```
% Zyad Khan
% Matlab Unit 3 Assignment
% MATH-210: Linear Algebra

% Display name and assignment details
disp('Zyad Khan - MATLAB Unit 3 Assignment')

% Using provided A matrix, decode the message: DVIZRTJQXVCWOGUJNKGSDEWMDDY
A = [2 5 3; 12 9 4; 17 22 8];

encodedTextMessage = 'DVIZRTJQXVCWOGUJNKGSDEWMDDY';
encodedMessage = [3 25 9 21 14 9 6 4 3; 21 17 16 2 6 13 18 22 3; 8 19 23 22 20
 10 3 12 24];

P = round(det(A)*inv(A));
a = round(det(A)); num = [1:26]; res = mod(a*num,26);
b = find(abs(res-1)<10^-10);

key = mod(b*P,26);

decodedMessage = key * encodedMessage;
decodedMessage = mod(decodedMessage, 26);
fprintf("\nThe encoded message in text is: %s\n", encodedTextMessage)
disp("The encoded message Matrix is: ")
disp(encodedMessage)

fprintf("\nThe decoded message matrix is: \n")
disp(decodedMessage)
disp("Translation: Alan Turing Cracked Enigma Code")
% This message refers to the person who cracked the German Enigma Code
% during WW2.


% Encode your own message with your own A matrix (mod 26 w/ an inverse)
message = 'Congrats. You solved the code';
messageMatrix = [2 6 19 14 14 4 7 14; 14 17 18 20 11 3 4  3 ; 13 0 24 18 21 19
 2 4];


A = [ 10 17 8 ; 3 22 4; 14 11 3];

P = round(det(A)*inv(A));
a = round(det(A)); num = [1:26]; res = mod(a*num,26);
b = find(abs(res-1)<10^-10);
key = mod(b*P,26);

encodedMessage = mod(A * messageMatrix, 26);
decodedMessage = key * encodedMessage;
decodedMessage = mod(decodedMessage, 26);

fprintf("\nThe key matrix used is: ");
disp(key)
```

```
disp("The encoded message matrix is: ");
disp(encodedMessage)
encodedMessageText = 'ycnlclmdqaicbeqjyqynspuh';

disp("The decoded message using this message is (which is the same as the
 message in matrix form: ");
disp(decodedMessage)
disp("Translation: Congrats you solved the code")
```

```
Zyad Khan - MATLAB Unit 3 Assignment

The encoded message in text is: DVIZRTJQXVCWOGUJNKGSDEWMDDY
The encoded message Matrix is:
     3    25     9    21    14     9     6     4     3
    21    17    16     2     6    13    18    22     3
     8    19    23    22    20    10     3    12    24


The decoded message matrix is:
     0    13    17     6     0     4    13    12    14
    11    19     8     2     2     3     8     0     3
     0    20    13    17    10     4     6     2     4

Translation: Alan Turing Cracked Enigma Code

The key matrix used is:     24    25    24
    17    24    18
    25    12    13

The encoded message matrix is:
    24    11    12     0     1     9    24    15
     2     2     3     8     4    24    13    20
    13    11    16     2    16    16    18     7

The decoded message using this message is (which is the same as the message in
 matrix form:
     2     6    19    14    14     4     7    14
    14    17    18    20    11     3     4     3
    13     0    24    18    21    19     2     4

Translation: Congrats you solved the code
```

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