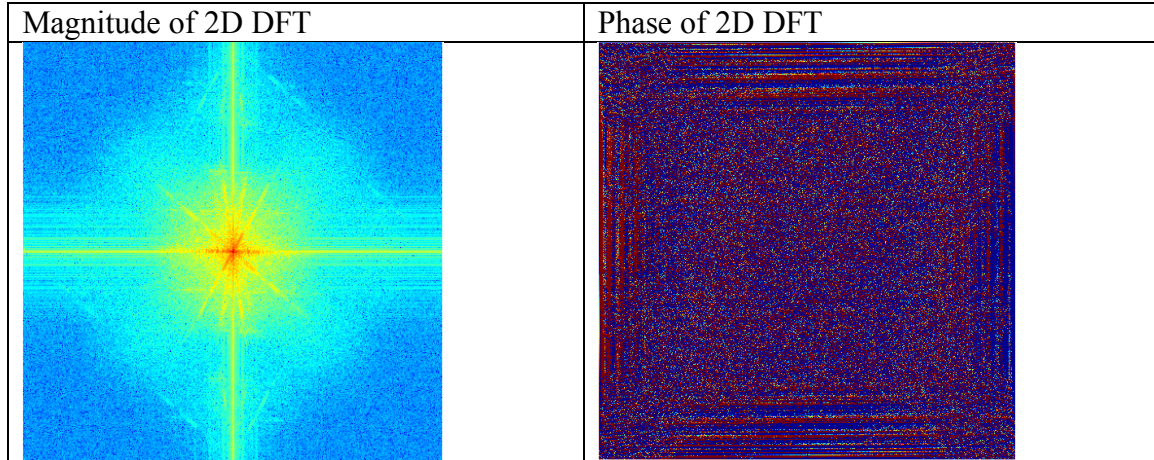


Problem 1:

a)

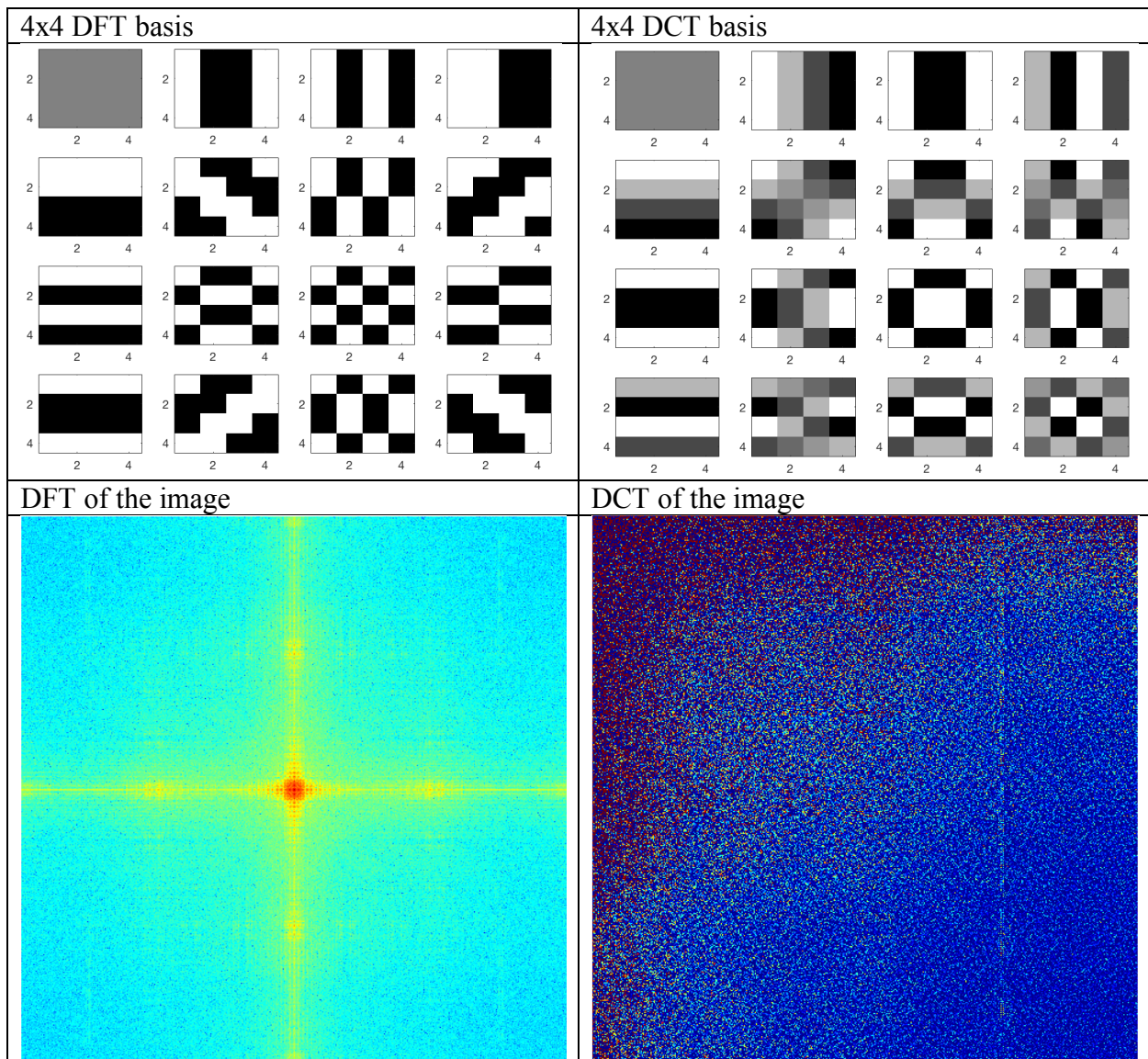


b)



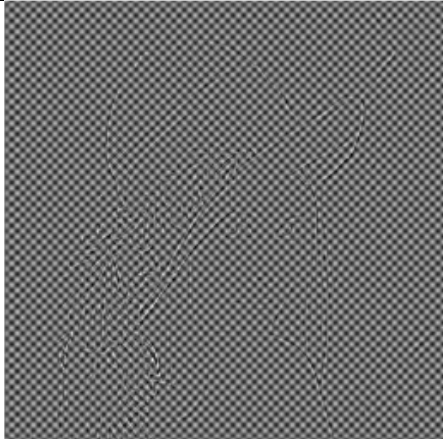

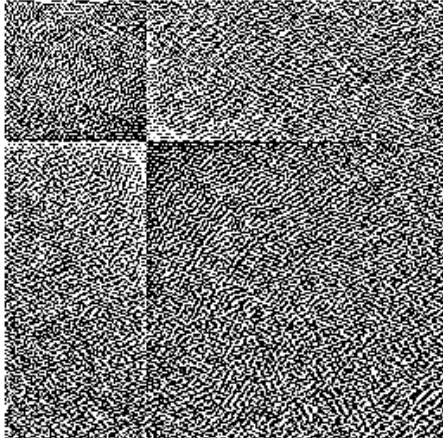
I used the distance of every pixel between the original image and the reconstructed image, which is the difference of the two pixel and scaled by 256. In that way we can observe that the sparser we resample the image, the vaguer we get from reconstruction, and thus the difference between pixel become greater.

Problem 2:



DFT transform the image into complex space while DCT keep the image in real space. While it can save more space by storing data just in real space, therefore, it's better to use DCT to compress the image.

Problem 4:

Separating high frequency component and low frequency component by DCT	
High frequency component	Low frequency component
	
Magnitude of DCT	
	

The image was covered by some high frequency noise across the image. We know that after the transformation of DCT, the high frequency component will locate on the left-upper triangular part of the diagram. By iterating through different cutoff rate of the triangle, we can find the best truncate threshold of the triangle. Finally, after separating the high frequency and low frequency component in the DCT, we can inverse the DCT and get the clear image with low frequency component.