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%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% ENGR 132
% Program Description
%This program was created to use the given martixes and separates
 specific
%points into row vectors, and also concatenates theses row vectors.
 Then
%the final part of the problem replaces martix elements with user
 input.
% Assigment Information
%   Assignment:   PS 03, Problem 1
%   Author:    Ranjan Behl, rbehl@purdue.edu
%   Team ID:   008-14
%   Paired Partner:  John Chapla, jchapla@purdue.edu
%   Contributor:  Name, login@purdue [repeat for each]
%   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

```
A = zeros(4); % creates the 4 by 4 martix of zeros
vals = [1,3,2,4;5:8;9:12;13,15,14,16];% creates the martix for part b
 of the problem
```

COPY & CONCATENATION

```
%a
M = vals(2:3,2:3);% the center 2 by 2 martix that is inside vals
%b
C = vals(1,2:3);% taking the 3 2 from the first row of vals and
 labeling it as a row vector c
%c
D = vals(4,2:3);% taking the 15 14
%d
E = [vals(1,1),D,vals(1,4)];% creating a row vector that concatenates
 D between the first and fourth elements
%e
F = [vals(4,1),C,vals(4,4)];% creating a row vector that concatenates
 C between the first and fourth elements
```

REPLACE MATRIX ELEMENTS

```
%a
A(2:3, 2:3) = M;% replacing the center 2 x 2 martix of A with M
A(1,:) = E;% replacing the first row of A with E
A(4,:) = F;% replacing the fourth rwo of A with F
%b
A(2,1) = vals(3,4);% replaces the 0 directly below the 1 in martix A
 with the 12 from matrix vals
A(3,1) = vals(2,4);% replaces the 0 above the 13 in martix A with the
 8 from martix vals
A(2,4) = vals(3,1);% replaces the 0 directly below the 4 in martix A
 with the 9 from martix vals
A(3,4) = vals(2,1);% replaces the 0 directly above the 16 in martix A
 with the 5 from matix vals
```

FINAL MATRIX

```
%a
X = sum(A);% X is vector that contains the sums of the columns of A
%b
G = [A;X];% Concatenates vector X to the bottom of martix A to create
 a new martix G
%c
Y = sum(G);% Creates a vector Y that contains the sums of the rows of
 G
%d
```

```
Ynew = Y.';% tranposes the Y vector into a column vector
Ynew(5,1) = 0; % creating a zero place holder for Ynew so it can be
 concatenated with martix G
H = [G Ynew]; % concatenates vector Y(in this case its Ynew) to the
 right of martix G to create a new martix H
%e
H(25) = sum(diag(H)) % replaces the lower right corner value of H with
 the sum of the first four values on the diagonal from the upper left
 corner and moving toward the lower right corner
```

```
H =

     1    15    14     4    68
    12     6     7     9    68
     8    10    11     5    68
    13     3     2    16    68
    34    34    34    34    34
```

FORMATTED TEXT DISPLAY

```
fprintf("\nAfter doing step 8.e, the value in the center of H is
 %d",H(13));
fprintf("\nAfter doing step 8.e, the value in the upper left of H is
 %d,and the value in the upper right of H is %d.",H(1),H(21));
fprintf("\nAfter doing step 8.e, the value in the lower left of H is
 %d,and the value in lower right of H is %d.",H(5),H(25));
```

```
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 of H is 68.
After doing step 8.e, the value in the lower left of H is 34,and the
 value in lower right of H 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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