Write-up Assignment 2

1)
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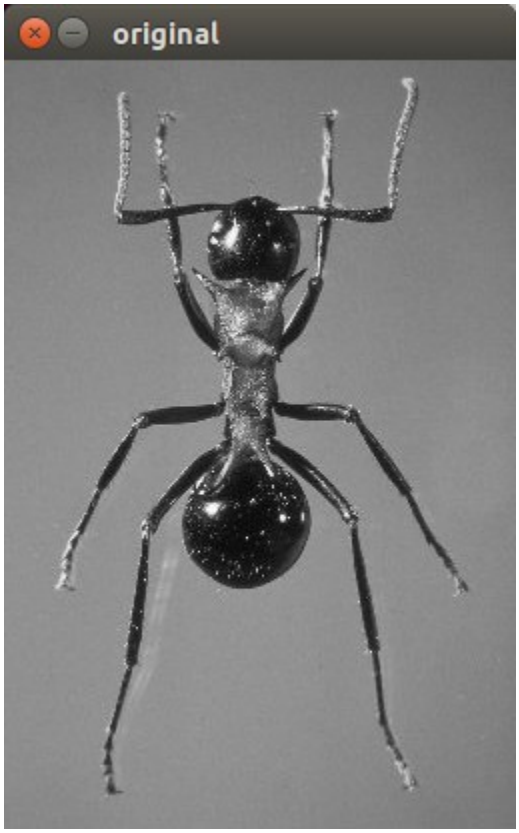
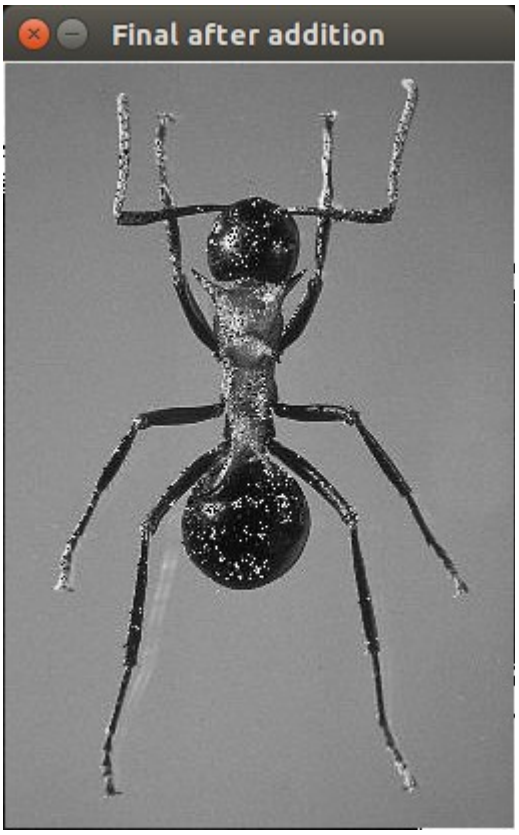
2) Purpose of the project-
The purpose of the project is to acknowledge different types of edge detection operators and how it works. Also, to understand how the different types of filters affects the image edge detection of the overall image and to know the better method to apply to an image so that optimal or good results can be achieved.

Methods:

1. Unsharp masking of Image-
1. Blur the original image.
2. Subtract the blurred image from the original (the resulting difference is called the mask)
3. Add the mask to the original.
4.Display the output as the final image

Unsharp masking

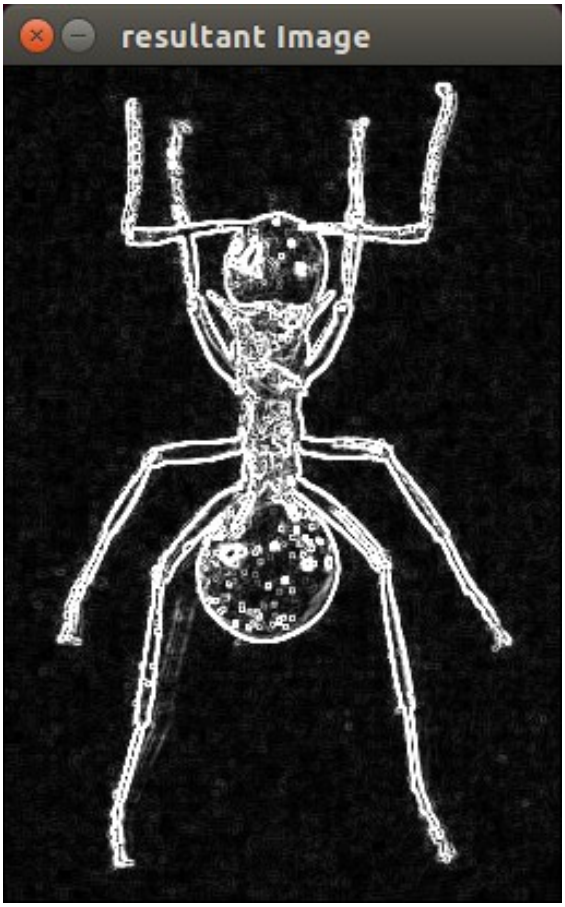




Unsharp masking

2. Sobel Operator-

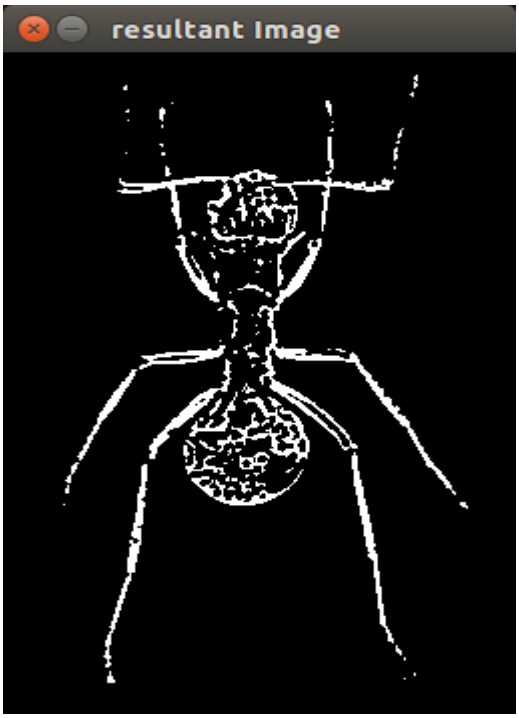
1.Perform blurring on image using 3*3 gaussian filter
2.Calculate X gradient for each pixel
3.Calculate Y gradient for each pixel
4.Calculate magnitude for X and Y gradient for each pixel.
5.Set a value as new pixel for final image ,iterate it until all original pixel values gets replaced by new values



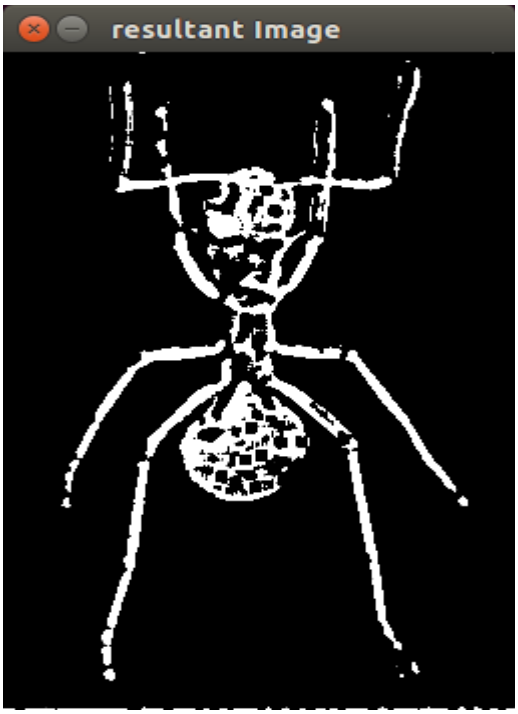
3. Laplacian of Gaussian

Generation of LoG mask 7*7 sigma 1.4 or 11*11 sigma 5
1.Calculate Laplacian of Gaussian mask as per the formula in lecture slides
2.print the mask
Apply the LoG mask to the image to generate edge image

mask 7 sigma 1.4



mask 11 sigma 5

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1. Unsharp Masking method
2. Sobel operator
3. Laplacian of Gaussian
4. Exit
Enter your choice:3
Enter size of mask: 7
Enter value of sigma: 1.4

Laplacian of Gaussian:
108     249     357     384     357     249     108
249     397     225     21      225     397     249
357     225     -856    -1677   -856    225     357
384     21      -1677   -2901   -1677   21      384
357     225     -856    -1677   -856    225     357
249     397     225     21      225     397     249
108     249     357     384     357     249     108
```

```
1. Unsharp Masking method
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4. Exit
Enter your choice:3
Enter size of mask: 11
Enter value of sigma: 5

Laplacian of Gaussian:
0       1       3       4       5       6       5       4       3       1       0
1       3       6       8       9       10      9       8       6       3       1
3       6       -9      -11     -13     -13     -13     -11     9       6       3
4       8       -11     -14     -16     -17     -16     -14     11      8       4
5       9       -13     -16     -18     -19     -18     -16     13      9       5
6       10      -13     -17     -19     -20     -19     -17     13      10      6
5       9       -13     -16     -18     -19     -18     -16     13      9       5
4       8       -11     -14     -16     -17     -16     -14     11      8       4
3       6       9       11      13      13      13      11      9       6       3
1       3       6       8       9       10      9       8       6       3       1
0       1       3       4       5       6       5       4       3       1       0
```

mask 7 sigma 1.4

mask 11 sigma 5

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Laplacian of Gaussian:
108     249     357     384     357     249     108
249     397     225     21      225     397     249
357     225     -856    -1677   -856    225     357
384     21      -1677   -2901   -1677   21      384
357     225     -856    -1677   -856    225     357
249     397     225     21      225     397     249
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Laplacian of Gaussian:
0       1       3       4       5       6       5       4       3       1       0
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3       6       -9      -11     -13     -13     -13     -11     9       6       3
4       8       -11     -14     -16     -17     -16     -14     11      8       4
5       9       -13     -16     -18     -19     -18     -16     13      9       5
6       10      -13     -17     -19     -20     -19     -17     13      10      6
5       9       -13     -16     -18     -19     -18     -16     13      9       5
4       8       -11     -14     -16     -17     -16     -14     11      8       4
3       6       9       11      13      13      13      11      9       6       3
1       3       6       8       9       10      9       8       6       3       1
0       1       3       4       5       6       5       4       3       1       0
```