***GROUP-8(Project Report)***

**Group ID: 4, 5, 6, 7, 8, 1**

Following is the description of the group project report. It contains the overview of the tasks given, followed by description of each class that we used and a table containing the individual’s contribution to the project.

*Overview (of tasks given):*

Task-4:

* Based on segmentation of the input Image for different thresholds and compositing them finally.

Task-5:

* Based on two different thresholds it binarizes the input Image and composites these two Images obtained.
* In absence of threshold, it finds reflection w.r.t. x axis and y axis and composites these two images.

Task-6:

* It describes the Labelling of connected components.

Task-7:

* This task creates four different images (which are reflections to one another) by compressing the input Image and combines these four images and then Stencils this image to obtain the final Image.

Task-8:

* This task generates a noise Image and composites this noise Image and input Image
* And then labels the connected components of composite Image obtained.

Task-1:

* Based on Stenciling and Clipping of the input Image.

Following is the description of classes that are used in the project.

*Classes Used:*

1. Color.cpp: Base class, modified by adding +, \* and = operation overloaders.
2. Pixel.cpp: Base class, modified by adding +, \* operation overloaders.
3. Image.cpp: Base class, modified by adding +, \* and = operation overloaders.
4. CompositeImage.cpp: Inherits from Image class. It is a constructor that takes two image objects as parameters and composites into a new image based on a float value, alpha.
5. Reflection\_x.cpp: Inherits from Image class. It is a constructor that takes an image object as parameter and produces another image object as reflection about x axis, which is similar to a water image.
6. Reflection\_y.cpp: Inherits from Image class. It is a constructor that takes an image object as a parameter and produces a new image as reflection about y axis, which is similar to a mirror image.
7. Histogram.cpp: Is a Base class. It is used to produce a histogram of brightness (that is based on mean of RGB values of a pixel) and pixel count. It also finds out the thresholds, which are just local minima of the histogram.
8. BinaryImage.cpp: Inherits from Image class. It binarizes the image based on some threshold value given, that converts the whole image into a new image which uses two different colors:

* one for fore ground (all the pixels having brightness more than threshold are colored with this) and
* another for back ground (all the pixels having brightness less than threshold are colored with this).

1. ConnectedComponent.cpp: Inherits from Image class. It labels the connected components (based on 8-neighbourhood of a pixel). After labelling is done, 100 random colors are generated and these are used to color the different labelled components.
2. ScaledImage.cpp: Creates four different Images (which are reflections to one another) by compressing the input Image to one fourth of its actual size and combines these Images and finally stencils the image to obtain the final Image.
3. Generateforone.cpp: Creates a black and white mould Image
4. Stenciling.cpp: It stencils the image you give.
5. Clipping.cpp: It just clips the image you give.
6. Segmentation.cpp: Inherits from Image class. It segments the image in which all the pixels with brightness in between two thresholds are colored with same color, whereas pixels with brightness in between next two thresholds are colored with some other different color.
7. Task5.cpp: Inherits from Image class. It uses 1st threshold to binarize the input image and uses blue and white colors as background and foreground colors. Then it uses 2nd threshold to binarize the input image and uses yellow and white colors as background and foreground colors. In absence of thresholds, it gives reflection about x and y axis and finally composites them.

Following is the tabular form of individual contributions.

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| --- | --- | --- | --- |
| ***Name*** | ***Roll No.*** | ***Task ID*** | ***Classes Contribution*** |
| Aditya Vikram Srivastava | IMT2016004 | 4 | Segmentation, Histogram and base classes. |
| Srujan Swaroop | IMT2016033 | 5 | Task5 and Reflection classes. |
| Durga Yasasvi Y | IMT2016060 | 7 | ScaledImage, CompositeImage and base classes. |
| Nimisha Garg | IMT2016082 | 8 | ConnectedComponent and BinaryImage classes. |
| Sai Krishna E | IMT2016102 | 6 | BinaryImage class. |
| Rishikesh R | IMT2016121 | 1 | Generateforone, stenciling and clipping classes. |

Below is a flowchart of the classes used in the project.

Composition:

Inheritance:

Image.cpp

Pixel.cpp

Color.cpp

Reflection\_x.cpp

Reflection\_y.cpp

ScaledImage.cpp

Segmentation.cpp

ConnectedComponent.cpp

CompositeImage.cpp

BinaryImage.cpp

Clipping.cpp

Stenciling.cpp