COMPUTER VISION 1

Homework 1

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Computer Vision Report – Homework 1

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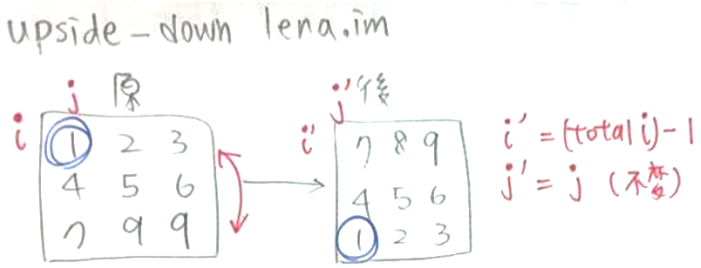
Question1.Use B_PIX to write a program to generate :

(a) upside-down lena.im

*使用到的概念說明:

影像上下顛倒，其實就等於是以影像的高度中心點為支點，上下翻轉，因此，在每一個 pixel 要顛倒時，只需要顛倒一半的高度長的 pixel 就好，如以下的矩正概念:



lena.bmp

upsidedown.bmp

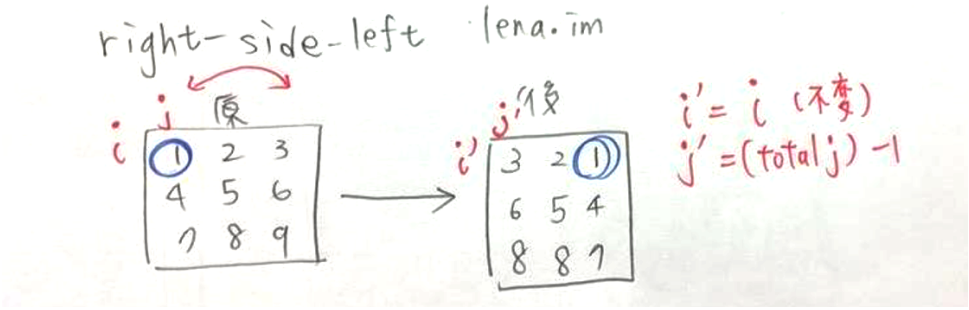
Sourse Code (upside-down lena)

```
LENA = imread('lena.bmp');
INFO = imfinfo('lena.bmp');
for i =1:INFO.Height/2,
    for j =1:INFO.Width,
        DRAWER = LENA(i,j);
        LENA(i,j) = LENA(INFO.Height-i,j);
        LENA(INFO.Height-i,j) = DRAWER;
    end;
end;
imwrite(LENA,'upsidedown.bmp');
```

(b)　right-side-left lena.im

使用到的概念說明:

影像為左右顛倒，其實就等於是以影像的寬度的中心點為支點，左右翻轉，因此 在每一個 pixel 要顛倒時，只需要顛倒一半的寬度長的 pixel 就好。 如以下的矩正概念:



lena.bmp

rightsideleft.bmp

Sourse Code (right-side-left lena)

```
LENA2 = imread('lena.bmp');
INFO2 = imfinfo('lena.bmp');
for i = 1:INFO2.Width/2,
    for j = 1:INFO2.Height,
        DRAWER2 = LENA2(j,i);
        LENA2(j,i) = LENA2(j,INFO2.Width-i);
        LENA2(j,INFO2.Width-i) = DRAWER2;
    end;
end;
imwrite(LENA2,'rightsideleft.bmp');
```

(c)　diagonally mirrored lena.im

使用到的概念說明: 影像的鏡像對稱，可以先做一次上下翻轉，在做一次左右翻轉，即可完成ＬＥＮＡ的鏡像對稱。

1.Up-side-down 一次圖檔後存入 usd1.bmp

2.在right-side-left 一次圖檔後存入 diagonallymirror.bmp

3.得到對角線鏡像圖檔 diagonallymirror.bmp

lena.bmp　　usd1.bmp　　diagonallymirror.bmp

Sourse Code (diagonally mirrored lena)

```
LENA3 = imread('lena.bmp');
INFO3 = imfinfo('lena.bmp');
for i = 1:INFO3.Height/2,
     for j = 1:INFO3.Width,
        DRAWER3 = LENA3(i,j);
        LENA3(i,j) = LENA3(INFO3.Height-i,j);
        LENA3(INFO3.Height-i,j) = DRAWER3;
     end;
end;
imwrite(LENA3,'usd1.bmp');
LENA4 = imread('usd1.bmp');
INFO4 = imfinfo('usd1.bmp');
for x = 1:INFO4.Width/2,
     for y = 1:INFO4.Height,
        DRAWER4 = LENA4(y,x);
        LENA4(y,x) = LENA4(y,INFO4.Width-x);
        LENA4(y,INFO4.Width-x) = DRAWER4;
     end;
end;
imwrite(LENA4,'diagonallymirror.bmp');
```

Question2.

(a) rotate lena.im 45 degrees clockwise

Sourse Code (rotate lena)

```
LENA = imread('lena.bmp');
LENA = imrotate(LENA, 315, 'bilinear');
% Rotate 315 degrees counter-clockwise -> Rotate 45 degrees clockwise
imwrite(LENA,'rotate lena.bmp');
```

lena.bmp

rotate lena.bmp

(b) shrink lena.im in half

Sourse Code (shrink lena)

```
LENA = imread('lena.bmp');
LENA = imresize(LENA, 0.5, 'bilinear');      %shrink lena.im in half
imwrite(LENA,'shrink lena.bmp')
```

lena.bmp

shrink lena.bmp

(c) binarize lena.im at 128 to get a binary image

Sourse Code (binarize lena)

```
>> LENA = imread('lena.bmp');                    % 讀取影像檔案 lena.bmp
>> BinarizeLENA = im2bw(LENA,0.5);
>> imwrite(BinarizeLENA,'Binarize lena.bmp');
```

lena.bmp　　Binarize lena.bmp

```
           Filename: '/Users/suwanlin/Documents/MATLAB/lena.bmp'
        FileModDate: '22-Sep-2016 13:41:35'
           FileSize: 263224
             Format: 'bmp'
      FormatVersion: 'Version 3 (Microsoft Windows 3.x)'
              Width: 512
             Height: 512
           BitDepth: 8
          ColorType: 'indexed'
    FormatSignature: 'BM'
 NumColormapEntries: 256
           Colormap: [256x3 double]
            RedMask: []
          GreenMask: []
           BlueMask: []
    ImageDataOffset: 1078
   BitmapHeaderSize: 40
         NumPlanes: 1
    CompressionType: 'none'
         BitmapSize: 0
     HorzResolution: 2834
     VertResolution: 2834
       NumColorsUsed: 0
 NumImportantColors: 0

           Filename: '/Users/suwanlin/Documents/MATLAB/Binarize lena.bmp'
        FileModDate: '25-Sep-2016 11:39:45'
           FileSize: 32830
             Format: 'bmp'
      FormatVersion: 'Version 3 (Microsoft Windows 3.x)'
              Width: 512
             Height: 512
           BitDepth: 1
          ColorType: 'indexed'
    FormatSignature: 'BM'
 NumColormapEntries: 2
           Colormap: [2x3 double]
            RedMask: []
          GreenMask: []
           BlueMask: []
    ImageDataOffset: 62
   BitmapHeaderSize: 40
         NumPlanes: 1
    CompressionType: 'none'
         BitmapSize: 32768
     HorzResolution: 0
     VertResolution: 0
       NumColorsUsed: 2
 NumImportantColors: 0
```