Table of Contents

```matlab
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% ENGR 133
% Program Description
%Using different MATLAB functions to concatenate, expand, and replace
%matrices
%
% Assigment Information
%   Assignment:   PS 2, Problem 1
%   Author:    Ayush Viswanathan, viswan11@purdue.edu
%   Team ID:   LC1-04
%   Contributor:   Jackson Bitterolf, jbittero@purdue.edu
%                  Nolan Hays, haysn@purdue.edu
%                  Roshan Sundar, rmsundar@purdue.edu
%   Our contributor(s) helped us:
%     [ ] understand the assignment expectations without
%         telling us how they will approach it.
%     [ ] understand different ways to think about a solution
%         without helping us plan our solution.
%     [ ] think through the meaning of a specific error or
%         bug present in our code without looking at our code.
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

INITIALIZATION

```matlab
A = zeros(4); %creates an empty matrix
vals = [1,2,3,4;5,6,7,8;9,10,11,12;,13,14,15,16]; %creates a matrix
 filled with values
```

COPY & CONCATENATION

```matlab
M = vals(2:3,2:3); %2 by 2 center matrix
C = vals(1,2:3); %vector with middles values of row 1
D = vals(4,2:3); %vector with middles values of row 4
E = [vals(1,1) D vals(1,4)]; %concatenating row 4 vector in row 1 to
 create a new vector
F = [vals(4,1) C vals(4,4)]; %concatenating row 1 vector in row 2 to
 create a new vector
```

REPLACE MATRIX ELEMENTS

```matlab
A(1,:) = E; %replacing first row of A with vector E
A(4,:) = F; %replacing last row of A with vector F
A(2:3,2:3) = M; %replacing middle of A with matrix M
%replacing the remaining zero values
A(2,1) = vals(3,4);
A(2,4) = vals(3,1);
A(3,1) = vals(2,4);
A(3,4) = vals(2,1);
```

FINAL MATRIX

```matlab
X = sum(A); %sum of the columns of A
G = [A;X]; %vertically concatenate A and X to create G (adds X as the
 5th row)
Y = sum(G')'; %sum of the rowx of G
H = [G Y]; %horizontally concatenate G and Y to create H (adds Y as
 the 5th column)
H(5,5) = trace(A); % trace function finds the diagonal sum and replace
 the last index of the matrices with that value
```

FORMATTED TEXT DISPLAY

```matlab
fprintf('After doing step 8.e, the value in the center of H is %d
\n',H(3,3)); %print statement
fprintf('After doing step 8.e, the value in the upper left of H is
 %d, and the value in the upper right is %d\n',H(1,1),H(1,5)); %print
 statement
```

```
fprintf('After doing step 8.e, the value in the lower left of H is
%d, and the value in the lower right is %d\n',H(5,1),H(5,5)); %print
statement
```

```
After doing step 8.e, the value in the center of H is 11
After doing step 8.e, the value in the upper left of H is 1, and the
 value in the upper right is 34
After doing step 8.e, the value in the lower left of H is 34, and the
 value in the lower right is 34
```

ACADEMIC INTEGRITY STATEMENT

We have not used source code obtained from any other unauthorized source, either modified or unmodified. Neither have we provided access to our code to another. The script we are submitting is our own original work.

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