Generate magic square with dimension n (n is ODD)

A magic square of dimension n is a n x n matrix, every element of which is unique integers and sum of all rows, all columns and 2 diagonals are always same. The following is an example of magic square with dimension n=5.

11	18	25	2	9
10	12	19	21	3
4	6	13	20	22
23	5	7	14	16
17	24	1	8	15

The sum of the rows/cols and diagonals is 65, this sum is called the magic constant and can be found using the formula $n * (n^2 + 1)/2$. Hence, a magic square with dimension n = 7 will have a magic constant 175. The following is the magic square with dimension n = 7.

22	31	40	49	2	11	20
21	23	32	41	43	3	12
13	15	24	33	42	44	4
5	14	16	25	34	36	45
46	6	8	17	26	35	37
38	47	7	9	18	27	29
30	39	48	1	10	19	28

In this assignment, you will write a program that will generate a magic square for **ODD Dimension** as given by the user, using the following algorithm.

1. Prompt the user to input dimension of the magic square, only odd integer between 1 and 15(inclusive), read the user input. If the input is invalid, print error message and terminate the program.
2. If the user input for the dimension is valid then do the following to generate the magic square.
   a. Allocate a 2D array of integers with dimension n x n.
   b. Initialize each element of the array with 0, you will need to run nested for loop for doing this.
   c. Take 2 variables row and column, initialize row with n-1 and column = n/2.
   d. For each k starting from 1 up to n^2 do the following:
      1. Assign k to the cell matrix[row][column].
      2. Increment both row and column.
      3. If row is n then assign 0. if row is n, that means you are exceeding number of rows, move back to the first
      4. If column is n then assign 0, if column is n, that means you are exceeding number of columns, move back column to 0.
      5. If matrix[row][column] is not 0, then

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       I.   row should be the previous row (the value before you increased row), take care to keep the value of the old row in a variable before you increment it at step 3.

      II.   column should be the precious column (the value before you increased column), take care to keep the old column in a variable before you increment it at step 4.

      III. Decrement the row by 1, you do not need to decrement column.

3. Print the magic square matrix.
4. Use the formula to find magic constant for given dimension, now, check if sum of all rows, all columns and 2 diagonals equals with magic constant, if so, print a message that "Magic square generate with dimension <n> and magic constant: <magicConstant>", otherwise, print an error message that "Error in forming magic square with dimension <n>", replace n with the dimension. You will only have error if you have not followed the algorithm correctly, if the algorithm is implemented correctly then it will always generate magic square for odd number n. (While displaying the magic square at step 3, you can check if the rows-sum equals with magic constant or not.)

Expected Output:

```
Enter dimension of Magic Square (Only ODD dimension >=1 and <=15 accepted): 5
The magic square:

  11   18   25    2    9
  10   12   19   21    3
   4    6   13   20   22
  23    5    7   14   16
  17   24    1    8   15
Magic square generated with dimension 5 and magic constant: 65
```

```
Enter dimension of Magic Square (Only ODD dimension >=1 and <=15 accepted): 1
The magic square:

   1
Magic square generated with dimension 1 and magic constant: 1
```

```
Enter dimension of Magic Square (Only ODD dimension >=1 and <=15 accepted): 16
Invalid input
Valid values are odd integers between 1 and 15
```

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```
Enter dimension of Magic Square (Only ODD dimension >=1 and <=15 accepted): 15
The magic square:

 106 123 140 157 174 191 208 225   2  19  36  53  70  87 104
 105 107 124 141 158 175 192 209 211   3  20  37  54  71  88
  89  91 108 125 142 159 176 193 210 212   4  21  38  55  72
  73  90  92 109 126 143 160 177 194 196 213   5  22  39  56
  57  74  76  93 110 127 144 161 178 195 197 214   6  23  40
  41  58  75  77  94 111 128 145 162 179 181 198 215   7  24
  25  42  59  61  78  95 112 129 146 163 180 182 199 216   8
   9  26  43  60  62  79  96 113 130 147 164 166 183 200 217
 218  10  27  44  46  63  80  97 114 131 148 165 167 184 201
 202 219  11  28  45  47  64  81  98 115 132 149 151 168 185
 186 203 220  12  29  31  48  65  82  99 116 133 150 152 169
 170 187 204 221  13  30  32  49  66  83 100 117 134 136 153
 154 171 188 205 222  14  16  33  50  67  84 101 118 135 137
 138 155 172 189 206 223  15  17  34  51  68  85 102 119 121
 122 139 156 173 190 207 224   1  18  35  52  69  86 103 120
Magic square generated with dimension 15 and magic constant: 1695
```

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