#include <stdio.h>

#include <iostream>

#include <opencv2/highgui/highgui.hpp>

#include <opencv2/imgproc/imgproc.hpp>

#include <opencv2/core/core.hpp>

using namespace cv;

using namespace std;

int i, j, k, l, p=0, a[100], b[100], c[100], x, y, t;

int g=0, sum1 =0, sum2=0, sum3=0;

float avg1, avg2, avg3;

int main(){

Mat img = imread("lena.jpg"); Mat img1(img.rows, img.cols, CV\_8UC3, 255);

for(i=0; i<img.rows; i++){

for(j=0; j<img.cols; j++){ p=0;

for(k=-1; k<=1; k++){

for(l=-1; l<=1; l++){

if(k+i>=0 && k+i<img.rows && j+l<img.cols && j +l>=0){

a[p] = img.at<Vec3b>(i+k,j+l)[0];

b[p] = img.at<Vec3b>(i+k,j+l)[1];

c[p] = img.at<Vec3b>(i+k,j+l)[2];

p++;

}

}

}

for(x=0 ; x<p; x++){

for(y=0; y<p-1; y++){

if(a[y]>a[y+1]){

t = a[y];

a[y]=a[y+1];

a[y+1]= t;

}

}

}

for(x=0 ; x<p; x++){

for(y=0; y<p-1; y++){

if(b[y]>b[y+1]){

t = b[y];

b[y]=b[y+1];

b[y+1]= t;

}

}

}

for(x=0 ; x<p; x++){

for(y=0; y<p-1; y++){

if(c[y]>c[y+1]){

t = c[y];

c[y]=c[y+1];

c[y+1]= t;

}

}

}

img1.at<Vec3b>(i,j)[0] = a[p/2];

img1.at<Vec3b>(i,j)[1] = b[p/2];

img1.at<Vec3b>(i,j)[2] = c[p/2];

}

}

Mat img2(img.rows, img.cols, CV\_8UC3, 255);

for(i=0; i<img.rows; i++){

for(j=0; j<img.cols; j++){

for(k=-1; k<=1; k++){

for(l=-1; l<=1; l++){

if(k+i>=0 && l+j<img.cols && k+i<img.rows && j +l>=0){

sum1+=img.at<Vec3b>(i+k, j+l)[0];

sum2+=img.at<Vec3b>(i+k, j+l)[1];

sum3+=img.at<Vec3b>(i+k, j+l)[2];

g++;

}

}

}

avg1= sum1/g; avg2= sum2/g; avg3= sum3/g;

img2.at<Vec3b>(i, j)[0] = avg1;

img2.at<Vec3b>(i, j)[1] = avg2;

img2.at<Vec3b>(i, j)[2] = avg3;

g=0;

sum1=0;

sum2=0;

sum3=0;

}

}

imshow("lena2",img2);

imshow("lena",img); imshow("lena1",img1);

waitKey(0);

}