



STRUCTURED PROGRAMMING (CS112)

(Assignment 3)

By:

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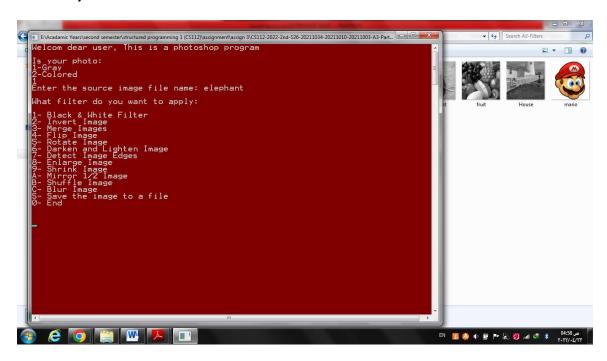
Ahmed Ahmed Hamed Ahmed (ID: 20211003)

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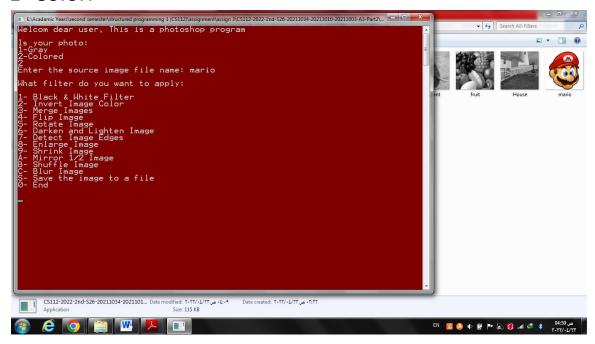
Dr. Mohammad El-Ramly

Task 1 (group task): Filters Menu

1- Gray:



2- Color:



Task 2: Filters

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Filter 3: Merge images (algorithm)

- 1- Take the two images from the user.
- 2- Loop on pixels in both images, and take each pixel from the image and its opposite in other image.
- 3- Take the average of two pixels and save it in a new image.

Filter 6: Darken and Lighten Image (algorithm)

- 1- Take the image from the user.
- 2- Ask user if he wants to darken or lighten
- 3- If darken: (0 means black)
 - a. Loop on pixels in the image.
 - b. Update the value by divide it by 2.
- 4- If lighten: (255 means white)
 - a. Loop on pixels in the image.
 - b. If its value >=128:
 - i. Update the value and make it = 255.
 - c. Else:
 - i. Update the value by multiply by 2.

Filter 9: Shrink image (algorithm)

- 1- Ask user how much he wants to shrink $(\frac{1}{2}, \frac{1}{3})$ or $\frac{1}{4}$.
- 2- Take the input from user.
- 3- When user chooses one:
 - a. Set jump = denominator (2, 3 or 4) (which means how many pixels we take to shrink).
 - b. Set num = jump² (the square that we will take its average).
 - c. Set blank = SIZE/denominator (2, 3 or 4) (the rest of the image that it's blank).
- 4- Loop on the image and increase counters by jump.
- 5- And each (jump) pixels in vertically and horizontally take their average, and loop on the new image (by 1) and put the average in the pixel.
- 6- After shrink, we make the rest of new image white (255).

Filter C: Blur Image

- 1- Loop on the original image and new image (increase counters by 1).
- 2- Take the average of 3x3 pixels (we will take first 3x3 pixels, and by increasing counters by 1 (moving on pixel), we will take the second 3x3 pixels, etc.
- 3- Put the average in the pixels (in order) in the new image.

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Filter 1: Black and white filter (algorithm)

- 1. Load the Image
- 2. Loop for each pixel in the image
- 3. Get the average of the pixels
- 4. Loop for each pixel in the image
- 5. Compare each pixel with the average
- 6. If pixel > average
 - a. Assign the pixel to 255
- 7. Else
 - a. Assign the pixel to 0
- 8. Save the image
- 9. End

Filter 4: Flip image (algorithm)

- 1. Load the image
- 2. Ask the user if he wants a vertical or horizontal flip
- 3. If user wants a vertical flip
 - a. Loop for each Colum in the image and replace the last columns with the first columns
 - b. Save the image
- 4. Else if user wants a horizontal flip
 - a. Loop for each row in the image and replace the last rows with the first rows
 - b. Save the image
- 5. End .

Filter 7: Detect Image Edges (algorithm)

- 1-Load image.
- 2-Convert the image into black & white image.
- 3-Loop on the image.
- 4- Check if the pixel is an edge pixel.
- 5- Make another image consist of edge pixels.
- 6-Save image.

Filter A: Mirror Image (algorithm)

- 1. Load image.
- 2. Ask user which half of the image that he wants to mirror.
- 3. If he wants the left half:
 - a. Apply the function on the left half.
- 4- Else if he wants the right half:
 - a. Apply the function on the right half.
- 5- Else if he wants the Upper half:
 - a. Apply the function on the upper half.
- 6- Else he wants the down half:
 - a. Apply the function on the down half.
- 7- Save

Ahmed Ahmed (20211003)

Filter 2: Invert image (algorithm)

- 1- Take input from user as name of image.
- 2- Declare 2d array and insert every pixel into it.
- 3- Loop through every element of the 2d array:
 - A- If it is black make it white.
 - B- If it is white make it black.
 - C- If it is grey make it the opposite shade of grey.
- 4- Save the image.

Filter 5: Rotate Image (algorithm)

1- UPSIDE DOWN

- a. for every pixel in the 2d matrix of pixels
 - i. 1-make every first row and pixel the last row and pixel
 - ii. and place it in another 2d matrix
- b. place every pixel in the second array back in the first array.

2- ROTATE TWO SEVENTY

- a. make every row a column and every column a row
- b. place every pixel in the second array back in the first array

3- ROTATE NINETY

a. call upside down then call two seventy.

4- ROTATE_G

- a. take input from user as single integer
- b. call correct function according to input

Filter 8: Enlarge photo (algorithm)

- 1- Take the requested image name from user.
- 2- Load every pixel of it in a 2d array.
- 3- Take a single integer input from user to choose which quarter to modify.
- 4- Adjust the starting values of X and Y according to user.
- 5- Declare row = 0.
- 6- Make a for loop that starts at the value of X and ends at the size of the image.
- 7- Make col = 0 inside the for loop.
- 8- Place each pixel from the 2d array of the image into another 2d array, and place it two more times for each pixel.
- 9- Copy the row which was placed into a row under it.
- 10-Increment row by 2 to change the row that is being changed.

Filters B: Shuffle Image (algorithm)

- 1- Take input from user and modify starting rows and columns accordingly.
- 2- Make four for loops, one for each quarter of the image.
- 3- Input the pixels into the 2d array according to the user's input.

All filters:

- 1. Include all needed libraries.
- 2. Define each filter function alone.
- 3. In main function:
 - a. Let user choose if the image gray or colored.
 - b. If gray:
 - i. Do while loop to display a list with all possible gray filters, save the image and end the program.
 - ii. Once the user chooses an option, we call its function.
 - c. If colored:
 - i. Do while loop to display all possible colored filters, save the image and end the program.
 - ii. Once the user chooses an option, we call its function.

Task 3: Typing Club

Doaa Ali (20211034):



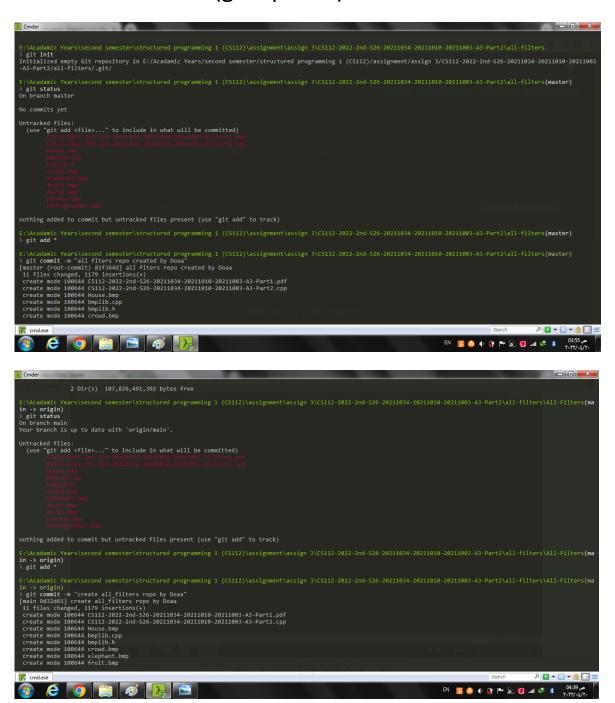
Ahmed Yasser (20211010):

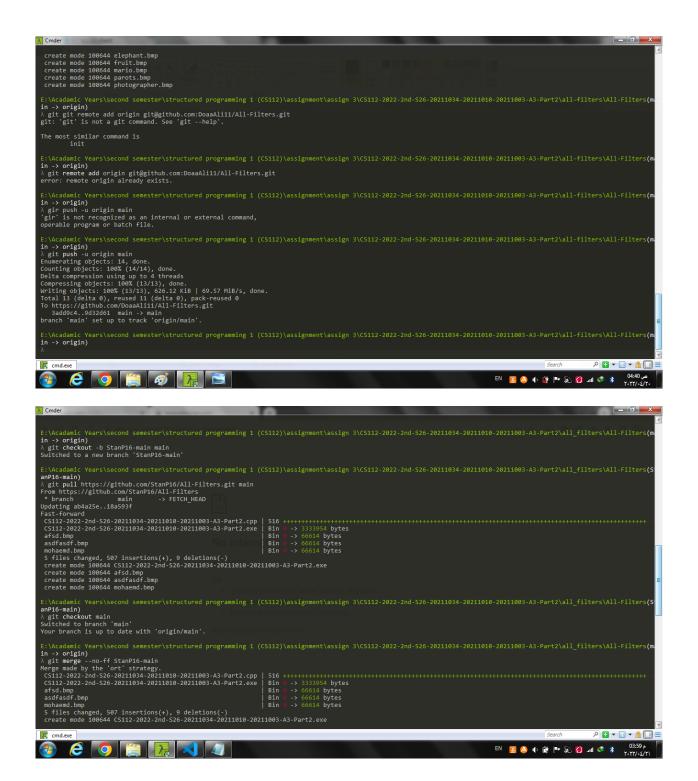


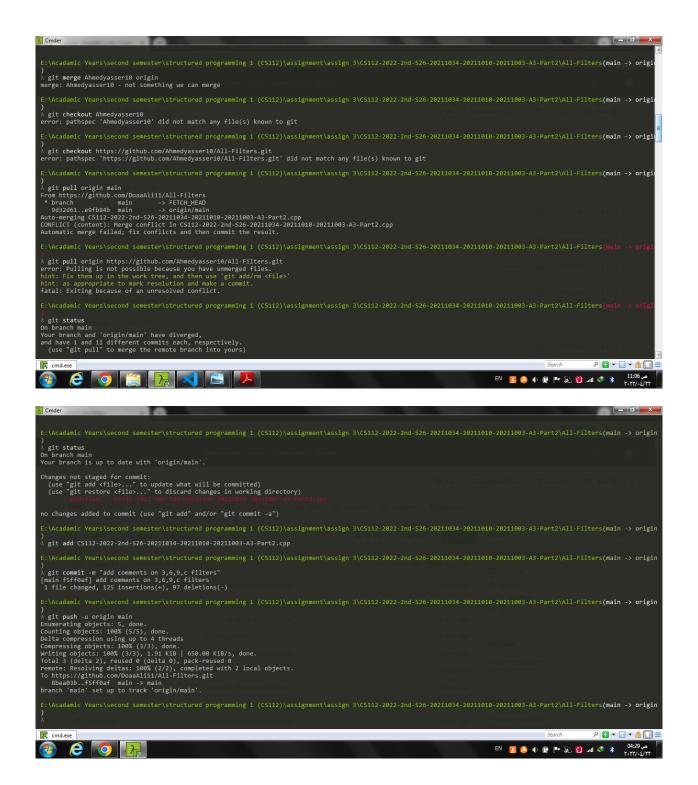
Ahmed Ahmed (20211003):

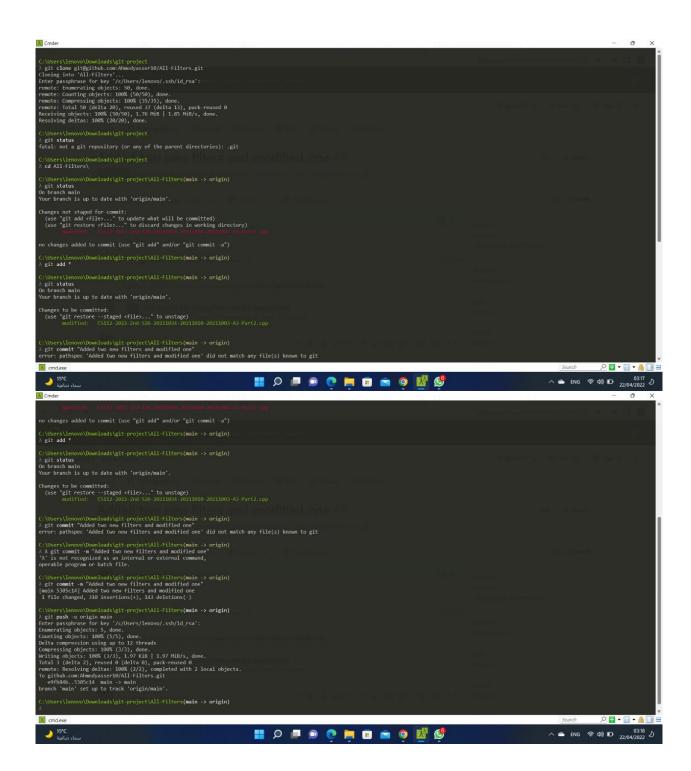


Task 4 (group task): Git Commands









```
Stan@DESKTOP-RMB7A7I MINGW64 /c/GitAhmedHamed/New folder

$ git clone https://github.com/StanP16/All-Filters.git
Cloning into 'All-Filters'...
remote: Enumerating objects: 66, done.
remote: Counting objects: 100% (66/66), done.
remote: Compressing objects: 100% (45/45), done.
remote: Total 66 (delta 30), reused 48 (delta 19), pack-reused 0
Receiving objects: 100% (66/66), 1.77 MiB | 431.00 KiB/s, done.
Resolving deltas: 100% (30/30), done.
```