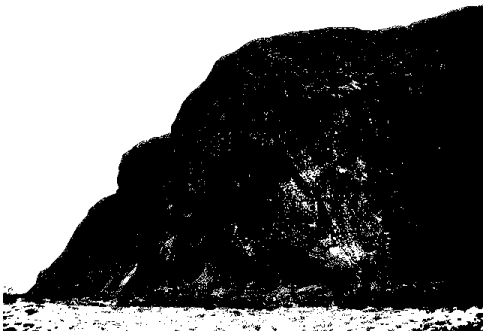
Part 1: Filters



pic_1_a.png

This image is a greyscale version of image1. It is 20% of the blue, 70% of the green, and 10% of the red of the color channel.

```
img=img[:,:,0]*.1+img[:,:,1]*.7+img[:,:,2]*.2
```



This image is a threshold of the greyscale of image1. Values greater than 128 is white, and less than or equal to is black.

```
img[img<=threshold]=0
img[img>threshold]=255
```

pic_1_b.png

pic_1_c_0.png -> pic_1_c_10.png

These pictures were created by desaturating image1. The first image is the original image, and the pictures go down incrementally to a greyscale image1.

```
img=mix(img,gray_img,percent)
```

pic_1_d_0.png -> pic_1_d_10.png

These pictures were created by changing the contrast by a factor of .5 to 1.5. This makes the color values of the image either closer or further away from 128.

```
dist_img=img-128.0
dist_img*=factor
dist_img[dist_img<-128]=-128
dist_img[dist_img>127]=127
img=blank+dist_img
```

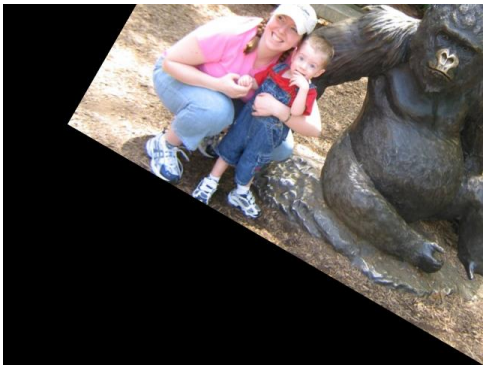
Part 2: Transformations

This image is image2 filliped over the y axis. The transformation matrix used was

$$M=\begin{matrix}-1 & 0 & w\\ 0 & 1 & 0\end{matrix}$$

```
cv2.warpPerspective(img2,M,(w,h))
```

pic_2_a.png



This image was a rotation of image2 about its lower right corner.

$$M1=\begin{matrix}1 & 0 & -w\\ 0 & 1 & -h\end{matrix} \qquad M2=\begin{matrix}\cos(30°) & \sin(30°) & 0\\ -\sin(30°) & \cos(30°) & 0\end{matrix}$$

$$M3=\begin{matrix}1 & 0 & w\\ 0 & 1 & h\end{matrix}$$

```
M=M3.dot(M2).dot(M1)
cv2.warpPerspective(img2,M,(w,h))
```

pic_2_b.png

This picture was created by getting the transformation matrix of image1 and image2 on the corners of the cube, and using those to transform the images. Then, the images were overlaid on the cube.

```
M1=cv2.getPerspectiveTransform(orig_tri,tri1_prime)
M2=cv2.getPerspectiveTransform(orig_tri,tri2_prime)
img1_perspective=cv2.warpPerspective(img1,M1,(w,h+100))
img2_perspective=cv2.warpPerspective(img2,M2,(w,h+100))
```

pic_2_c.png