Submission deadline (on or before):
19th January 2016, 10:00:00 PM (for Advanced batch)

Naming Conventions for submission:
Submit a single ZIP (.zip) file (do not submit in any other archived formats like .rar or .tar.gz). The name of this file must be ASSG<Number>A_<ROLLNO>_<FIRSTNAME>.zip
(For example: ASSG1A_BxxyyyyCS_LAXMAN.zip). DO NOT add any other files (like temporary files, input files, etc.) except your source code, into the zip archive.
The source codes must be named as ASSG<Number>A_<ROLLNO>_<FIRST NAME>_<PROGRAM-NUMBER>.<extension> (For example: ASSG2A_BxxyyyyCS_ LAXMAN_1.c)

Questions:

1. Implement an in-place algorithm that reads an $n \times n$ matrix M as input and rotates M clockwise by 90°, that is, i^{th} row of M, $1 <= i <= $ n becomes $(n – i + 1)^{th}$ column in the rotated matrix.

   Input: An $n \times n$ matrix **M**, with $0 < n <= 100$, containing integers in the
          range $0\text{-}2^{31}$.
   Output: Matrix **M** rotated clockwise by 90°.

   Example:
   Input:
   ```
    1   2   3   4
    5   6   7   8
    9  10  11  12
   13  14  15  16
   ```
   Output:
   ```
   13   9   5   1
   14  10   6   2
   15  11   7   3
   16  12   8   4
   ```

2. Write a menu driven program that reads an $n \times m$ matrix **M**, with $0 < n, m <= 100$ and prints the elements of **M** by performing a spiral-order traversal as per the user's choice, given in the example. Spiral-order traversal intends to traverse the elements of **M** in a spiral-like fashion and prints them in the order of traversal. We consider the following spiral-order traversals in this question:

   a) *Clockwise spiral-order* traversal starts from the top, left-most position of a matrix and visits the remaining elements spirally inwards in the clockwise direction (see the example below).

   b) *Anti-clockwise spiral-order* traversal starts from the top, left-most position of a matrix and visits the remaining elements spirally inwards in the anti-clockwise direction (see the example below).

   Note: You should not use any additional array or matrix other than the input matrix to output the spiral-order traversal of the input matrix.

   Input: An $n \times m$ matrix **M**, with $0 < n,m <= 100$, containing integers in the
          range $0\text{-}2^{31}$ and a choice

   Output: Result of the chosen spiral-order traversal in **M**

Example 1:
Input:
Enter the elements of the matrix:
```
    1   2   3   4
    5   6   7   8
    9  10  11  12
   13  14  15  16
   17  18  19  20
```
Menu:
a. Clockwise spiral-order traversal
b. Anti-clockwise spiral-order traversal
c. Exit

Enter your choice:
a
Output:
```
1 2 3 4 8 12 16 20 19 18 17 13 9 5 6 7 11 15 14 10
```

Menu:
a. Clockwise spiral-order traversal
b. Anti-clockwise spiral-order traversal
c. Exit

Enter your choice:
b
Output:
```
1 5 9 13 17 18 19 20 16 12 8 4 3 2 6 10 14 15 11 7
```

Example 2:
Input:
Enter the elements of the matrix:
```
    1   2   3   4
    5   6   7   8
```
Menu:
a. Clockwise spiral-order traversal
b. Anti-clockwise spiral-order traversal
c. Exit

Enter your choice:
a
Output:
```
1 2 3 4 8 7 6 5
```

Menu:
a. Cockwise spiral-order traversal
b. Anti-clockwise spiral-order traversal
c. Exit

Enter your choice:
b
Output:
```
1 5 6 7 8 4 3 2
```

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