

**C Language Programming: Homework #3**  
**Assigned on 10/24/2017, Due on 10/31/2017**

Write a program that prints an  $n \times n$  magic square (a square arrangement of the numbers 1, 2, ...,  $n^2$  in which the sums of the rows, columns, and diagonals are all the same). For example, the user run the program by specifying the value of  $n$ :

This program creates a magic square of a specified size.

The size must be an *odd* number between 1 and 99.

Enter size of magic square: 5

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

Store the magic square in a two-dimensional array. Start by placing the number 1 in the middle of row 0. Place each of the remaining numbers 2, 3, ...,  $n^2$  by moving up one row and right one column. Any attempt to go outside the bounds of the array should “wrap around” to the opposite side of the array. For example, instead of storing the next number in row  $-1$ , we would store it in row  $n - 1$  (the last row). Instead of storing the next number in column  $n$  which does not exist, we would store it in column 0. If a particular array element is already occupied, put the number directly below the previously stored number. Try the following two options for array in two different files like hw3a.c and hw3b.c:

- (1) Use traditional static array like magic[99][99].
- (2) Use variable-length arrays of  $n$  rows and  $n$  columns.

## Command Line:

```
./hw3a
```

```
./hw3b n
```

## Output:

hw3a: A file named “output\_a” which include results.

hw3b: A file named “output\_b” which include results.

## Example:

```
> ./hw3a
```

```
> ./hw3b 5
```

## Score:

hw3a: 40%

hw3b: 40%

Report: 20%

## Output format:

將magic square依照範例輸出，從第一列開始從左到右依序印出，兩兩之間由空格隔開，持續輸出到最後一列，換到下一列時必須換行。

EX:

```
17 24 1 8 15
```

```
23 5 7 14 16
```

```
4 6 13 20 22
```

```
10 12 19 21 3
```

```
11 18 25 2 9
```