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(1) Assignment statement

Homework 1 (Due: 3/7)

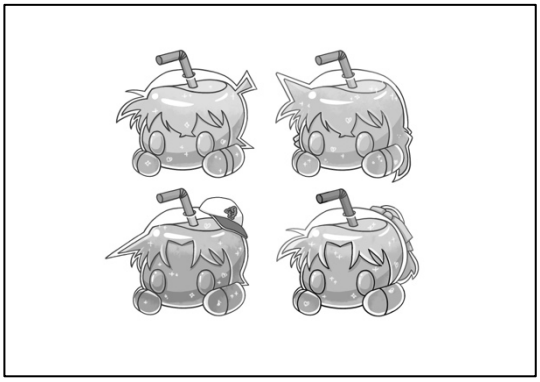
1. Input a color image $C(R,G,B)$
2. Output the color image C
3. Transform the color image C into a grayscale image I by $I = (R+G+B)/3$
4. Show the grayscale image I.

(2)

(a) Input/output images

Input:

Output:



(b) Source code

hw.py

hw.py > rgb2gray

```python
import sys
import numpy as np
import matplotlib.pyplot as plt
import matplotlib.image as mpimg

def rgb2gray(rgb):
  return np.dot(rgb[..., :3],[1/3,1/3,1/3])

img=mpimg.imread(sys.argv[1])

gray=rgb2gray(img)

plt.imsave("input_"+sys.argv[1],img)
plt.imsave("outGray_"+sys.argv[1],gray,cmap='gray')

figure,ax=plt.subplots(1,2)
ax[0].imshow(img)
ax[1].imshow(gray,cmap='gray')
plt.show()
```

(c) Comments

此作業轉灰階時使用的算法是 I = (1/3)*R + (1/3)*G + (1/3)*B，單純讓 RGB 的值平均算出灰階的值。有另一種轉灰階的方式是 I = 0.299*R + 0.587*G + 0.114*B，該方式會考慮到人眼對 RGB 三個分量各有不同的敏銳度，可以計算出更符合人眼視覺的灰階圖片。