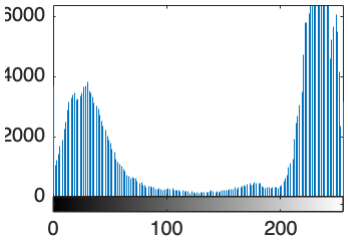
Import the images taken inside a variable

```
I = imread("/Users/fcuervo/MATLAB-Drive/VisionArtificial/ProjectImages/P090831011.jpg"
```

Apply first layer of filters

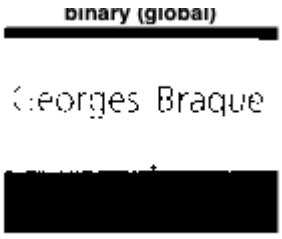
```
% Apply im2gray to convert an RGB image to grayscale.
gs = im2gray(I);
% Apply imadjust to increase the contrast of the image.
gsAdj = imadjust(gs);
% Show image after two filters
imshow(gsAdj)
```


```
% Print histogram which shows us in a hisogram the gray scale,
% this scale allows us to identify in which range black or white colors are found.
imhist(gsAdj)
```



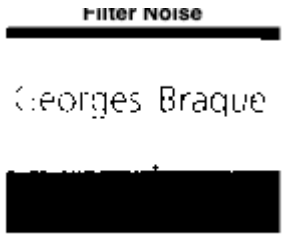
Implement a binarization method to separate black and white colors.

```
% Create a binary image by replacing all values determined
% threshold with 1s and setting all other values to 0s.
BW = imbinarize(gsAdj);
imshow(BW)
title("binary (global)")
```



Clean up some existing noise in the image

```
% Prepare parameter to apply, in this case it is an average
% filter to create an average.
H = fspecial("average",3);
% Here we apply an input array values outside the bounds of
% the array are assumed to equal the nearest array border value.
BWsmooth = imfilter(BW, H, "replicate");
imshow(BWsmooth)
title("Filter Noise")
```

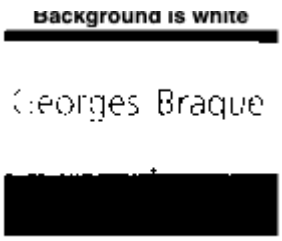


Apply new binarization using parameters

```
% Perform a conversion of the previous image to be able to apply the last filter
img = im2uint8(BWsmooth)
```

```
img = 480×640 uint8 matrix
   255   255   255   255     0     0     0     0     0     0     0     0     0 ···
   255   255   255   255     0     0     0     0     0     0     0     0     0
   255   255   255     0     0     0     0     0     0     0     0     0     0
   255   255   255     0     0     0     0     0     0     0     0     0     0
   255   255     0     0     0     0     0     0     0     0     0     0     0
   255     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0     0     0     0     0
     ⋮
```

```
% This binarization works in the event that in our region of
% interest the background is white. The 'sensitivity'
% parameter is applied since there may be regions with shadows,
% this parameter is responsible for cleaning up a bit around the text.
BWadapt = imbinarize(img, "adaptive", "ForegroundPolarity","dark",'Sensitivity',0.4);
imshow(BWadapt)
title("Background is white")
```




```
% Output route
%imwrite(BWadapt, "/Users/fcuervo/MATLAB-Drive/VisionArtificial/PreprocessedImages/Prep
```