#include "helpers.h"

#include <math.h>

// Convert image to grayscale

void grayscale(int height, int width, RGBTRIPLE image[height][width])

{

for(int i=0; i < height ;i++)

{

for(int j=0; j< width;j++)

{

int average = round((image[i][j].rgbtRed + image[i][j].rgbtBlue + image[i][j].rgbtGreen)/3.0);

image[i][j].rgbtRed=average;

image[i][j].rgbtBlue=average;

image[i][j].rgbtGreen=average;

}

}

return;

}

// Convert image to sepia

void sepia(int height, int width, RGBTRIPLE image[height][width])

{

for(int i=0; i < height ;i++)

{

for(int j=0; j< width;j++)

{

int originalRed = image[i][j].rgbtRed;

int originalGreen = image[i][j].rgbtGreen;

int originalBlue = image[i][j].rgbtBlue;

int sepiaRed =round( (.393 \* originalRed) + (.769 \* originalGreen) + (.189 \* originalBlue) );

int sepiaGreen =round( (.349 \* originalRed) + (.686 \* originalGreen) + (.168 \* originalBlue) );

int sepiaBlue =round( (.272 \* originalRed) + (.534 \* originalGreen) + (.131 \* originalBlue) );

if(sepiaRed>255){

sepiaRed=255;

}

if(sepiaGreen>255){

sepiaGreen=255;

}

if(sepiaBlue>255){

sepiaBlue=255;

}

image[i][j].rgbtRed=sepiaRed;

image[i][j].rgbtGreen=sepiaGreen;

image[i][j].rgbtBlue=sepiaBlue;

}

}

return;

}

// Reflect image horizontally

void reflect(int height, int width, RGBTRIPLE image[height][width])

{

for(int i=0; i < height ;i++)

{

for(int j=0; j <= width ;j++){

if(j<(width/2)){

int temp = image[i][j].rgbtRed;

image[i][j].rgbtRed=image[i][width-(j+1)].rgbtRed;

image[i][width-(j+1)].rgbtRed=temp;

temp = image[i][j].rgbtGreen;

image[i][j].rgbtGreen=image[i][width-(j+1)].rgbtGreen;

image[i][width-(j+1)].rgbtGreen=temp;

temp = image[i][j].rgbtBlue;

image[i][j].rgbtBlue=image[i][width-(j+1)].rgbtBlue;

image[i][width-(j+1)].rgbtBlue=temp;

}

if(j>(width/2)){

image[i][j].rgbtRed=image[i][j].rgbtRed;

image[i][j].rgbtGreen=image[i][j].rgbtGreen;

image[i][j].rgbtBlue=image[i][j].rgbtBlue;

}

}

}

return;

}

// Blur image

void blur(int height, int width, RGBTRIPLE image[height][width])

{

RGBTRIPLE imgcpy[height][width];

float boxBlur1;

float boxBlur2;

float boxBlur3;

for(int i=0;i < height; i++){

for(int j=0;j < width;j++){

imgcpy[i][j].rgbtRed=image[i][j].rgbtRed;

imgcpy[i][j].rgbtGreen=image[i][j].rgbtGreen;

imgcpy[i][j].rgbtBlue=image[i][j].rgbtBlue;

}

}

for(int i=0; i<height ;i++){

for(int j=0;j <width ;j++ ){

if(i != 0 && j != 0 && i != (height-1) && j != (width-1)){

boxBlur1=(round(imgcpy[i-1][j].rgbtRed+imgcpy[i+1][j].rgbtRed

+imgcpy[i][j].rgbtRed

+imgcpy[i][j-1].rgbtRed

+imgcpy[i][j+1].rgbtRed

+imgcpy[i+1][j+1].rgbtRed

+imgcpy[i-1][j+1].rgbtRed

+imgcpy[i+1][j-1].rgbtRed

+imgcpy[i-1][j-1].rgbtRed)/9);

boxBlur2=(round(imgcpy[i-1][j].rgbtGreen+imgcpy[i+1][j].rgbtGreen

+imgcpy[i][j].rgbtGreen

+imgcpy[i][j-1].rgbtGreen

+imgcpy[i][j+1].rgbtGreen

+imgcpy[i+1][j+1].rgbtGreen

+imgcpy[i-1][j+1].rgbtGreen

+imgcpy[i+1][j-1].rgbtGreen

+imgcpy[i-1][j-1].rgbtGreen)/9);

boxBlur3=(round(imgcpy[i-1][j].rgbtBlue+imgcpy[i+1][j].rgbtBlue

+imgcpy[i][j].rgbtBlue

+imgcpy[i][j-1].rgbtBlue

+imgcpy[i][j+1].rgbtBlue

+imgcpy[i+1][j+1].rgbtBlue

+imgcpy[i-1][j+1].rgbtBlue

+imgcpy[i+1][j-1].rgbtBlue

+imgcpy[i-1][j-1].rgbtBlue)/9);

image[i][j].rgbtRed=boxBlur1;

image[i][j].rgbtGreen=boxBlur2;

image[i][j].rgbtBlue=boxBlur3;

}

///left upper corner

else if(i==0 && j==0){

boxBlur1= (round((imgcpy[i][j].rgbtRed+imgcpy[i+1][j].rgbtRed

+imgcpy[i+1][j+1].rgbtRed+imgcpy[i][j+1].rgbtRed)/4));

boxBlur2= (round((imgcpy[i][j].rgbtGreen+imgcpy[i+1][j].rgbtGreen

+imgcpy[i+1][j+1].rgbtGreen+imgcpy[i][j+1].rgbtGreen)/4));

boxBlur3 = (round((imgcpy[i][j].rgbtBlue+imgcpy[i+1][j].rgbtBlue

+imgcpy[i+1][j+1].rgbtBlue+imgcpy[i][j+1].rgbtBlue)/4));

image[i][j].rgbtRed= boxBlur1;

image[i][j].rgbtGreen=boxBlur2;

image[i][j].rgbtBlue=boxBlur3;

}

///right upper corner

else if(i==0 && j==(width-1))

{

boxBlur1=(round((imgcpy[i+1][j].rgbtRed+

imgcpy[i+1][j-1].rgbtRed+imgcpy[i][j-1].rgbtRed+imgcpy[i][j].rgbtRed)/4));

boxBlur2=(round((imgcpy[i+1][j].rgbtGreen+

imgcpy[i+1][j-1].rgbtGreen+imgcpy[i][j-1].rgbtGreen+imgcpy[i][j].rgbtGreen)/4));

boxBlur3=(round((imgcpy[i+1][j].rgbtBlue+

imgcpy[i+1][j-1].rgbtBlue+imgcpy[i][j-1].rgbtBlue+imgcpy[i][j].rgbtBlue)/4));

image[i][j].rgbtRed=boxBlur1;

image[i][j].rgbtGreen=boxBlur2;

image[i][j].rgbtBlue=boxBlur3;

}

///right lower corner

else if(i==(height-1) && j==(width-1))

{

boxBlur1

=(round((imgcpy[i-1][j].rgbtRed+imgcpy[i][j].rgbtRed+image[i-1][j-1].rgbtRed+imgcpy[i][j-1].rgbtRed)/4));

boxBlur2

=(round((imgcpy[i-1][j].rgbtGreen+imgcpy[i][j].rgbtGreen+imgcpy[i-1][j-1].rgbtGreen+imgcpy[i][j-1].rgbtGreen)/4));

boxBlur3

=(round((imgcpy[i-1][j].rgbtBlue+imgcpy[i][j].rgbtBlue+imgcpy[i-1][j-1].rgbtBlue+imgcpy[i][j-1].rgbtBlue)/4));

image[i][j].rgbtRed=boxBlur1;

image[i][j].rgbtGreen=boxBlur2;

image[i][j].rgbtBlue=boxBlur3;

}

///left lower corner

else if(i==(height-1) && j==0)

{

boxBlur1=(round((imgcpy[i][j+1].rgbtRed+imgcpy[i-1][j].rgbtRed

+imgcpy[i-1][j+1].rgbtRed+imgcpy[i][j].rgbtRed)/4));

boxBlur2=(round((imgcpy[i][j+1].rgbtGreen+imgcpy[i-1][j].rgbtGreen

+imgcpy[i-1][j+1].rgbtGreen+imgcpy[i][j].rgbtGreen)/4));

boxBlur3=(round((imgcpy[i][j+1].rgbtBlue+imgcpy[i-1][j].rgbtBlue

+imgcpy[i-1][j+1].rgbtBlue+imgcpy[i][j].rgbtBlue)/4));

image[i][j].rgbtRed=boxBlur1;

image[i][j].rgbtGreen=boxBlur2;

image[i][j].rgbtBlue=boxBlur3;

}

///upper edge

else if(i==0 && j!=0 && j!=(width-1))

{

boxBlur1

=(round((imgcpy[i+1][j].rgbtRed+imgcpy[i][j+1].rgbtRed

+imgcpy[i+1][j+1].rgbtRed+imgcpy[i][j-1].rgbtRed+imgcpy[i+1][j-1].rgbtRed+imgcpy[i][j].rgbtRed)/6));

boxBlur2

=(round((imgcpy[i+1][j].rgbtGreen+imgcpy[i][j+1].rgbtGreen

+imgcpy[i+1][j+1].rgbtGreen+imgcpy[i][j-1].rgbtGreen+imgcpy[i+1][j-1].rgbtGreen+imgcpy[i][j].rgbtGreen)/6));

boxBlur3

=(round((imgcpy[i+1][j].rgbtBlue+imgcpy[i][j+1].rgbtBlue

+imgcpy[i+1][j+1].rgbtBlue+imgcpy[i][j-1].rgbtBlue+imgcpy[i+1][j-1].rgbtBlue+imgcpy[i][j].rgbtBlue)/6));

image[i][j].rgbtRed=boxBlur1;

image[i][j].rgbtGreen=boxBlur2;

image[i][j].rgbtBlue=boxBlur3;

}

///lower edge

else if(i==(height-1) && j!=(width-1) && j!=0)

{

boxBlur1=(round((imgcpy[i-1][j].rgbtRed+

imgcpy[i-1][j-1].rgbtRed+imgcpy[i][j].rgbtRed

+imgcpy[i-1][j+1].rgbtRed

+imgcpy[i][j+1].rgbtRed

+imgcpy[i][j-1].rgbtRed)/6));

boxBlur2=(round((imgcpy[i-1][j].rgbtGreen+

imgcpy[i-1][j-1].rgbtGreen+imgcpy[i][j].rgbtGreen

+imgcpy[i-1][j+1].rgbtGreen

+imgcpy[i][j+1].rgbtGreen

+imgcpy[i][j-1].rgbtGreen)/6));

boxBlur3=(round((imgcpy[i-1][j].rgbtBlue+

imgcpy[i-1][j-1].rgbtBlue+imgcpy[i][j].rgbtBlue

+imgcpy[i-1][j+1].rgbtBlue

+imgcpy[i][j+1].rgbtBlue

+imgcpy[i][j-1].rgbtBlue)/6));

image[i][j].rgbtRed=boxBlur1;

image[i][j].rgbtGreen=boxBlur2;

image[i][j].rgbtBlue=boxBlur3;

}

///left edge

else if(j==0 && i!=(height-1) && i!=0 )

{

boxBlur1=(round((imgcpy[i-1][j].rgbtRed+imgcpy[i][j].rgbtRed

+imgcpy[i-1][j+1].rgbtRed+imgcpy[i+1][j+1].rgbtRed

+imgcpy[i+1][j].rgbtRed+imgcpy[i][j+1].rgbtRed)/6));

boxBlur2=(round((imgcpy[i-1][j].rgbtGreen+imgcpy[i][j].rgbtGreen

+imgcpy[i-1][j+1].rgbtGreen+imgcpy[i+1][j+1].rgbtGreen

+imgcpy[i+1][j].rgbtGreen+imgcpy[i][j+1].rgbtGreen)/6));

boxBlur3=(round((imgcpy[i-1][j].rgbtBlue+imgcpy[i][j].rgbtBlue

+imgcpy[i-1][j+1].rgbtBlue+imgcpy[i+1][j+1].rgbtBlue

+imgcpy[i+1][j].rgbtBlue+imgcpy[i][j+1].rgbtBlue)/6));

image[i][j].rgbtRed=boxBlur1;

image[i][j].rgbtGreen=boxBlur2;

image[i][j].rgbtBlue=boxBlur3;

}

///right edge

else if(j==(width-1) && i!=(height-1) && i!=0)

{

boxBlur1=(round((imgcpy[i-1][j].rgbtRed+imgcpy[i-1][j-1].rgbtRed

+imgcpy[i][j].rgbtRed+imgcpy[i+1][j].rgbtRed+imgcpy[i+1][j-1].rgbtRed

+imgcpy[i][j-1].rgbtRed)/6));

boxBlur2=(round((imgcpy[i-1][j].rgbtGreen+imgcpy[i-1][j-1].rgbtGreen

+imgcpy[i][j].rgbtGreen+imgcpy[i+1][j].rgbtGreen+imgcpy[i+1][j-1].rgbtGreen

+imgcpy[i][j-1].rgbtGreen)/6));

boxBlur3=(round((imgcpy[i-1][j].rgbtBlue+imgcpy[i-1][j-1].rgbtBlue

+imgcpy[i][j].rgbtBlue+imgcpy[i+1][j].rgbtBlue+imgcpy[i+1][j-1].rgbtBlue

+imgcpy[i][j-1].rgbtBlue)/6));

image[i][j].rgbtRed=boxBlur1;

image[i][j].rgbtGreen=boxBlur2;

image[i][j].rgbtBlue=boxBlur3;

}

}

}

return;

}