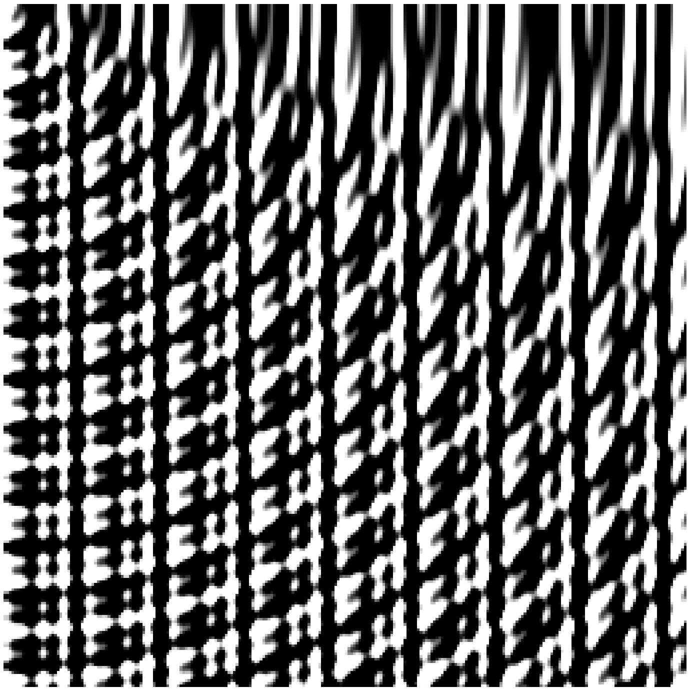
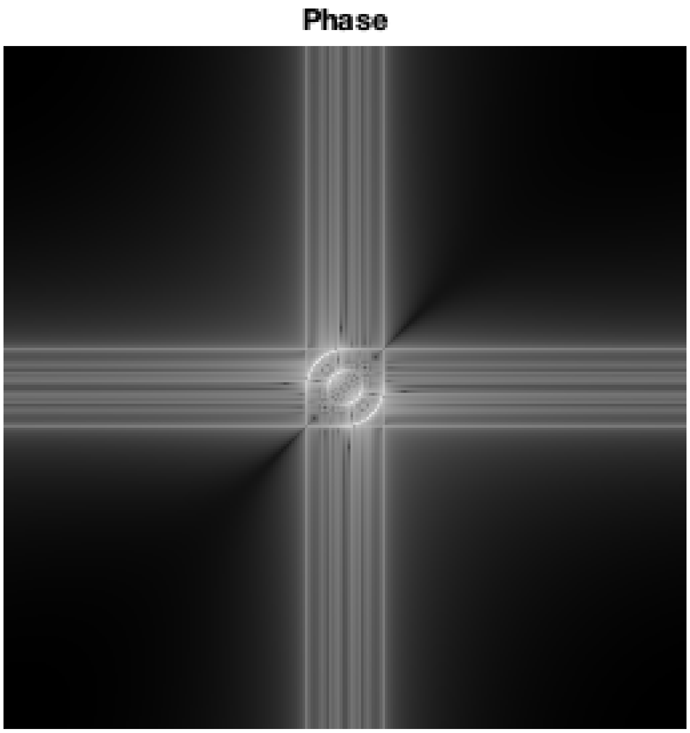
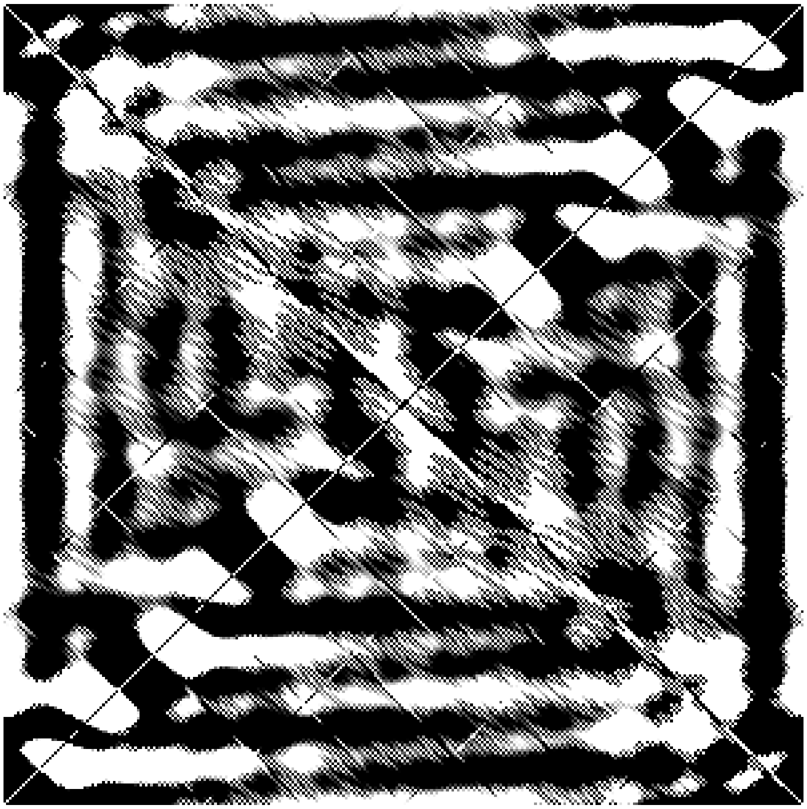
Part 1: Discrete Fourier Transform

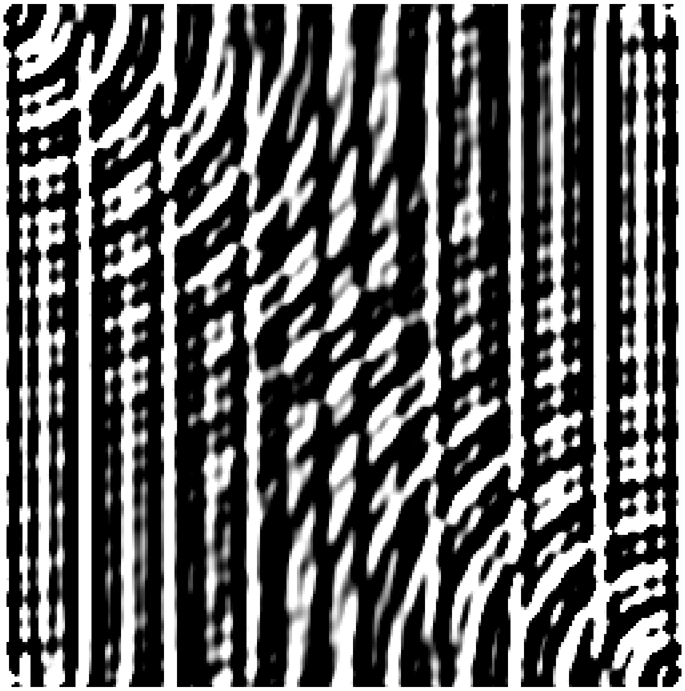
```
% a
% a step 1
rows = 512;
[x,y] = meshgrid(1:rows, 1:rows);

% a step 2
img = sin(0.2 * x) + sin(0.3 * x) + cos(0.4 * x) + sin(sqrt(x .* x +
 y .* y) * 0.15) + sin(sqrt(x .* x + y .* y) * 0.35);
imshow(img);

% a step 3
fftImg = fftshift(fft2(img));
% Show the magnitude and phase of DFT for this image
phase = angle(fftImg);
amplitude = abs(fftImg);

figure;
imshow(log(amplitude),[]);
title("Log amplitude");

figure;
imshow(unwrap(phase), []);
title("Phase");

% a step 4
% Multiply the magnitude of DFT with 2
mul = ifftshift(amplitude) * 2;
% Calculate the inverse Discrete Fourier Transform
ifftImg = ifft2(mul);
figure
imshow(ifftImg);

% b
img = im2double(imread('./images/Cross.jpg'));

dft = fft2(img);
fftImg = fftshift(dft);

figure
imshow((fftshift(fftImg)));
```

```
Warning: Displaying real part of complex input.
```




Phase





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