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Robotic Vision
Assignment 03

Geometric Transformations of images in ANSI C.

Contenido

Background:

To have a basic understanding of how images are handled and manipulated, ANSI C provides an excellent programming language. Geometric transformation is the manipulation of images in order to rotate, mirror, scale down, scale of, and flip them.

Objective:

Using LenaGrey 512x512.pgm image file we have been using in class and the template I gave you, write 5 different C programs that do the following image geometric transformations:

		
Original image	Flip horizontal	Flip vertical
		
Rotate left	Rotate right	Rotate 180
Image geometrics transformations to perform		

Upload the following:

- Upload to the 5 programs written in C.
- Upload your 5 manipulated images as evidence.
- Include a report, written in word, which explains how your algorithm works for each case. This could be done using a flow chart, block diagram or any other representation.

Solution:

Flip Horizontal:

For this part I use the following code inside the USER DEFINED section:

```
// Declare local variables:
unsigned char Matrix[NCols][MRows];
int Column, Row;

// Fill the Matrix with the input image, using for:
for (  Row = 0; Row < MRows; Row++ ){
     for (  Column = 0; Column < NCols; Column++ ){
          Matrix[Column][Row] = fgetc( infptr );
     }
}

// Flip horizontal and Save output image:
for (  Row = 0; Row < MRows; Row++ ){
     for (  Column = 0; Column < NCols; Column++ ){
          fputc(  Matrix[(NCols-1)-Column][Row], outfptr );
     }
}
```

The resulting image is:

Flip Vertical:

For this part I use the following code inside the USER DEFINED section:

```
// Define the local variables:
unsigned char Matrix[NCols][MRows];
int Column, Row;

// Import the original image into Matrix:
for( Row = 0; Row < MRows; Row++ ){
     for( Column = 0; Column < NCols; Column++ ){
          Matrix[Column][Row] = fgetc( infptr );
     }
}

// Flip vertically the image and save it in output image:
for( Row = 0; Row < MRows; Row++ ){
     for( Column = 0; Column < NCols; Column++ ){
          fputc( Matrix[Column][(MRows-1)-Row], outfptr );
     }
}
```

The resulting image is:

Rotate 90 degrees to the left:

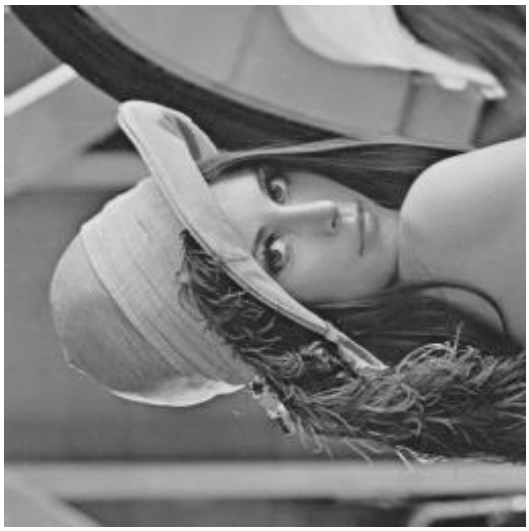
For this part I use the following code inside the USER DEFINED section:

```
// Define the local variables:
unsigned char Matrix[NCols][MRows];
int Column, Row;

// Import the original image an store it in Matrix:
for( Column = 0; Column < NCols; Column++ ){
     for( Row = 0; Row < MRows; Row++ ){
          Matrix[Column][Row] = fgetc( infptr );
     }
}

// Rotate 90 degrees to the left and save the output image:
for( Column = 0; Column < NCols; Column++ ){
     for ( Row = 0; Row < MRows; Row++ ){
          fputc( Matrix[Row][(NCols-1)-Column], outfptr );
     }
}
```

The resulting image is:



Rotate 90 degrees to the right:

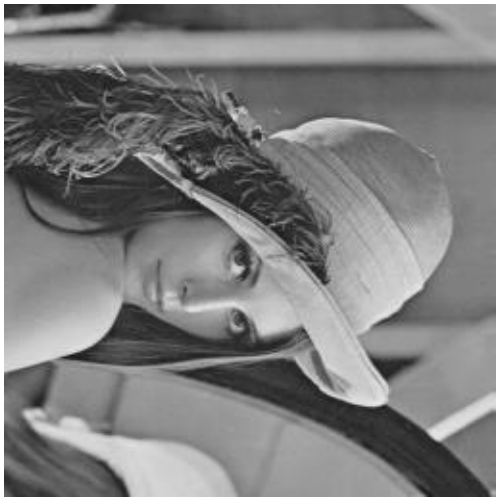
For this part I use the following code inside the USER DEFINED section:

```
// Define the local variables:
unsigned char Matrix[NCols][MRows];
int Column, Row;

// Import the original image in Matrix:
for( Column = 0; Column < NCols; Column++ ){
     for( Row = 0; Row < MRows; Row++ ){
          Matrix[Column][Row] = fgetc( infptr );
     }
}

// Rotate 90 degrees to the right & save the output image:
for( Column = 0; Column < NCols; Column++ ){
     for( Row = 0; Row < MRows; Row++ ){
          fputc( Matrix[(MRows-1)-Row][Column], outfptr );
     }
}
```

The resulting image is:



Rotate 180 degrees:

For this part I use the following code inside the USER DEFINED section:

```
// Define the local variables:
unsigned char Matrix[NCols][MRows];
int Column, Row;

// Import the original image in Matrix:
for( Column = 0; Column < NCols; Column++ ){
      for( Row = 0; Row < MRows; Row++ ){
            Matrix[Column][Row] = fgetc( infptr );
      }
}

// Rotate 180 degrees and save the output image:
for( Column = 0; Column < NCols; Column++ ){
      for( Row = 0; Row < MRows; Row++ ){
      fputc(Matrix[(NCols-1)-Column][(MRows-1)-Row],outfptr);
      }
}
```

The resulting image is: