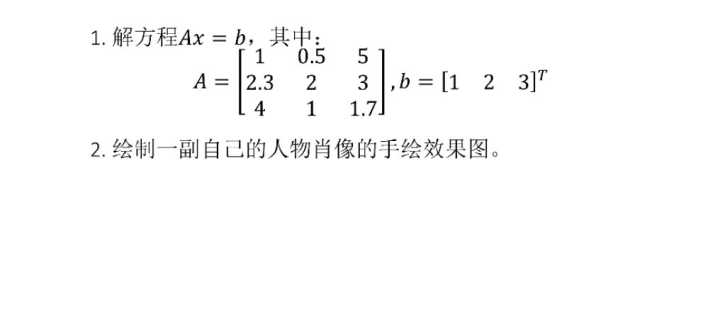
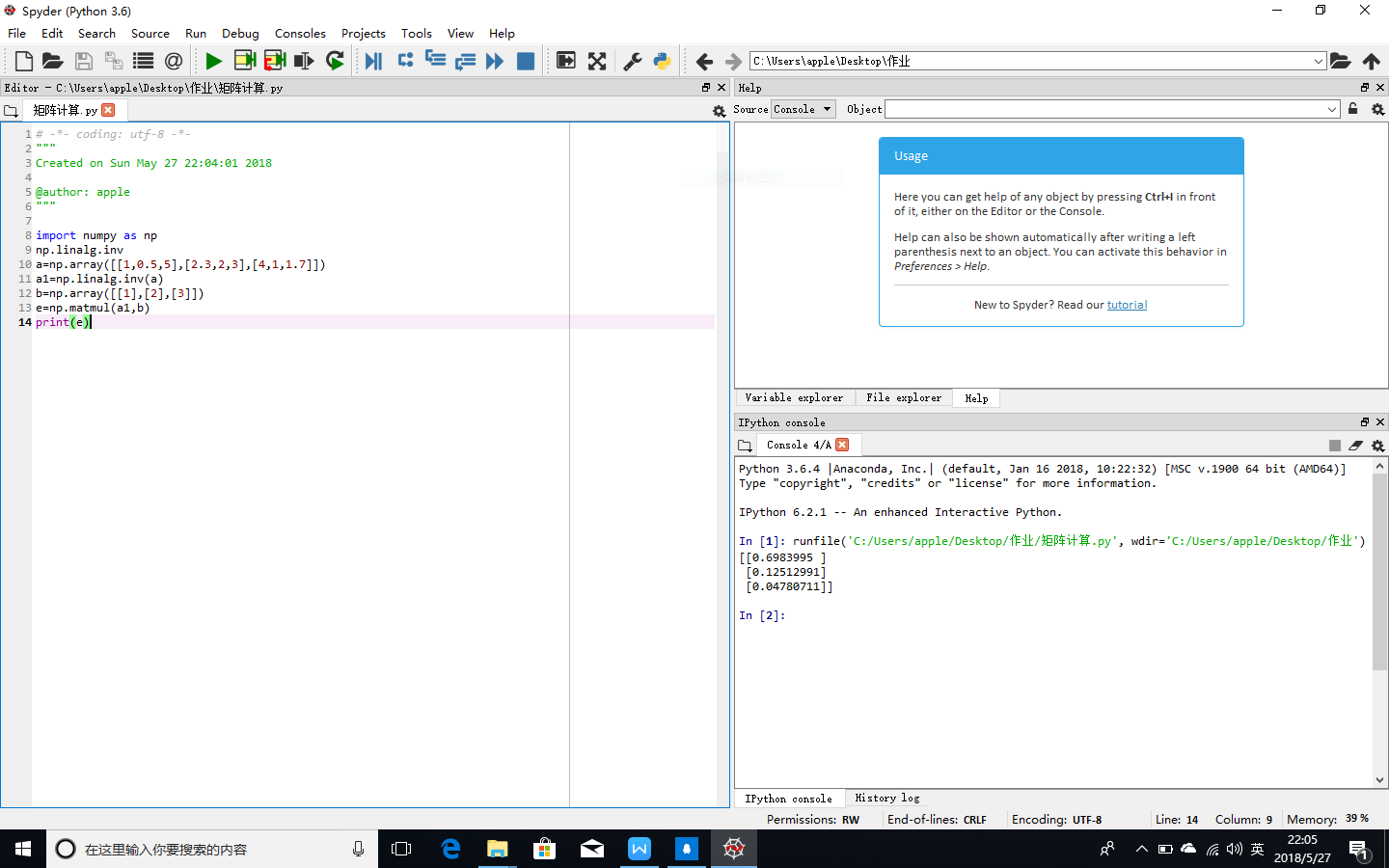
# 作业3

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1. 

2.from PIL import Image

import numpy as np

vec\_el = np.pi/2.2

vec\_az = np.pi/4

depth = 10.

im = Image.open("me.jpg").convert("L")

a = np.asarray(im).astype("float")

grad = np.gradient(a)

grad\_x,grad\_y = grad

grad\_x=grad\_x\*depth/100.

grad\_y=grad\_y\*depth/100.

dx = np.cos(vec\_el)\*np.cos(vec\_az)

dy = np.cos(vec\_el)\*np.sin(vec\_az)

dz = np.sin(vec\_el)

A = np.sqrt(grad\_x\*\*2+grad\_y\*\*2+1.)

uni\_x = grad\_x/A

uni\_y = grad\_y/A

uni\_z = 1./A

a2 = 255\*(dx\*uni\_x + dy\*uni\_y + dz\*uni\_z)

a2 = a2.clip(0,255)

im2 = Image.fromarray(a2.astype("uint8"))

im2.save("me2.jpg")

