

EECE 5612 HW4
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First, the .mat data file was read into Matlab and converted into an array.

```
Y = table2array(struct2table(load('hwk4.mat')));
```

For each complex number array element, the phase angle was found and mapped to $[0, 2\pi]$.

```
complex = Y(y);  
phi = angle(complex);  
  
if (phi < 0)  
    phi = (2*pi) + phi;  
end
```

Next, the angle was mapped to 0-7 depending on which region it lied in. This number was then converted to 3 digit binary and appended to the bit string.

```
enum = round(phi/(pi/4));  
  
if (enum == 8)  
    enum = 0;  
end  
  
bits = cat(2, bits, dec2bin(enum, 3));
```

This bit string was then iterated and every 5 bits were then converted back into a decimal value, and then mapped to an English alphabet letter.

```
for i = 1:(length(bits))/5  
  
    bits5 = bits((5*i)-4 : 5*i);  
    bitsStr = strjoin(string(bits5));  
    enum2 = bin2dec(bitsStr);  
  
    if (enum2 == 0)  
        message = append(message, " ");  
    else  
        message = append(message, alphabet(enum2));  
    end
```

The final message read:

PLANET E RTH IS BLUE AND THERE IS OTXING I CAN DO

hw4.m

```
% EECE 5612 HW4  
% Stav Rones  
% 2.22.2022
```

```
function hw4
```

```
    % load file  
    Y = table2array(struct2table(load('hwk4.mat')));  
    bits = zeros(0);  
  
    for y = 1:length(Y)  
        complex = Y(y);  
        phi = angle(complex);  
  
        if (phi < 0)  
            phi = (2*pi) + phi;  
        end  
  
        enum = round(phi/(pi/4));  
  
        if (enum == 8)  
            enum = 0;  
        end  
  
        bits = cat(2,bits,dec2bin(enum, 3));  
    end  
  
    alphabet = 'ABCDEFGHJKLMNOPQRSTUVWXYZ';  
    message = '';  
  
    for i = 1:(length(bits))/5  
        bits5 = bits((5*i)-4 : 5*i);  
        bitsStr = strjoin(string(bits5));  
        enum2 = bin2dec(bitsStr);  
  
        if (enum2 == 0)  
            message = append(message, " ");  
        else  
            message = append(message, alphabet(enum2));  
        end  
    end  
  
    disp(message)  
end
```