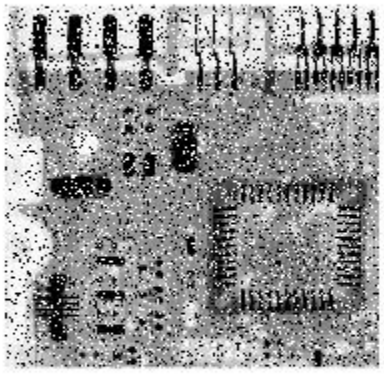
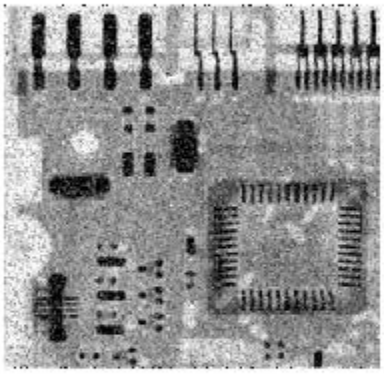
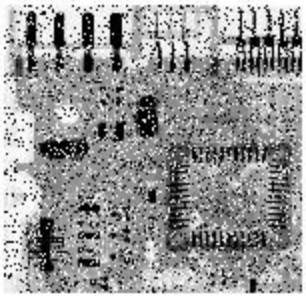
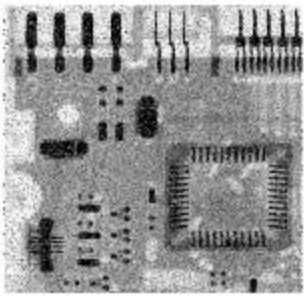
```
% 5 CAINE, Wilbert (20584260)

function LAF = linear_average_filter()
    A = imread('Fig3.37(a).jpg');
    LAF = A;
    [row, col] = size(A);
    for i = 2 : row-1
        for j = 2 : col-1
            f = 0;
            for s = i-1 : i+1
                for t = j-1 : j+1
                    f = f + uint64(A(s,t));
                end
            end
            LAF(i,j) = f/9;
        end
    end
    subplot(1, 2, 1);
    imshow(A);
    subplot(1, 2, 2);
    imshow(LAF);
end
```

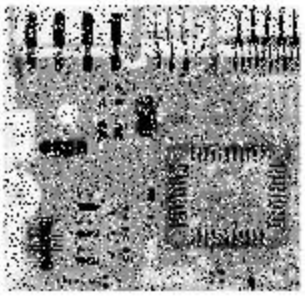


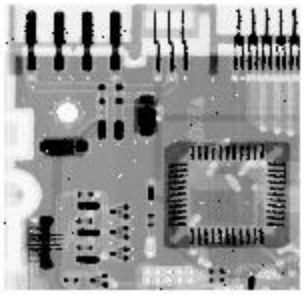


```
% 6 CAINE, Wilbert (20584260)

function MF = median_filter()
    LAF = linear_average_filter();
    A = imread('Fig3.37(a).jpg');
    MF = A;
    [row, col] = size(A);
    for i = 2 : row-1
        for j = 2 : col-1
            f = [];
            for s = i-1 : i+1
                for t = j-1 : j+1
                    f(end+1) = A(s,t);
                end
            end
            MF(i,j) = median(f);
        end
    end
    subplot(2, 2, 1);
    imshow(A);
    subplot(2, 2, 2);
    imshow(LAF);
    subplot(2, 2, 3);
    imshow(A);
    subplot(2, 2, 4);
    imshow(MF);
end
```

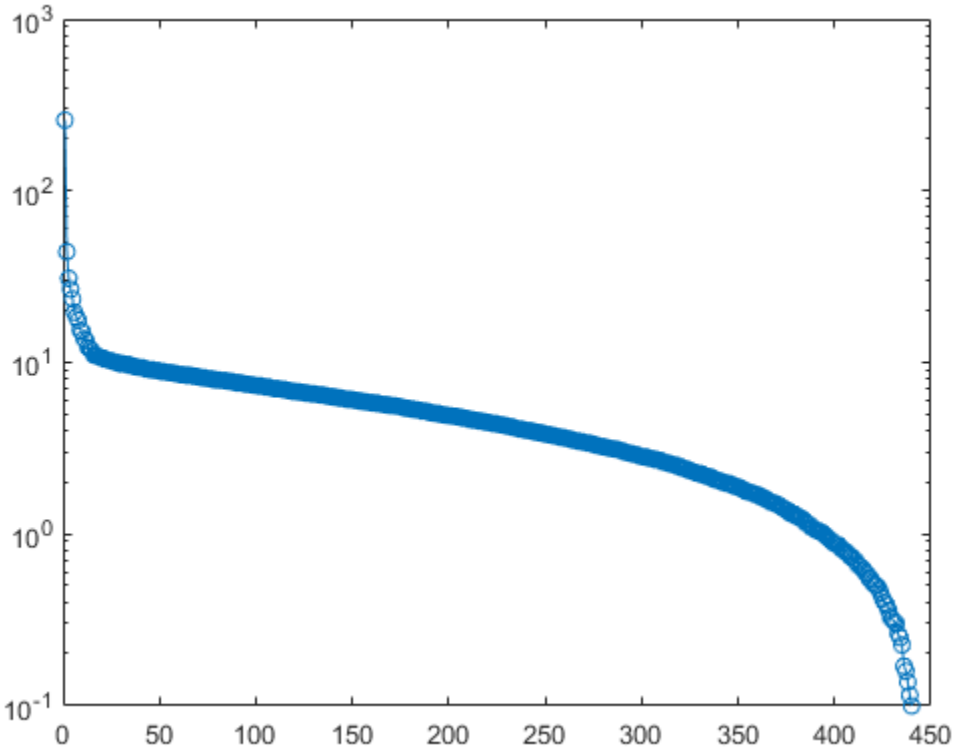








```
% 8a CAINE, Wilbert (20584260)

function B = svd_for_image_compression(input_image, n)
    A = imread(input_image);
    [U,S,V] = svd(double(A)/255);
    figure(1);
    semilogy(diag(S), 'o-');
    B = U(:, 1:n) * S(1:n, :) * V';
end
```



```
% 8b CAINE, Wilbert (20584260)

original_image = 'Fig3.37(a).jpg';
A = imread(original_image);

for i = 0 : 5
    n = 2^i;
    B = svd_for_image_compression(original_image, n);
    close(1);
    figure(2);
    subplot(6, 2, 2*i+1);
    imshow(A);
    subplot(6, 2, 2*i+2);
    imshow(B);
    rel_err = norm(B, 'fro');
    title(rel_err);
end
```