109 學年度第一學期電腦視覺實務期中考答案

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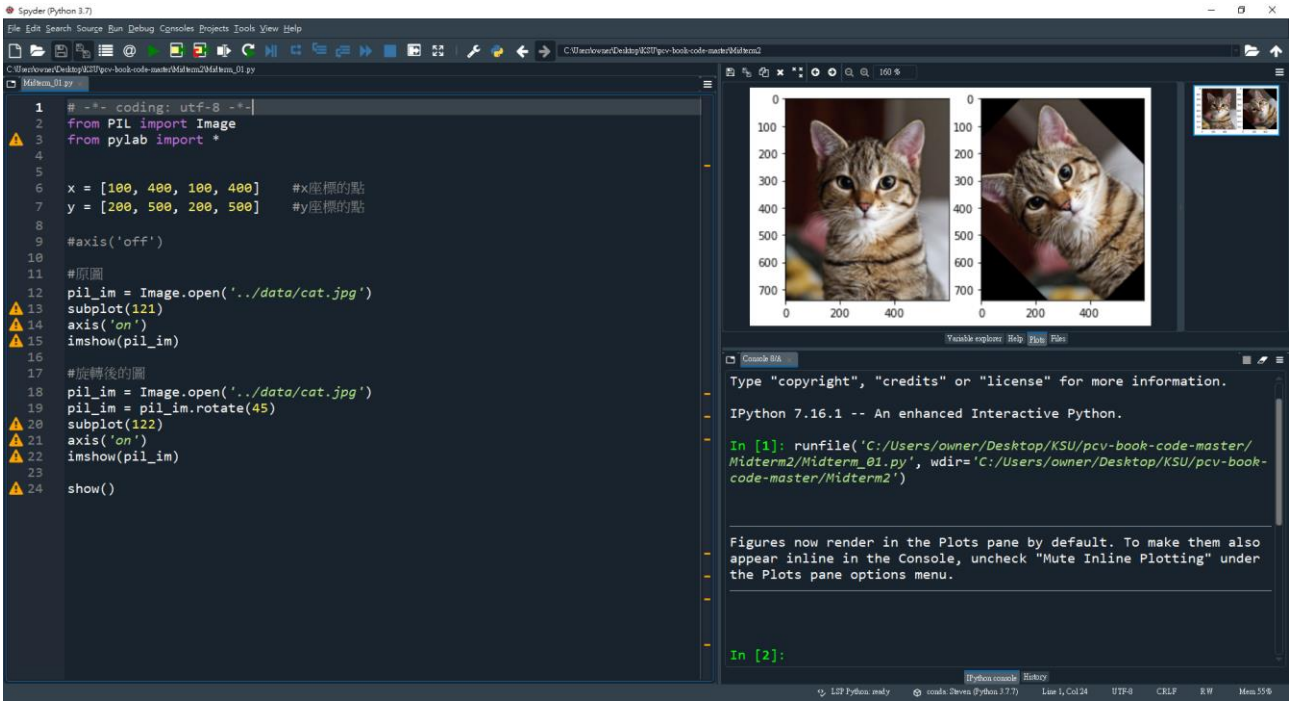
1. Midterm_01.py



```
# -*- coding: utf-8 -*-
from PIL import Image
from pylab import *


x = [100, 400, 100, 400]    #x座標的點
y = [200, 500, 200, 500]    #y座標的點

#axis('off')

#原圖
pil_im = Image.open('../data/cat.jpg')
subplot(121)
axis('on')
imshow(pil_im)

#旋轉後的圖
pil_im = Image.open('../data/cat.jpg')
pil_im = pil_im.rotate(45)
subplot(122)
axis('on')
imshow(pil_im)

show()
```

```
Type "copyright", "credits" or "license" for more information.

IPython 7.16.1 -- An enhanced Interactive Python.

In [1]: runfile('C:/Users/owner/Desktop/KSU/pcv-book-code-master/
Midterm2/Midterm_01.py', wdir='C:/Users/owner/Desktop/KSU/pcv-book-
code-master/Midterm2')

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appear inline in the Console, uncheck "Mute Inline Plotting" under
the Plots pane options menu.

In [2]:
```
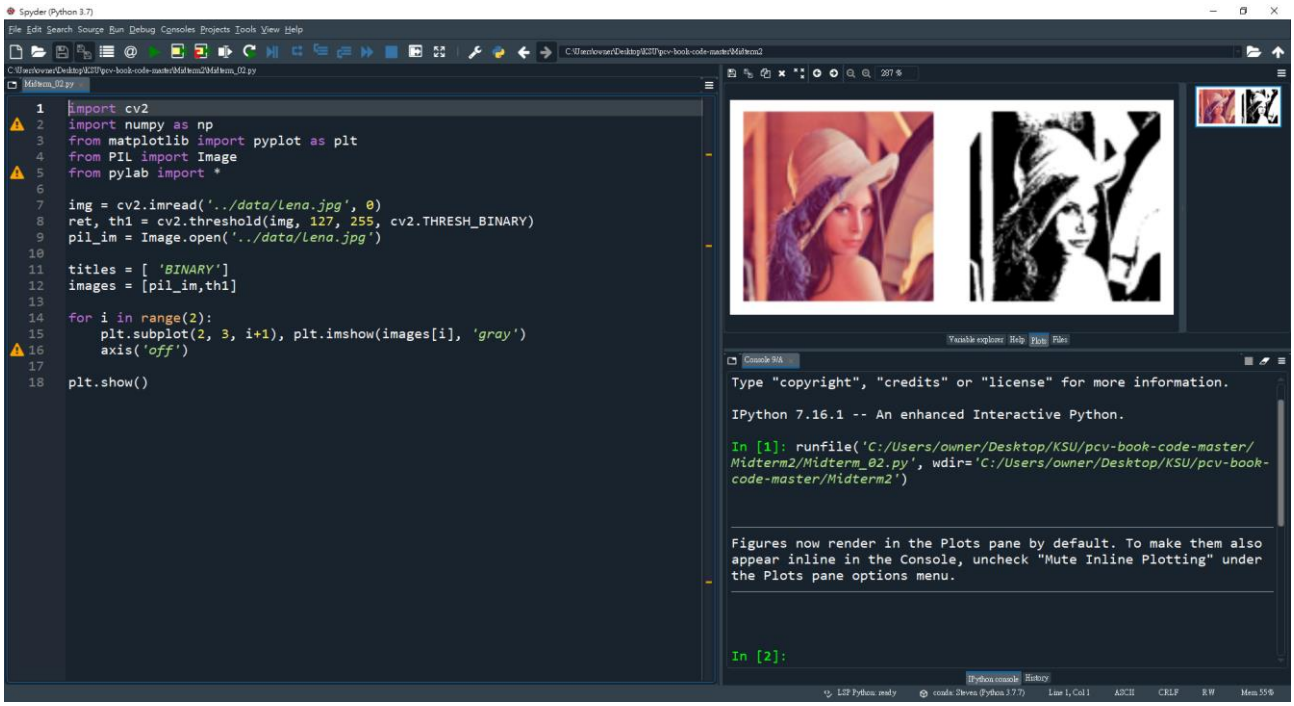

2. Midterm_02.py



```
import cv2
import numpy as np
from matplotlib import pyplot as plt
from PIL import Image
from pylab import *

img = cv2.imread('../data/lena.jpg', 0)
ret, th1 = cv2.threshold(img, 127, 255, cv2.THRESH_BINARY)
pil_im = Image.open('../data/Lena.jpg')

titles = [ 'BINARY']
images = [pil_im,th1]

for i in range(2):
    plt.subplot(2, 3, i+1), plt.imshow(images[i], 'gray')
    axis('off')

plt.show()
```

```
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In [1]: runfile('C:/Users/owner/Desktop/KSU/pcv-book-code-master/
Midterm2/Midterm_02.py', wdir='C:/Users/owner/Desktop/KSU/pcv-book-
code-master/Midterm2')

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appear inline in the Console, uncheck "Mute Inline Plotting" under
the Plots pane options menu.

In [2]:
```
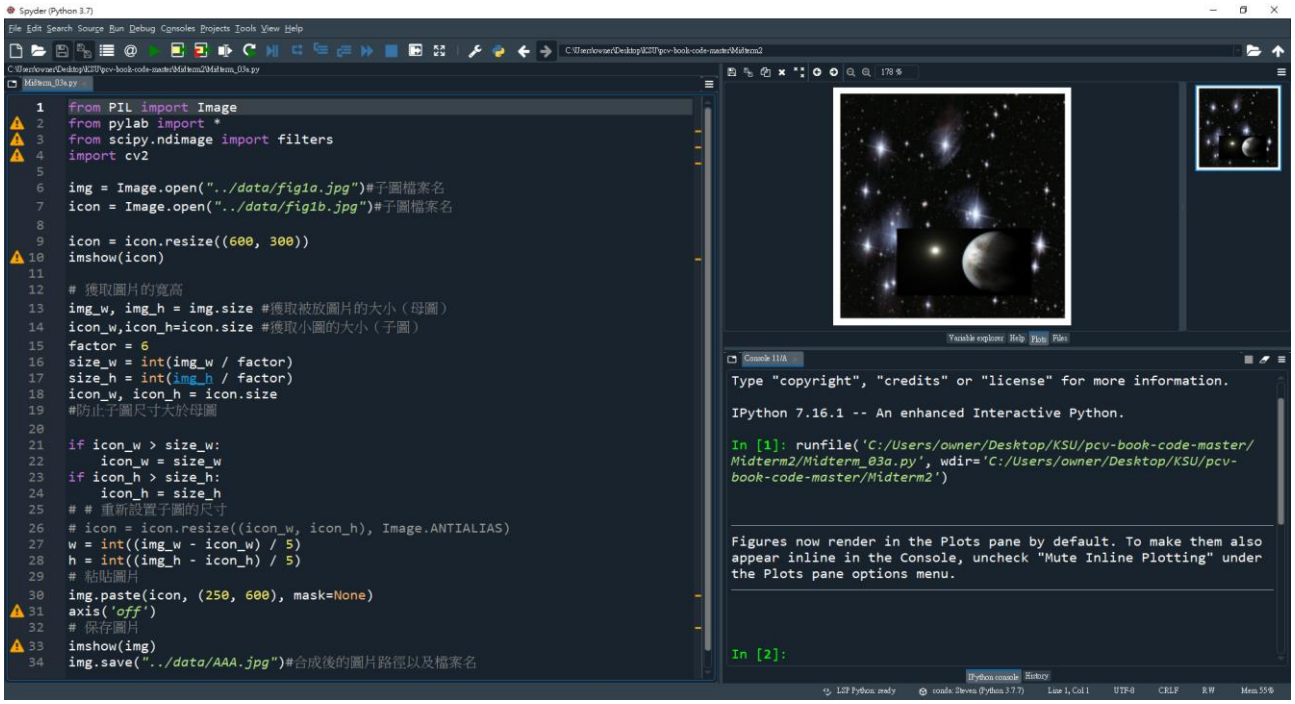

3. Midterm_03a.py



```
from PIL import Image
from pylab import *
from scipy.ndimage import filters
import cv2

img = Image.open("../data/fig1a.jpg")#子圖檔案名
icon = Image.open("../data/fig1b.jpg")#子圖檔案名

icon = icon.resize((600, 300))
imshow(icon)

# 獲取圖片的寬高
img_w, img_h = img.size #獲取被放圖片的大小（母圖）
icon_w,icon_h=icon.size #獲取小圖的大小（子圖）
factor = 6
size_w = int(img_w / factor)
size_h = int(img_h / factor)
icon_w, icon_h = icon.size
#防止子圖尺寸大於母圖

if icon_w > size_w:
    icon_w = size_w
if icon_h > size_h:
    icon_h = size_h
# # 重新設置子圖的尺寸
# icon = icon.resize((icon_w, icon_h), Image.ANTIALIAS)
w = int((img_w - icon_w) / 5)
h = int((img_h - icon_h) / 5)
# 粘貼圖片
img.paste(icon, (250, 600), mask=None)
axis('off')
# 保存圖片
imshow(img)
img.save("../data/AAA.jpg")#合成後的圖片路徑以及檔案名
```

```
Type "copyright", "credits" or "license" for more information.

IPython 7.16.1 -- An enhanced Interactive Python.

In [1]: runfile('C:/Users/owner/Desktop/KSU/pcv-book-code-master/Midterm2/Midterm_03a.py', wdir='C:/Users/owner/Desktop/KSU/pcv-book-code-master/Midterm2')

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In [2]:
```
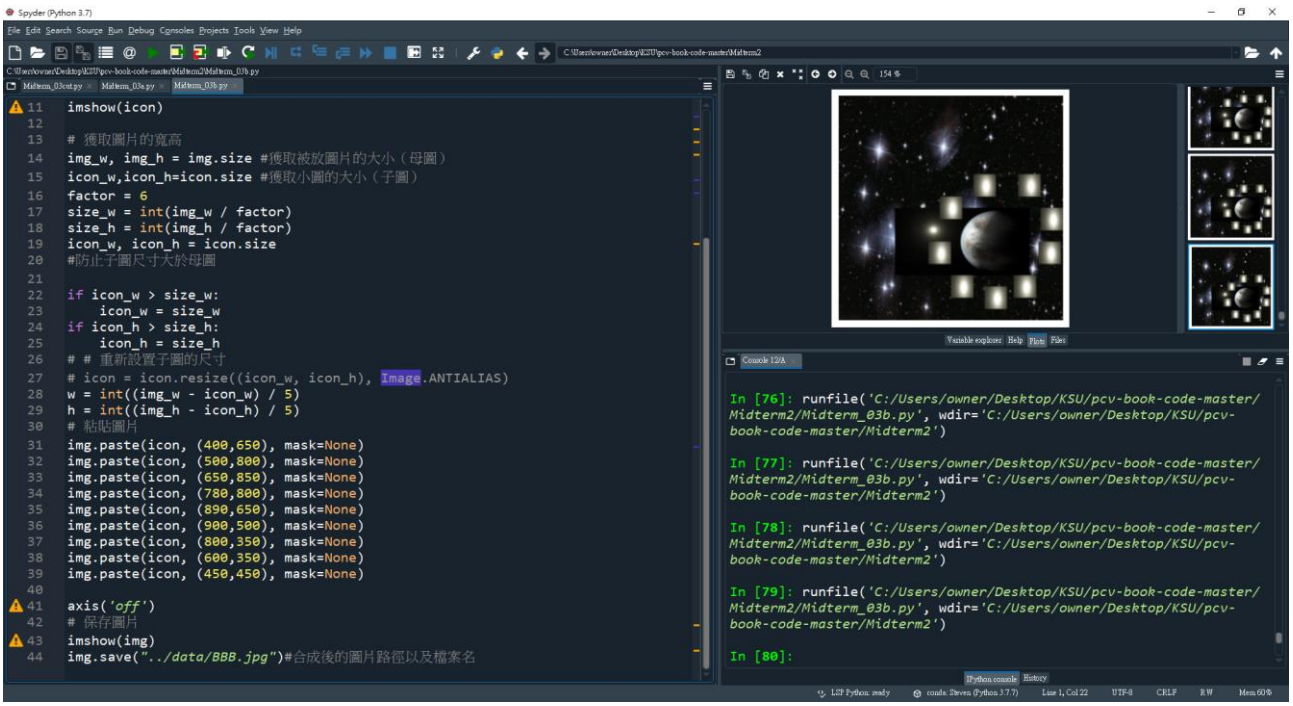
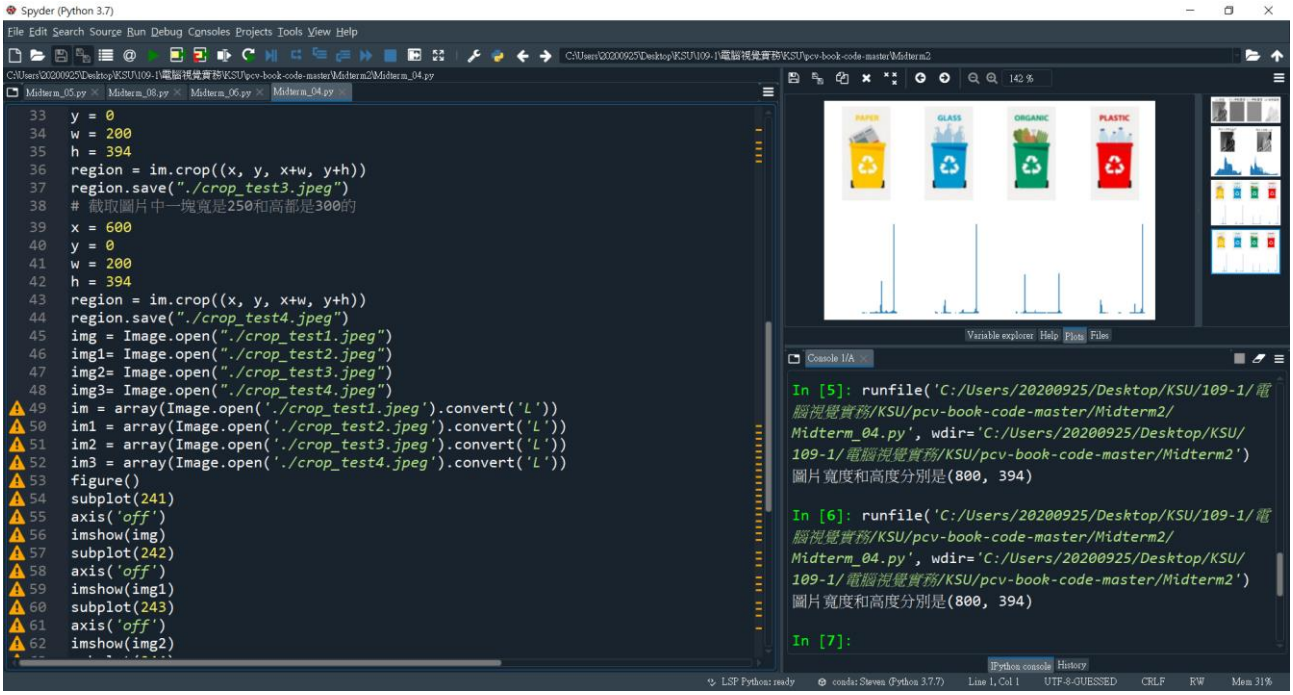

4. Midterm_03b.py(先執行 cut.py)



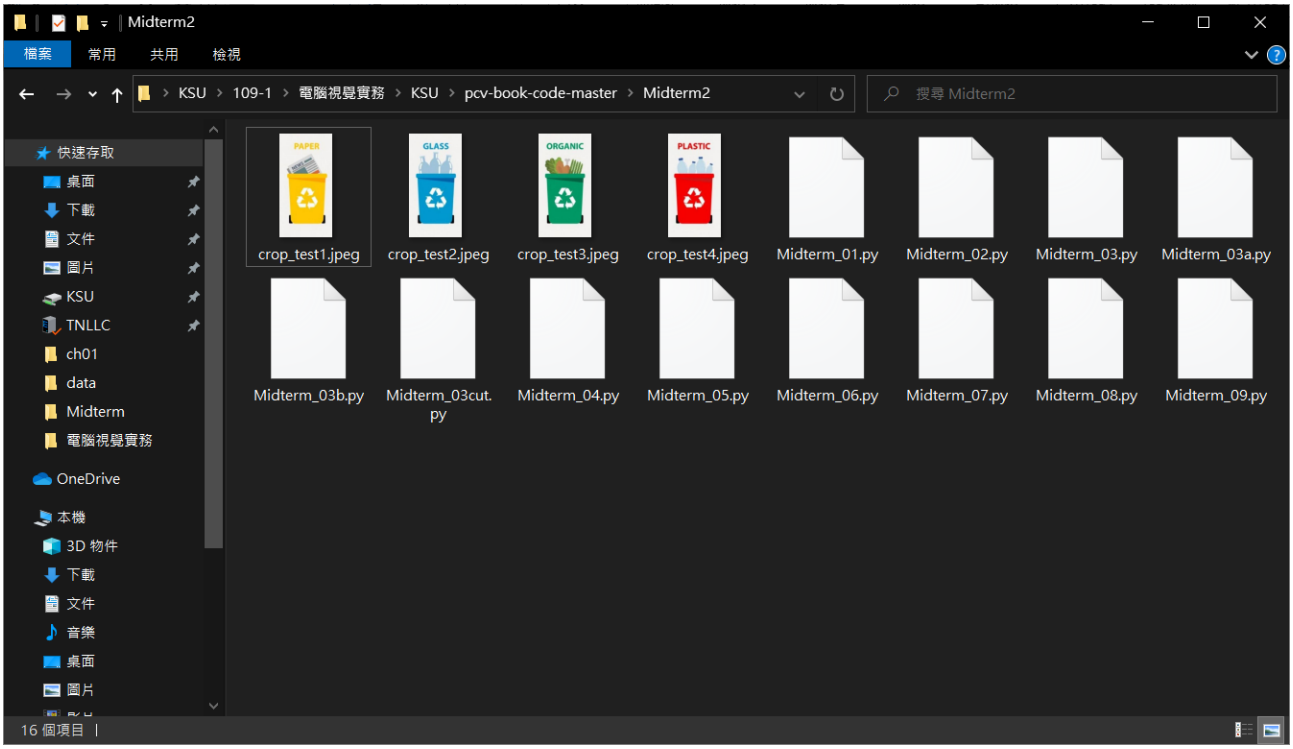
```
imshow(icon)

# 獲取圖片的寬高
img_w, img_h = img.size #獲取被放圖片的大小（母圖）
icon_w,icon_h=icon.size #獲取小圖的大小（子圖）
factor = 6
size_w = int(img_w / factor)
size_h = int(img_h / factor)
icon_w, icon_h = icon.size
#防止子圖尺寸大於母圖

if icon_w > size_w:
    icon_w = size_w
if icon_h > size_h:
    icon_h = size_h
# # 重新設置子圖的尺寸
# icon = icon.resize((icon_w, icon_h), Image.ANTIALIAS)
w = int((img_w - icon_w) / 5)
h = int((img_h - icon_h) / 5)
# 粘貼圖片
img.paste(icon, (400,650), mask=None)
img.paste(icon, (500,800), mask=None)
img.paste(icon, (650,850), mask=None)
img.paste(icon, (780,800), mask=None)
img.paste(icon, (890,650), mask=None)
img.paste(icon, (900,500), mask=None)
img.paste(icon, (800,350), mask=None)
img.paste(icon, (600,350), mask=None)
img.paste(icon, (450,450), mask=None)

axis('off')
# 保存圖片
imshow(img)
img.save("../data/BBB.jpg")#合成後的圖片路徑以及檔案名
```

```
In [76]: runfile('C:/Users/owner/Desktop/KSU/pcv-book-code-master/Midterm2/Midterm_03b.py', wdir='C:/Users/owner/Desktop/KSU/pcv-book-code-master/Midterm2')

In [77]: runfile('C:/Users/owner/Desktop/KSU/pcv-book-code-master/Midterm2/Midterm_03b.py', wdir='C:/Users/owner/Desktop/KSU/pcv-book-code-master/Midterm2')

In [78]: runfile('C:/Users/owner/Desktop/KSU/pcv-book-code-master/Midterm2/Midterm_03b.py', wdir='C:/Users/owner/Desktop/KSU/pcv-book-code-master/Midterm2')

In [79]: runfile('C:/Users/owner/Desktop/KSU/pcv-book-code-master/Midterm2/Midterm_03b.py', wdir='C:/Users/owner/Desktop/KSU/pcv-book-code-master/Midterm2')

In [80]:
```

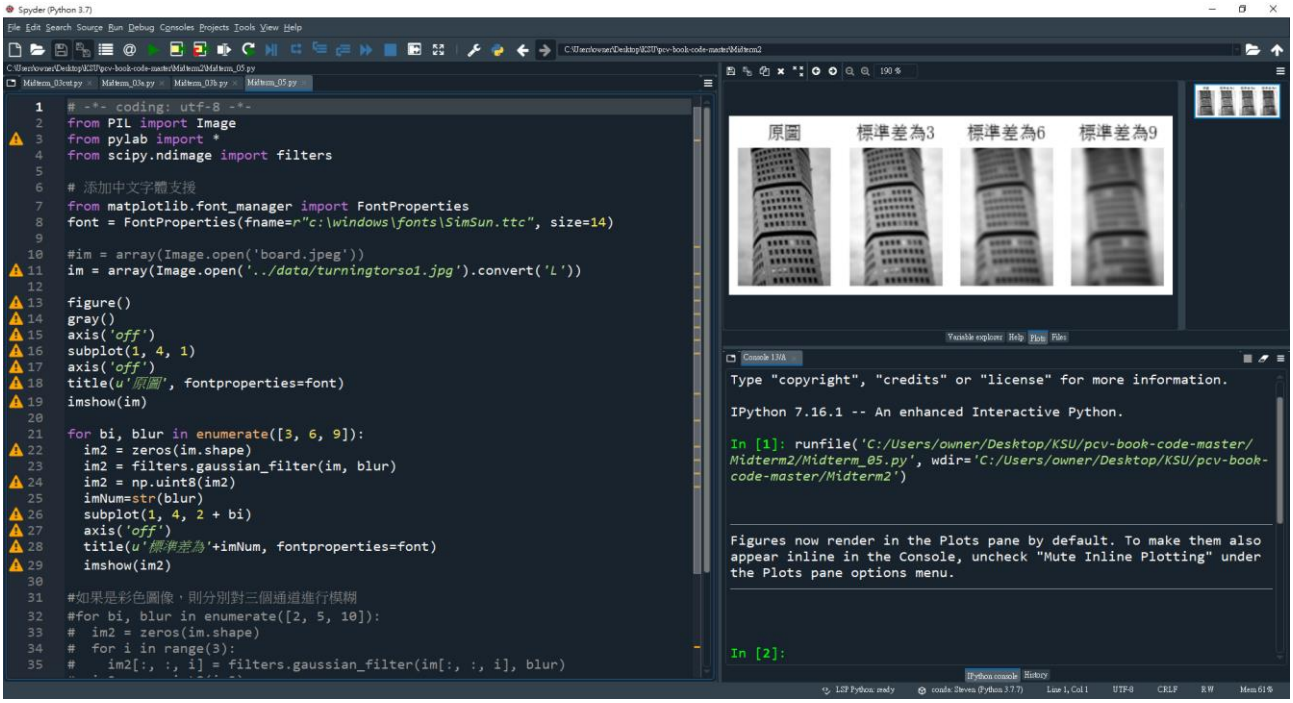
5. Midterm_04.py(Project)



6. Midterm_04.py(Result)



7. Midterm_05.py




```
# -*- coding: utf-8 -*-
from PIL import Image
from pylab import *
from scipy.ndimage import filters

# 添加中文字體支援
from matplotlib.font_manager import FontProperties
font = FontProperties(fname=r"c:\windows\fonts\SimSun.ttc", size=14)

#im = array(Image.open('board.jpeg'))
im = array(Image.open('../data/turningtorso1.jpg').convert('L'))

figure()
gray()
axis('off')
subplot(1, 4, 1)
axis('off')
title(u'原圖', fontproperties=font)
imshow(im)

for bi, blur in enumerate([3, 6, 9]):
  im2 = zeros(im.shape)
  im2 = filters.gaussian_filter(im, blur)
  im2 = np.uint8(im2)
  imNum=str(blur)
  subplot(1, 4, 2 + bi)
  axis('off')
  title(u'標準差為'+imNum, fontproperties=font)
  imshow(im2)

#如果是彩色圖像，則分別對三個通道進行模糊
#for bi, blur in enumerate([2, 5, 10]):
#  im2 = zeros(im.shape)
#  for i in range(3):
#    im2[:, :, i] = filters.gaussian_filter(im[:, :, i], blur)
```

```
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In [1]: runfile('C:/Users/owner/Desktop/KSU/pcv-book-code-master/Midterm2/Midterm_05.py', wdir='C:/Users/owner/Desktop/KSU/pcv-book-code-master/Midterm2')

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In [2]:
```
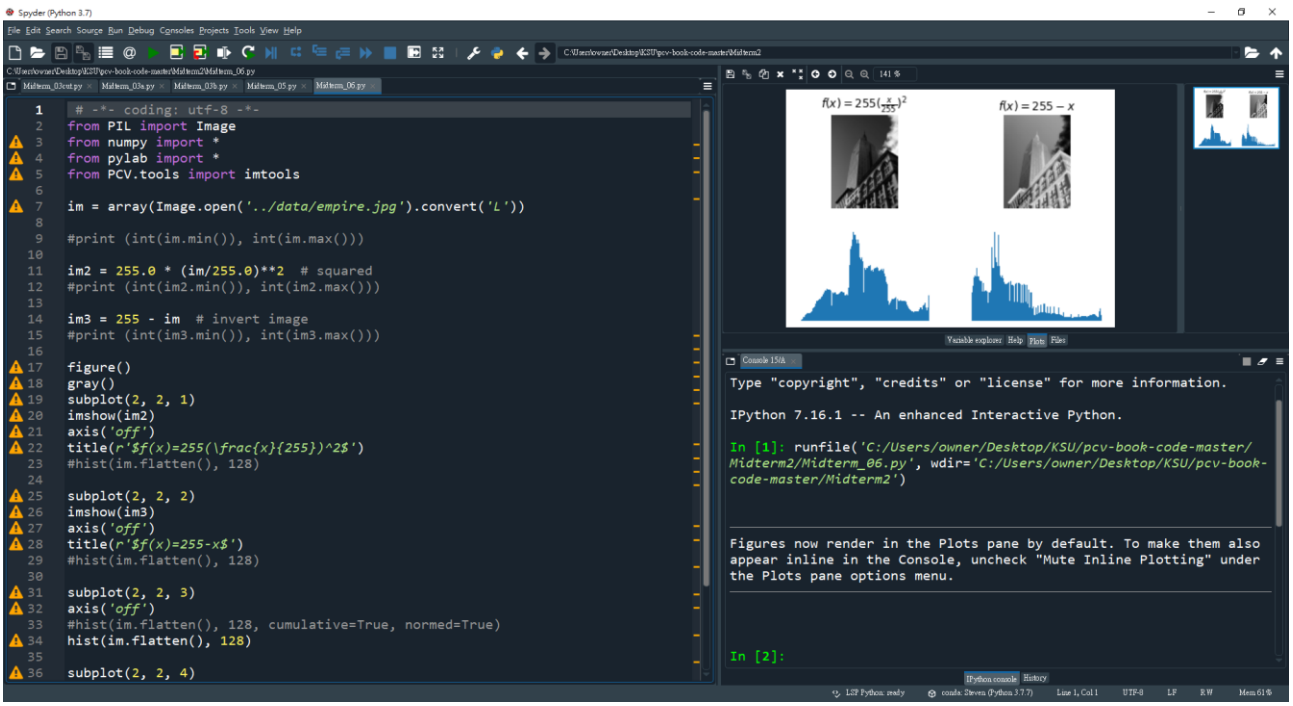

8. Midterm_06.py




```
# -*- coding: utf-8 -*-
from PIL import Image
from numpy import *
from pylab import *
from PCV.tools import imtools

im = array(Image.open('../data/empire.jpg').convert('L'))

#print (int(im.min()), int(im.max()))

im2 = 255.0 * (im/255.0)**2  # squared
#print (int(im2.min()), int(im2.max()))

im3 = 255 - im  # invert image
#print (int(im3.min()), int(im3.max()))

figure()
gray()
subplot(2, 2, 1)
imshow(im2)
axis('off')
title(r'$f(x)=255(\frac{x}{255})^2$')
#hist(im.flatten(), 128)

subplot(2, 2, 2)
imshow(im3)
axis('off')
title(r'$f(x)=255-x$')
#hist(im.flatten(), 128)

subplot(2, 2, 3)
axis('off')
#hist(im.flatten(), 128, cumulative=True, normed=True)
hist(im.flatten(), 128)

subplot(2, 2, 4)
```

```
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IPython 7.16.1 -- An enhanced Interactive Python.

In [1]: runfile('C:/Users/owner/Desktop/KSU/pcv-book-code-master/Midterm2/Midterm_06.py', wdir='C:/Users/owner/Desktop/KSU/pcv-book-code-master/Midterm2')

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In [2]:
```
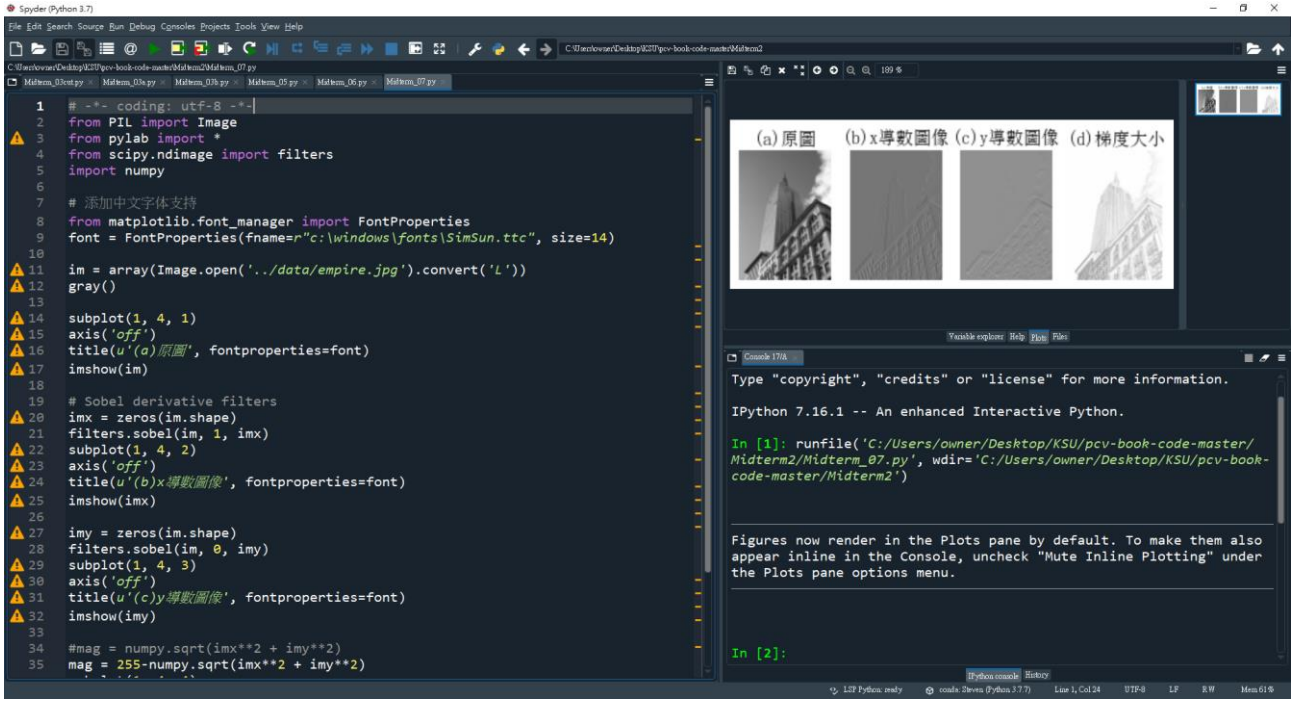

9. Midterm_07.py




```
# -*- coding: utf-8 -*-
from PIL import Image
from pylab import *
from scipy.ndimage import filters
import numpy

# 添加中文字体支持
from matplotlib.font_manager import FontProperties
font = FontProperties(fname=r"c:\windows\fonts\SimSun.ttc", size=14)

im = array(Image.open('../data/empire.jpg').convert('L'))
gray()

subplot(1, 4, 1)
axis('off')
title(u'(a)原圖', fontproperties=font)
imshow(im)

# Sobel derivative filters
imx = zeros(im.shape)
filters.sobel(im, 1, imx)
subplot(1, 4, 2)
axis('off')
title(u'(b)x導數圖像', fontproperties=font)
imshow(imx)

imy = zeros(im.shape)
filters.sobel(im, 0, imy)
subplot(1, 4, 3)
axis('off')
title(u'(c)y導數圖像', fontproperties=font)
imshow(imy)

#mag = numpy.sqrt(imx**2 + imy**2)
mag = 255-numpy.sqrt(imx**2 + imy**2)
```

```
Type "copyright", "credits" or "license" for more information.

IPython 7.16.1 -- An enhanced Interactive Python.

In [1]: runfile('C:/Users/owner/Desktop/KSU/pcv-book-code-master/
Midterm2/Midterm_07.py', wdir='C:/Users/owner/Desktop/KSU/pcv-book-
code-master/Midterm2')

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appear inline in the Console, uncheck "Mute Inline Plotting" under
the Plots pane options menu.

In [2]:
```
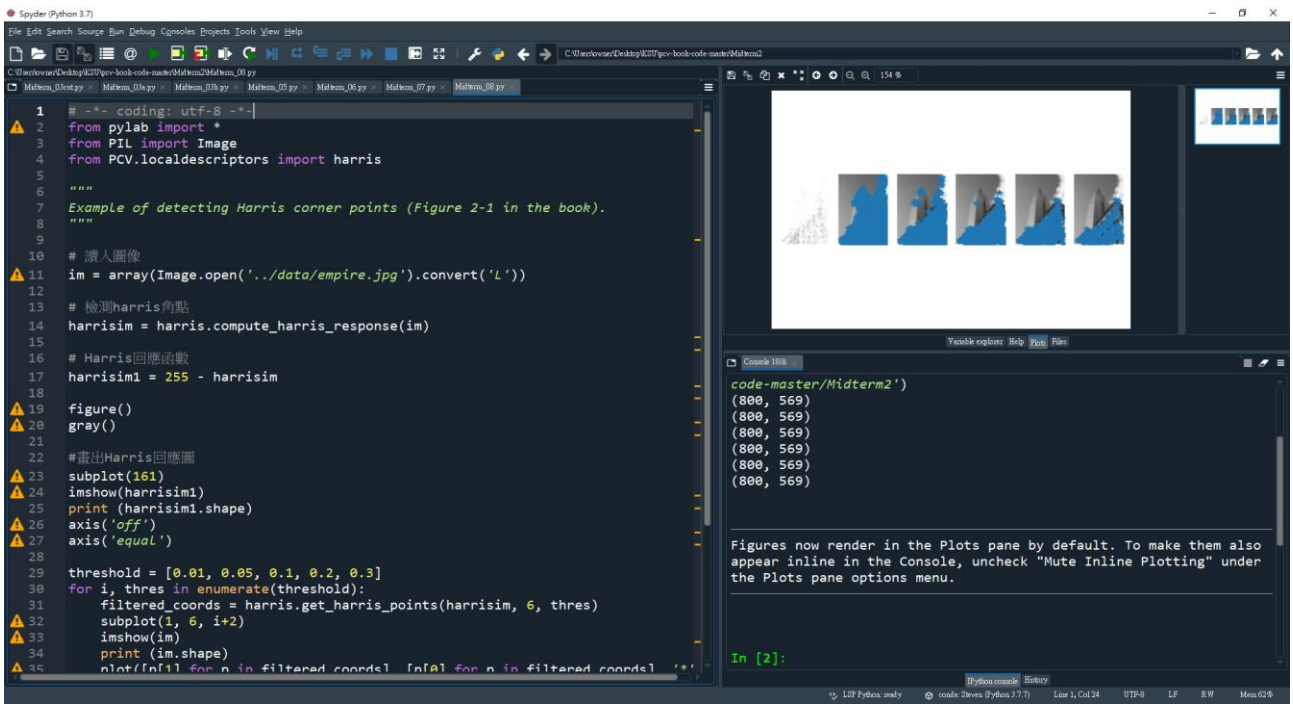
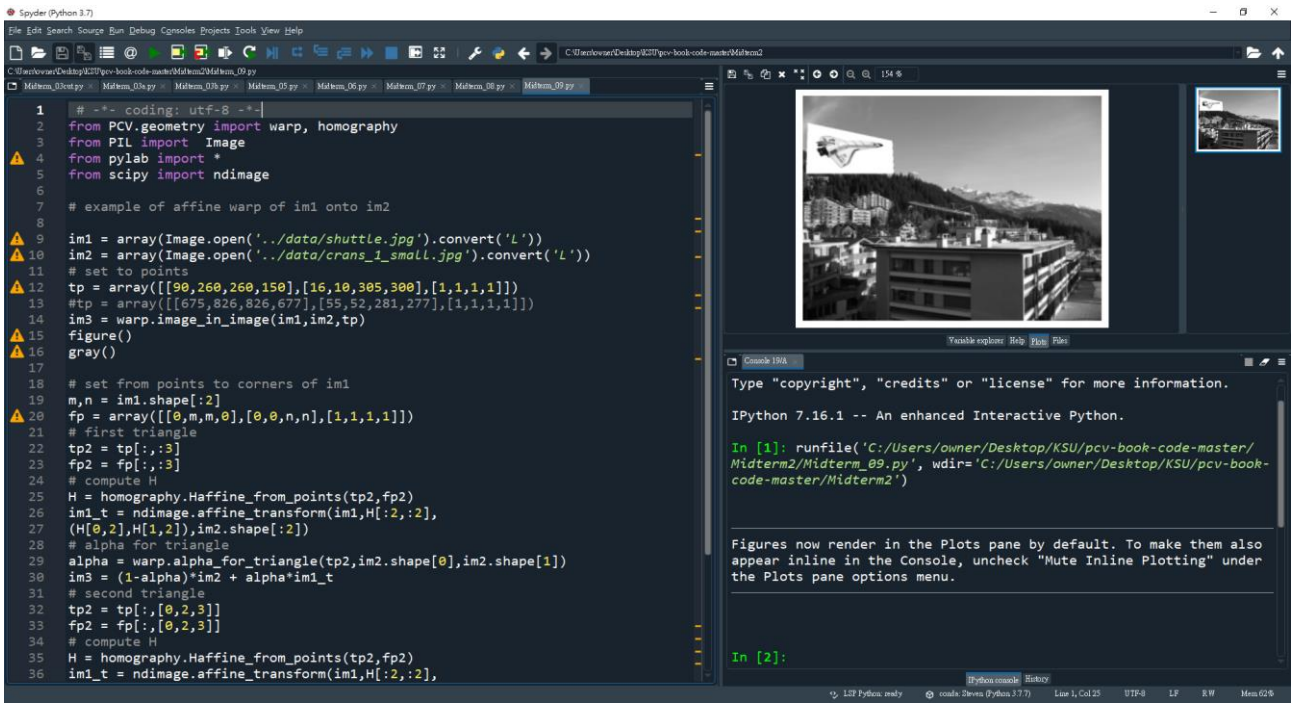

10. Midterm_08.py



```
# -*- coding: utf-8 -*-
from pylab import *
from PIL import Image
from PCV.localdescriptors import harris

"""
Example of detecting Harris corner points (Figure 2-1 in the book).
"""

# 讀入圖像
im = array(Image.open('../data/empire.jpg').convert('L'))

# 檢測harris角點
harrisim = harris.compute_harris_response(im)

# Harris回應函數
harrisim1 = 255 - harrisim

figure()
gray()

#畫出Harris回應圖
subplot(161)
imshow(harrisim1)
print (harrisim1.shape)
axis('off')
axis('equal')

threshold = [0.01, 0.05, 0.1, 0.2, 0.3]
for i, thres in enumerate(threshold):
    filtered_coords = harris.get_harris_points(harrisim, 6, thres)
    subplot(1, 6, i+2)
    imshow(im)
    print (im.shape)
```

```
code-master/Midterm2')
(800, 569)
(800, 569)
(800, 569)
(800, 569)
(800, 569)
(800, 569)

Figures now render in the Plots pane by default. To make them also
appear inline in the Console, uncheck "Mute Inline Plotting" under
the Plots pane options menu.

In [2]:
```

11. Midterm_09.py