#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 ,a, b ,c,t , p,q;

void createimage(){

Mat lena = imread("lena.jpg");

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

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

a = lena.at<Vec3b>(i,j)[0];

b = lena.at<Vec3b>(i,j)[1];

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

t = (a + b + c)/3;

lena.at<Vec3b>(i,j)[0] = t;

lena.at<Vec3b>(i,j)[1] = t;

lena.at<Vec3b>(i,j)[2] = t;

}

}

Mat img2 = imread("lena.jpg");

Mat img3 = imread("lena.jpg");

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

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

a = img3.at<Vec3b>(i,j)[0];

b = img3.at<Vec3b>(i,j)[1];

c = img3.at<Vec3b>(i,j)[2];

p = min(min(a,b) , min(b,c));

q = max(max(a, b), max(b ,c));

t = q - p ;

img3.at<Vec3b>(i,j)[0] = t;

img3.at<Vec3b>(i,j)[1] = t;

img3.at<Vec3b>(i,j)[2] = t;

}

}

Mat img4 = imread("lena.jpg");

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

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

a = img4.at<Vec3b>(i,j)[0];

b = img4.at<Vec3b>(i,j)[1];

c = img4.at<Vec3b>(i,j)[2];

p = min(min(a,b) , min(b,c));

q = max(max(a, b), max(b ,c));

t = (q + p )/2;

img4.at<Vec3b>(i,j)[0] = t;

img4.at<Vec3b>(i,j)[1] = t;

img4.at<Vec3b>(i,j)[2] = t;

}

}

Mat img5 = imread("lena.jpg");

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

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

a = img5.at<Vec3b>(i,j)[0];

b = img5.at<Vec3b>(i,j)[1];

c = img5.at<Vec3b>(i,j)[2];

t = .11\*a + .59\*b + .30\*c;

img5.at<Vec3b>(i,j)[0] = t;

img5.at<Vec3b>(i,j)[1] = t;

img5.at<Vec3b>(i,j)[2] = t;

}

}

imshow("img4", img4);

imshow("img3", img3);

imshow("lena", lena );

imshow("img2", img2);

}

int main(){

createimage();

waitKey(0);

return 0;

}