Fast Prototyping 2
Mean Shift Segmentation

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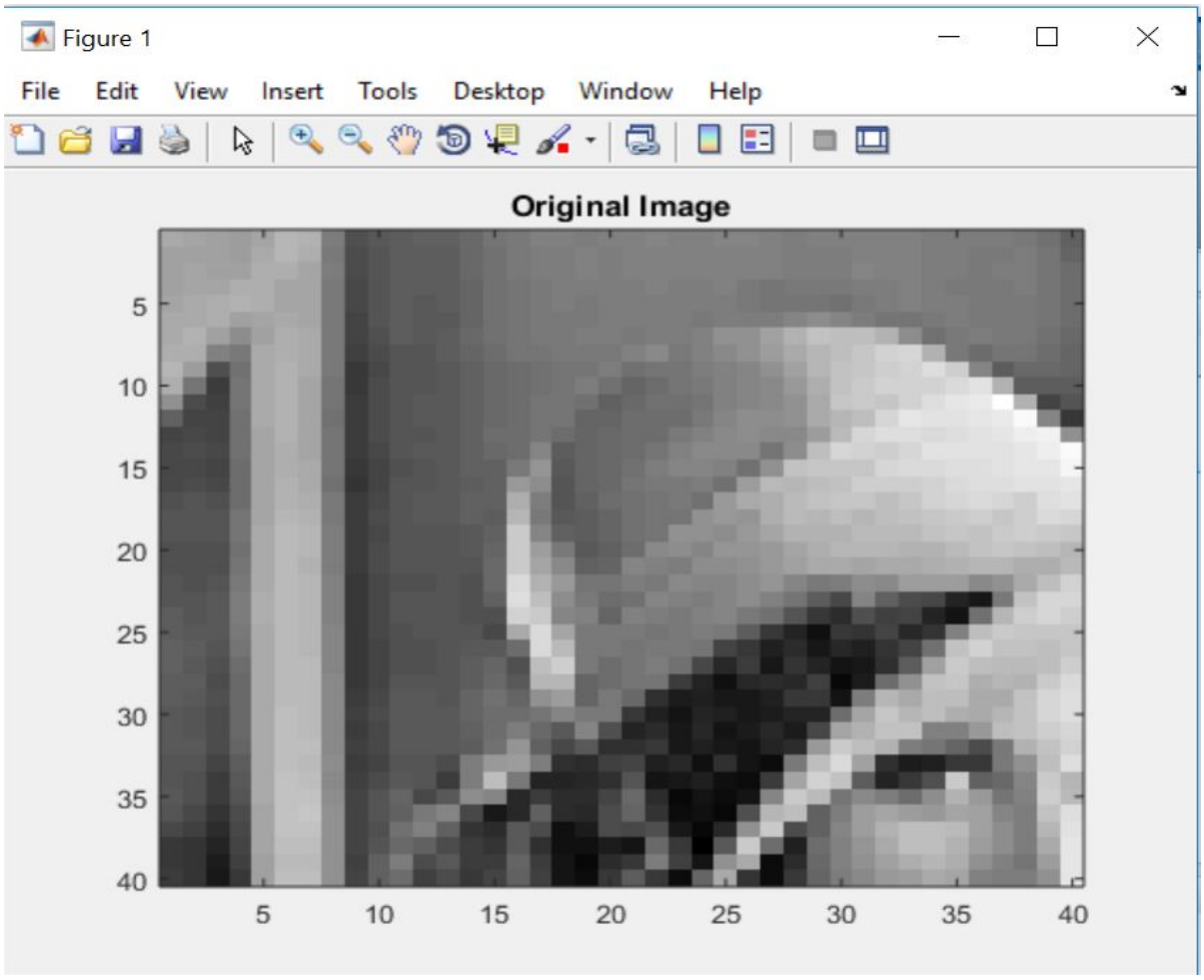
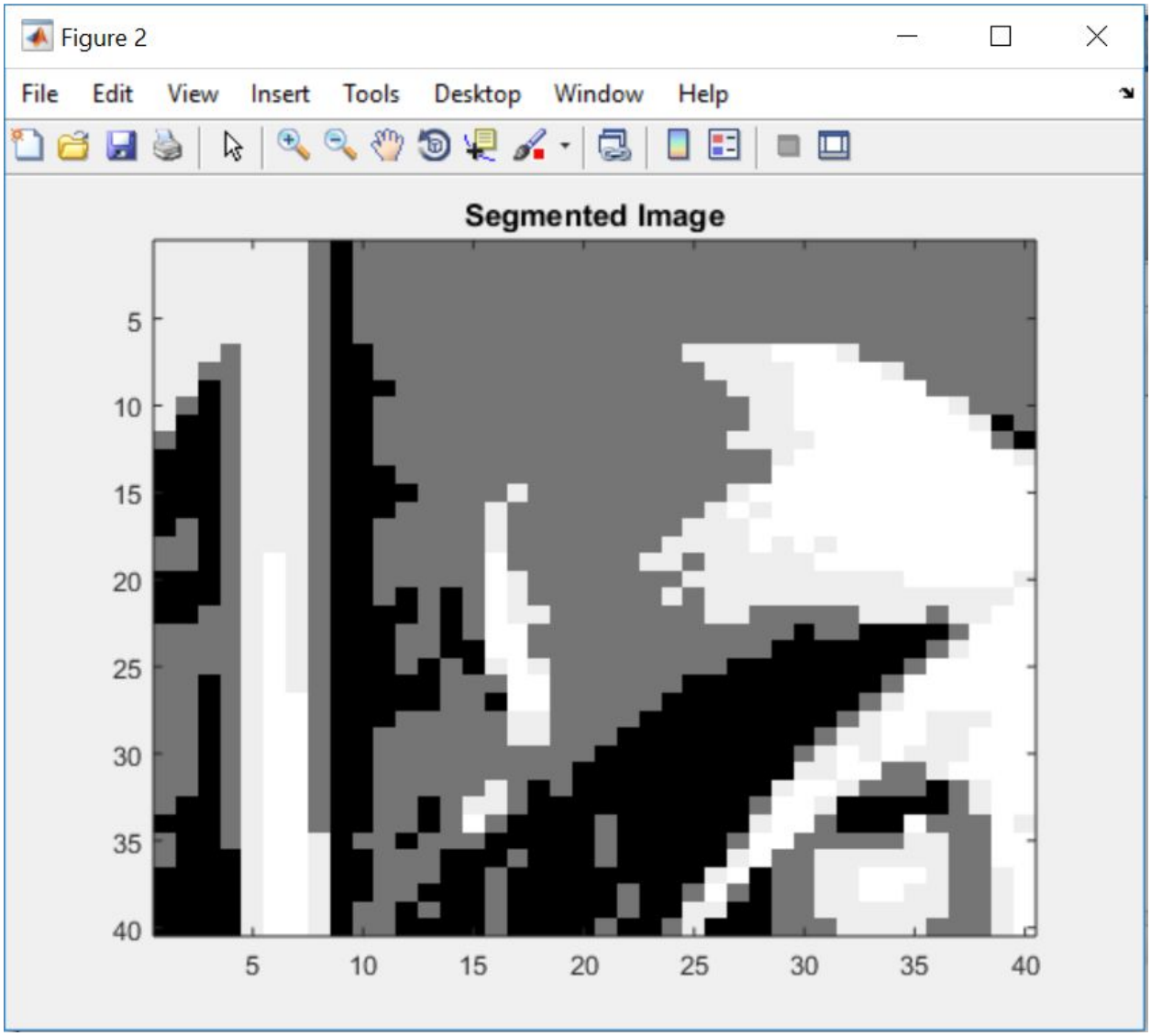
Matlab Code:

```
%Load and resize image to 64x64
lena = imresize(imread('Segmentation_Data/Lena.bmp'), 0.125);
lena = imcrop(lena,[0 0 40 40]); %crop image to reduce computation time
h1 = figure;
colormap('gray');
imagesc(lena)
title('Original Image')

%Vectorize image
vectorized_im = lena(:);
l_length = length(vectorized_im);
h = 1; %bandwidth
max_iterations = 10; %max iteration = 10
J = zeros(l_length, 1);
gaussian = zeros(l_length, 1);
numerator_results = zeros(l_length, 1);

%main loop
for i=1:l_length

  y = vectorized_im(i);

  for k=1:max_iterations
    for j=1:l_length
      exp_arg = -(norm(double(y - vectorized_im(j))) ^ 2) / (h ^ 2); %gaussian kernel
      gaussian(j) = exp(exp_arg);
    end

    for j=1:l_length
      numerator_results(j) = (vectorized_im(j) * gaussian(j));
    end
```

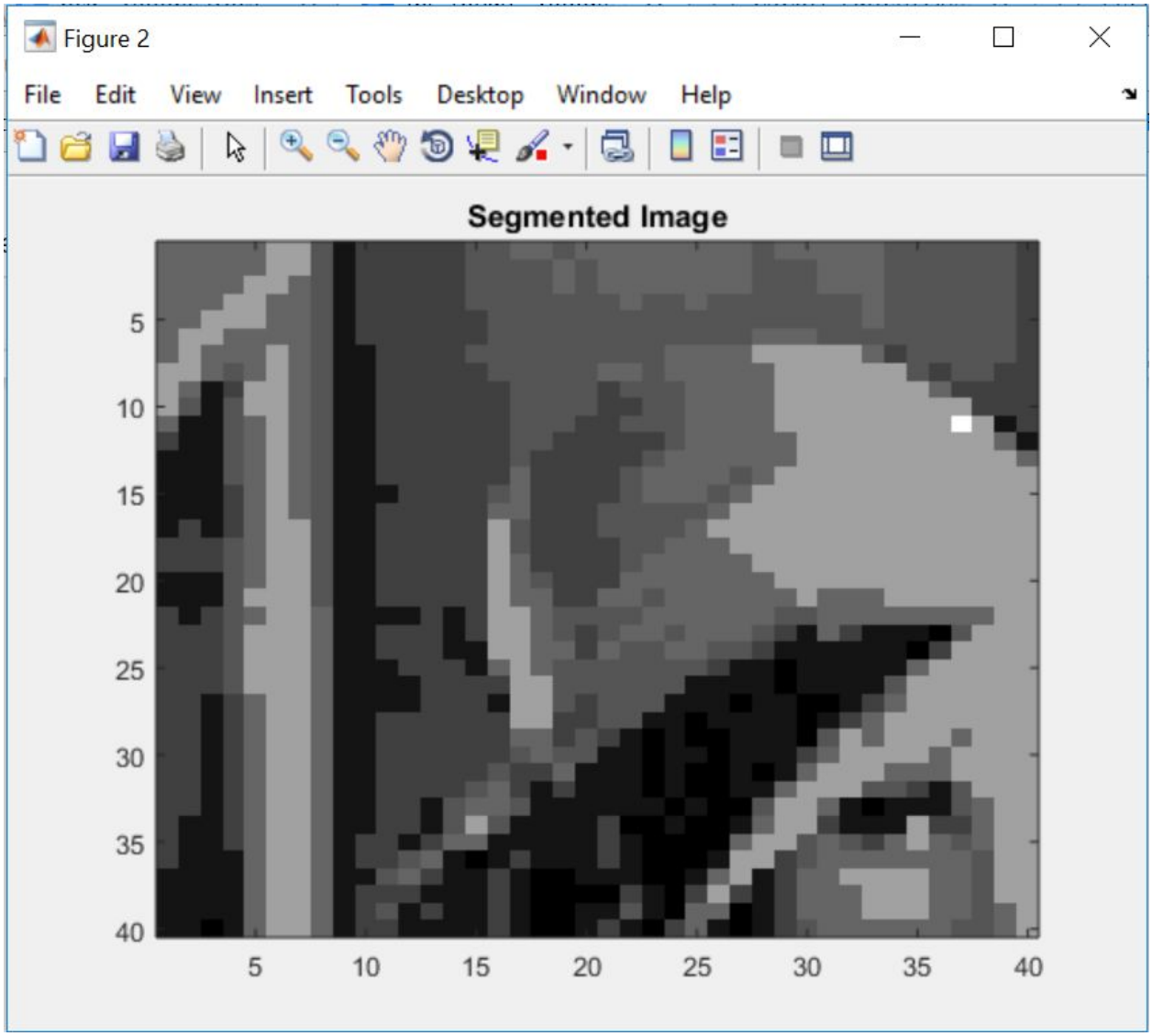
```
    numerator = sum(numerator_results);
    denominator = sum(gaussian);
    y = numerator / denominator;
  end

  J(i) = y; %filtered image

end

%Display output image
h2 = figure;
colormap('gray');
result = reshape(J, [40, 40]);
imagesc(result)
title('Segmented Image')
```

Results:





Bandwidth = 1, Max Iterations = 10



Bandwidth = 2, Max Iterations = 10