

**Cairo university**

**Faculty of computer and artificial intelligence**

**Cs112 – Structured programming**

**Second semester 2021-2022**

**Group: B S16**

**Assignment #3 Report**

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| --- | --- | --- |
| **Name** | **ID** | **Filters** |
| **Adel Magdy Abd El-Hay** | **20210190** | **1,4** |
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| **Roaa Talat Mohamed** | **20210138** | **3,6** |

**Algorithm**

1. **Ask the user to choose the number of the filter**
2. **If the number is 1(Black & White Filter)**

* **Call the functions(loadImage() convertImageToBlackAndWhiteImage() and saveImage())**
* **Make a nested loop that passes over each pixel in the image and take the average of all pixels**
* **Again, make a nested loop that passes over each pixel in the image to convert all pixels to black and white with condition**
* **If the value of pixel greater than average convert it to white**
* **If not convert it to black**
* **Then save the image**

1. **if the number is 2(Invert Filter)**

* **Call the function (loadImage()), (Invert()) and saveImage(()**
* **Use a nested loop , once loop to represent pixel in raws ,and second loop to represent pixel in columns**
* **Subtract from 255 each pixel value to represent it with the inverse.**
* **Save the image .**

1. **if the number is 3( Merge Filter)**

* **call the functions ( loadImage() ) , (loadSecondImage()) ,(** **mergeImage() )and (saveImage() )**
* **ask the user to enter the name of the first and second image**
* **make a nested loop that passes over each pixel**

**in the first and second image**

* **add each pixel in the first image to the second image then divide them by 2**
* **save the image**

1. **if the number is 4(Flip Image)**

* **Call the functions(loadImage() , flipImage() and saveImage())**
* **Make a nested loop that passes over each pixel in the image and reverse elements of every column**

1. **if the number is 5(Rotate Image)**

* **Call the functions (loadImage()),(rotateImage()) and (saveRotate()).**
* **Ask the user which degree of rotate he want .(90 -180 – 270 )**
* **If user chose (90) , call the function (rotate -90-degree)**
* **Use nested loop to represent raws and columns .**
* **Turn each raw into a column and subtract the column from the size and put the result in the new raw.**
* **If user choose (180) , call the function (rotate -180-degree)**
* **Use nested loop to represent rasa and columns .**
* **Subtract the columns and raws from size .**
* **If user chose (270) , call the function (rotate -270-degree)**
* **Use nested loop to represent raws and columns .**
* **Turn each column into rows and subtract the row from the size and put the result in new column.**
* **Save the image .**

1. **if the number is 6(Darken and Lighten Image)**

* **call the functions ( loadImage() ) , and (saveImage() )**
* **ask the user to enter the name of the image**
* **ask the user to enter d for darken and l for lighten**
* **if he enter (d) call function (darkenImage())**
* **make a nested loop that passes over each pixel**

**then** **multiply each pixel by 0.5**

* **if he enter (l) call function ( lightenImage() )**
* **make a nested loop that passes over each pixel**

**then** **multiply each pixel by 1.5 and check if it is bigger than 255 let it it be 255**

* **save the image**

1. **if the number is 0 (exit)**