Computer Vision hw_1

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Part I.

In this part the OpenCV-2.4.2 I/O function was included.

Three functions as follow will be use in the algorithms below.

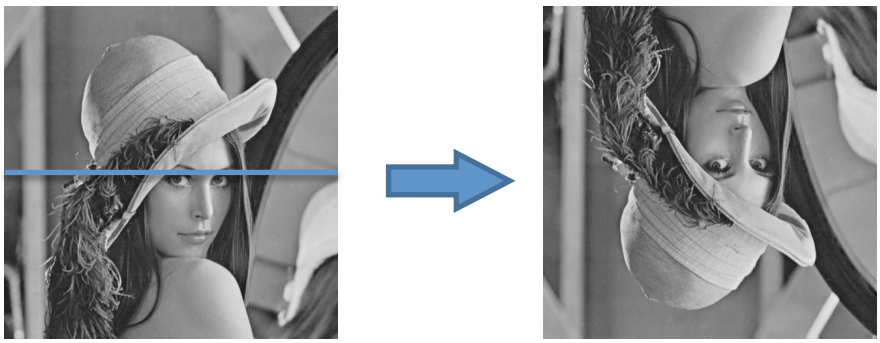
```
void pixel_set(Mat *p, int x, int y, int value){        //set B_PIX(p,x,y) to 'value'
        uchar* tp = p->data+x*p->cols+y;
        *tp = value;
}

uchar pixel_get(Mat *p, int x,int y){                   //return B_PIX(p,x,y)
        uchar* tp = p->data+x*p->cols+y;
        return *tp;
}

void pixel_swap(Mat *p, int x, int y, int xp, int yp){  //swap B_PIX(p,x,y) and B_PIX(p,xp,yp)
        uchar pix = pixel_get(p,xp,yp);
        pixel_set(p,xp,yp,pixel_get(p,x,y));
        pixel_set(p,x,y,pix);
}
```

1. Upside-down lena.im

   main algorithm:

```
void up_side_down(char *input, char *output){
        Mat image=imread(input,0);                      //0: gray image

        for (int i=0; i<image.rows/2; i++){
                for (int j=0; j<image.cols; j++){
                        pixel_swap(&image,i,j,image.rows-1-i,j);
                }
        }
```

   result:

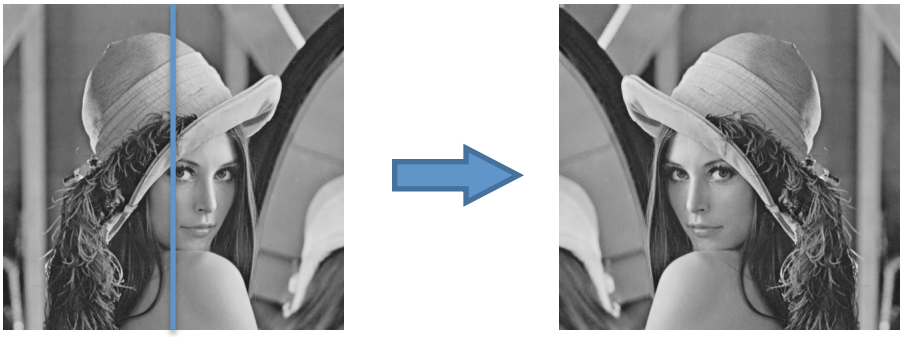


2. Right-side-left lena.im

   main algorithm:

```
void right_side_left(char *input, char *output){
        Mat image=imread(input,0);                          //0: gray image

        for (int i=0; i<image.rows; i++){
                for (int j=0; j<image.cols/2; j++){
                        pixel_swap(&image,i,j,i,image.cols-1-j);
                }
        }

        imwrite(output,image);                              //write image
}
```

result:

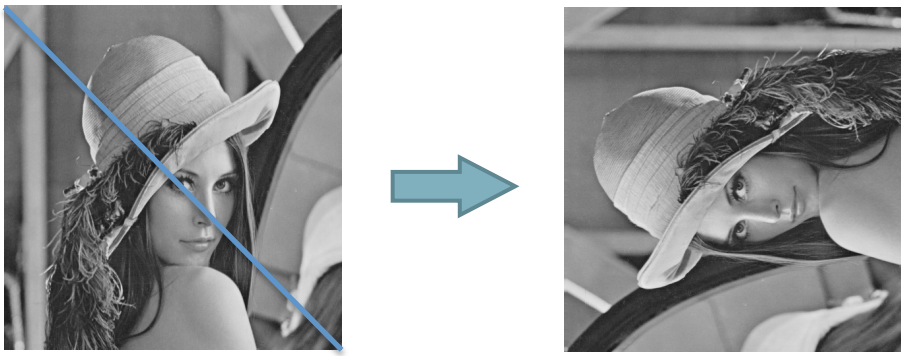


3. Diagonally mirrored lena.im

   main algorithm:

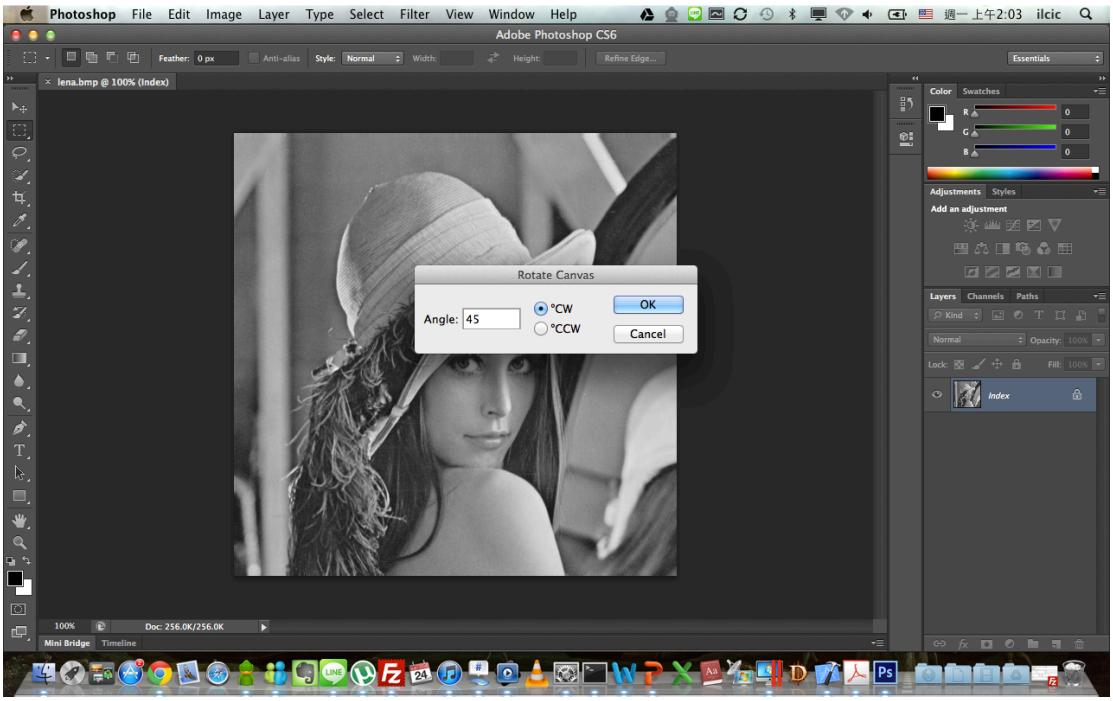
```
void diagonally_mirrored(char *input, char *output){
        Mat image=imread(input,0);                          //0: gray image

        for (int i=0; i<image.rows; i++){                   //up side down
                for (int j=i; j<image.cols; j++){
                        pixel_swap(&image,i,j,j,i);
                }
        }

        imwrite(output,image);
}
```

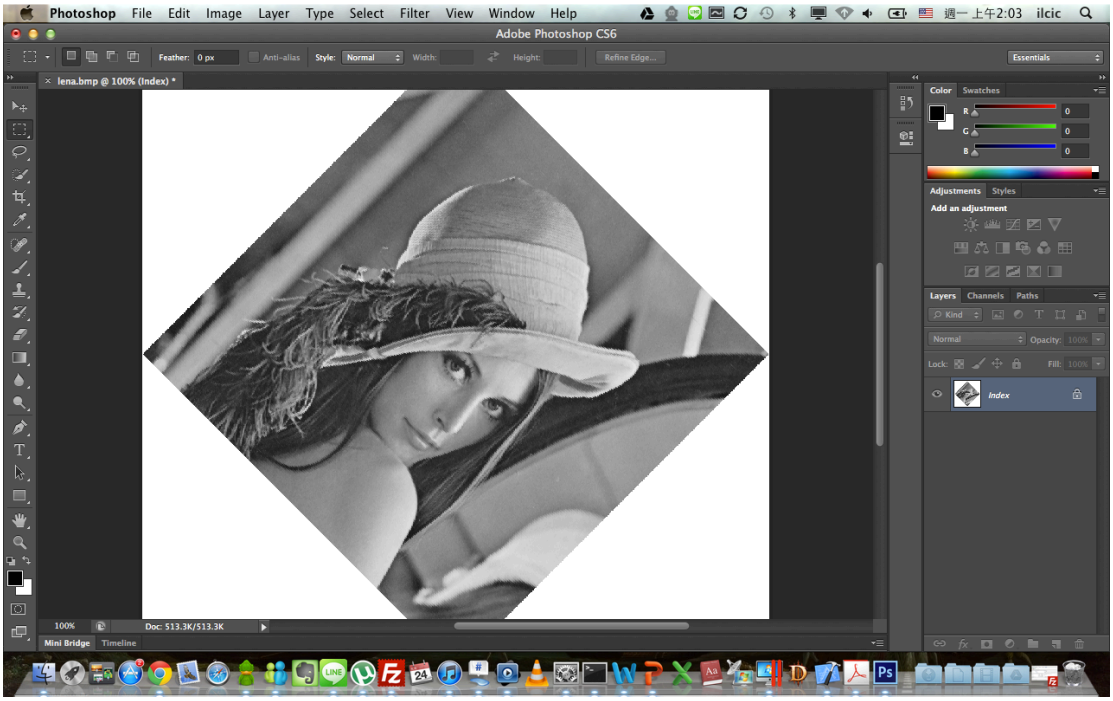
result:



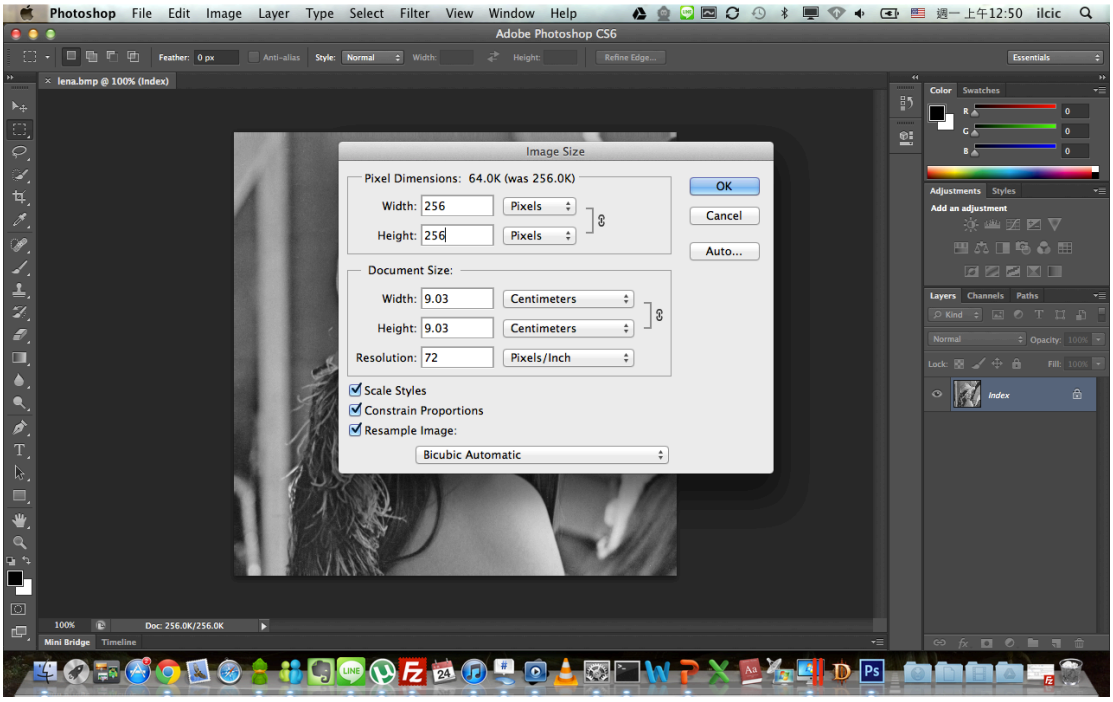
Part II. (Using Photoshop CS6)

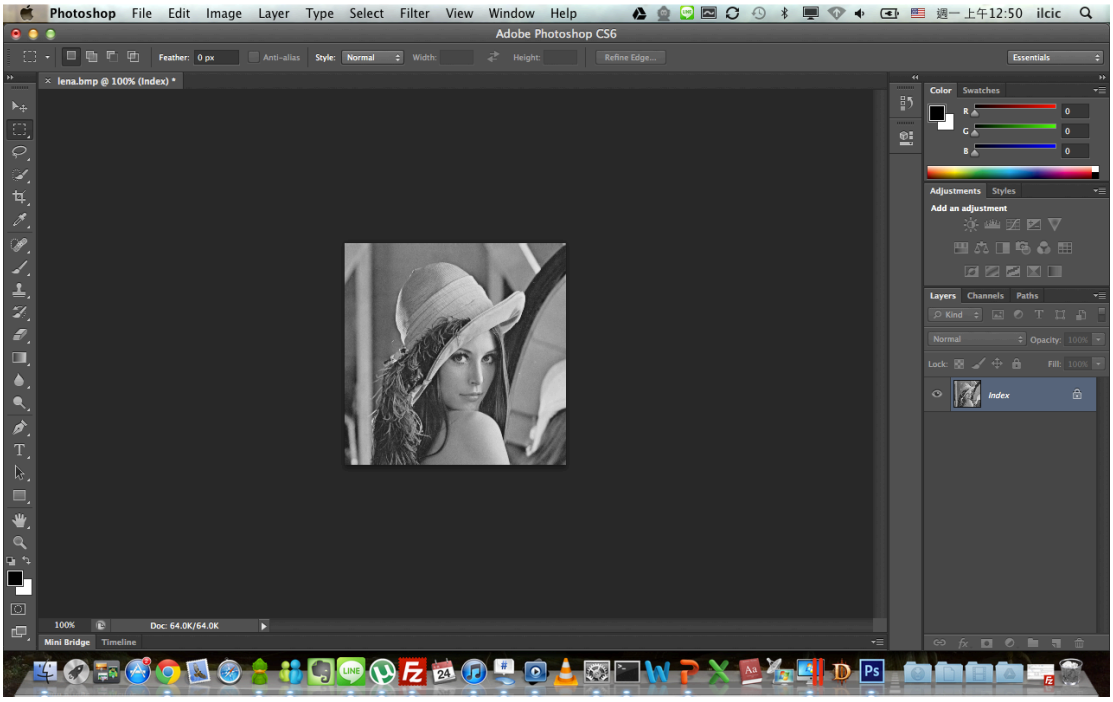
1. Rotate lena.im 45 degrees clockwise



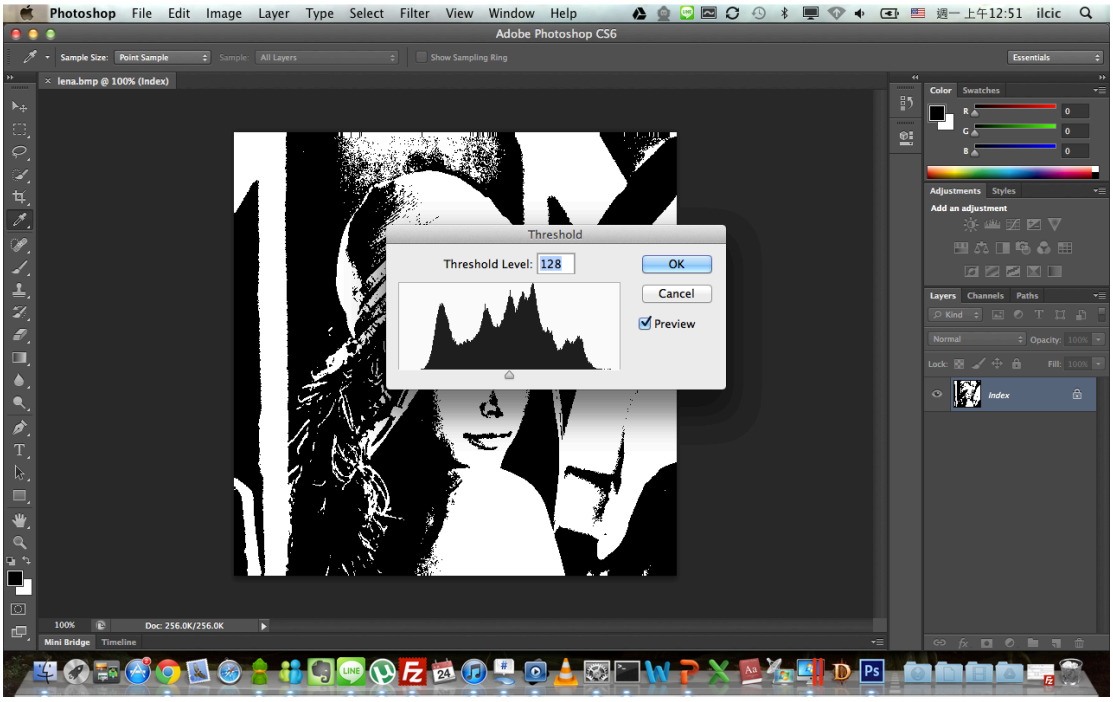


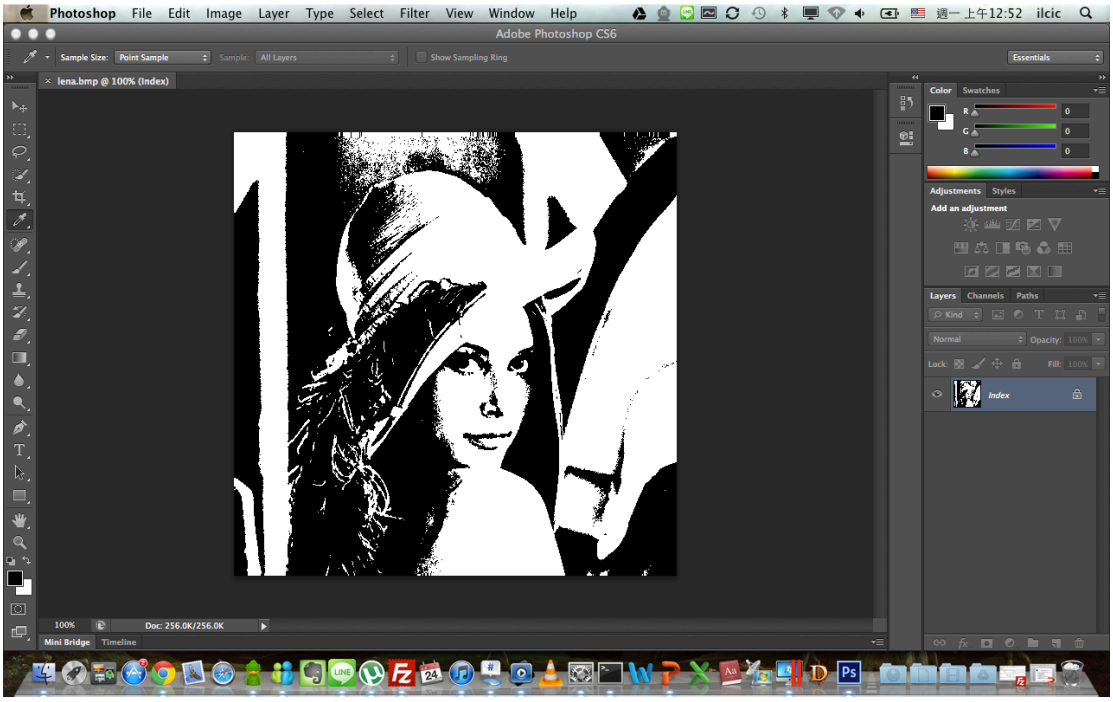
2. Shrink lena.im in half





3. Binarize lena.im at 128 to get a binary image


Photoshop File Edit Image Layer Type Select Filter View Window Help
Adobe Photoshop CS6
lena.bmp @ 100% (Index)
Threshold
Threshold Level: 128
OK
Cancel
Preview


Photoshop File Edit Image Layer Type Select Filter View Window Help
Adobe Photoshop CS6
lena.bmp @ 100% (Index)