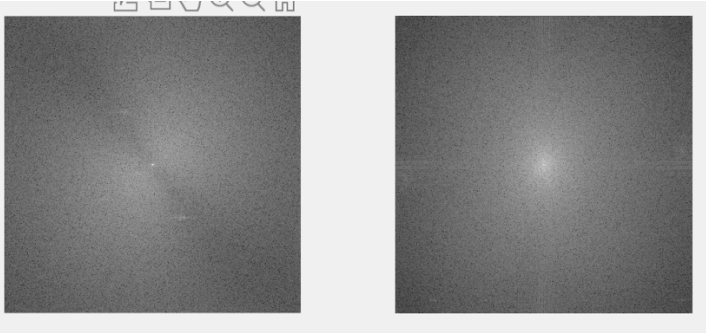


## Problem 1

用取  $15 * \log()$  的方式去 requantize，可得到最大值接近 255

```
p1.m x p2.m x p3.m x +
3 - m=512; n=512;
4 - fin=fopen('D04.raw','r');
5 - X=fread(fin,m*n,'uint8=>uint8');
6 - Y=reshape(X,m,n)';
7 - F=fftshift(fft2(Y));
8 - Sc=abs(F);
9 - Sc = 15*log(Sc);
10 - max(Sc(:))
11 - min(Sc(:))
12 - fin=fopen('D23.raw','r');
13 - X=fread(fin,m*n,'uint8=>uint8');
14 - Y=reshape(X,m,n)';
15 - F=fftshift(fft2(Y));
16 - Sc2=abs(F);
17 - Sc2 = 15*log(Sc2);
18 - max(Sc2(:))
19 - min(Sc2(:))
20 - subplot(1, 2, 1);
21 - imshow(Sc, []);
22 - subplot(1, 2, 2);
23 - imshow(Sc2, []);
24
```

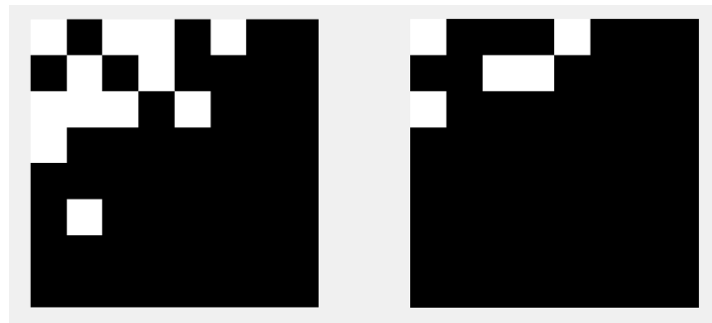


## Problem 2

```
fin=fopen('D04.raw','r');
X=fread(fin,m*n,'uint8=>uint8'); fclose(fin);
Y=reshape(X,m,n);
Y=Y';
S04 = zeros(8, 8);
S23 = zeros(8, 8);
for i=256:8:264
    for j=1:8:8
        tmp = Y(i:i+7, j:j+7);
        tmp = dct2(tmp-128);
        quantized = round(tmp./Q);
        S04(1:8, 1:8) = quantized;
    end
end
fin=fopen('D23.raw','r');
X=fread(fin,m*n,'uint8=>uint8'); fclose(fin);
Y=reshape(X,m,n);
for i=256:8:264
    for j=256:8:264
        tmp = Y(i:i+7, j:j+7);
        tmp = dct2(tmp-128, [8,8]);
        quantized = round(tmp./Q);
        S23(1:8, 1:8) = quantized;
    end
end
subplot(1,2,1);
imshow(S04);
subplot(1,2,2);
imshow(S23)
```

S04

S23



### Problem 3

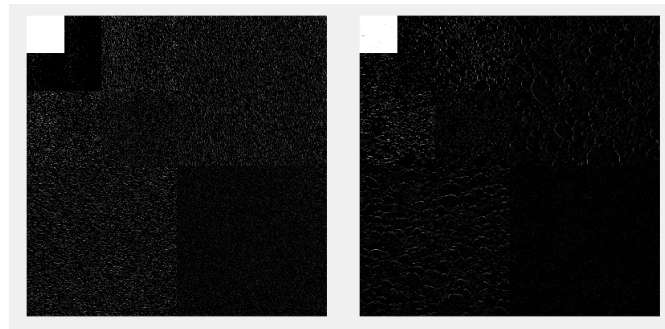
```

1 - N=512;
2 - fin=fopen('D23.raw','r');
3 - X=fread(fin,N*N,'uint8=>uint8'); fclose(fin);
4 - X=reshape(X,N,N);
5 - [A, D]=haart(X,1);
6 - T=zeros(N,N);
7 - T(1:N,1:N/2)=A'; T(1:N,N/2+1:N)=D';
8 - [A, D]=haart(T,1);
9 - T(1:N,1:N/2)=A'; T(1:N,N/2+1:N)=D';
10 - S04(1:N,1:N)=T(1:N,1:N);
11 - N=N/2;
12 - X1=S04(1:N,1:N);
13 - [A, D]=haart(X1,1);
14 - T=zeros(N,N);
15 - T(1:N,1:N/2)=A'; T(1:N,N/2+1:N)=D';
16 - [A, D]=haart(T,1);
17 - T(1:N,1:N/2)=A'; T(1:N,N/2+1:N)=D';
18 - S04(1:N,1:N)=T(1:N,1:N);
19 - N=N/2;
20 - X2=S04(1:N,1:N);
21 - [A, D]=haart(X2,1);
22 - T=zeros(N,N);
23 - T(1:N,1:N/2)=A'; T(1:N,N/2+1:N)=D';
24 - [A, D]=haart(T,1);
25 - T(1:N,1:N/2)=A'; T(1:N,N/2+1:N)=D';
26 - S04(1:N,1:N)=T(1:N,1:N);
27 - subplot(1, 2, 1);
28 - imshow(S04);

```

S04

S23



### Problem 4

```

fin=fopen('D04.raw','r');
X=fread(fin,m*n,'uint8=>uint8'); fclose(fin);
Y=reshape(X,m,n);
Y=Y';
S04 = zeros(m, n);
S23 = zeros(m, n);
for i=1:8:m
    for j=1:8:n
        tmp = Y(i:i+7, j:j+7);
        tmp = dct2(tmp-128);
        quantized = round(tmp./Q);
        S04(i:i+7, j:j+7) = quantized;
    end
end

fin=fopen('D23.raw','r');
X=fread(fin,m*n,'uint8=>uint8'); fclose(fin);
Y=reshape(X,m,n);
for i=1:8:m
    for j=1:8:n
        tmp = Y(i:i+7, j:j+7);
        tmp = dct2(tmp-128, [8,8]);
        quantized = round(tmp./Q);
        S23(i:i+7, j:j+7) = quantized;
    end
end
subplot(1,2,1);
imshow(S04);
subplot(1,2,2);
imshow(S23);

```

S04

S23

