Homework #7

[ECE10002] C Programming

Mission

- **Solve Problem 1, 2, 3 in C language.**

- **Submit through Hisnet**
  - Due date: PM11:00, Dec. 7th (Sat.)
  - Submit a zip file including three files: hw7_1.c, hw7_2.c, hw7_3.c
  - Use the skeleton codes for Problem 2, and 3.

- **All variables, except for arrays, should be initialized properly.**

  Ex) int i = 0, *p = NULL;   // Okay!

  int i, *p;   // Uninitialized variables can be penalized

- **Every program should contain algorithm in pseudo code.**
  - Use comments to describe each step of the algorithm

Problem 1

- Magic square: a matrix of size NxN, filled with $1 \sim N^2$ numbers. The sums of each row or column are all same.

- Write a program to draw magic square, by the following algorithm.
    - Assume the width is an odd number not larger than 13.

  fill square with 0's
  initialize (x, y) with (width − 1, width / 2)
  set size = width * width

  repeat for n from 1 to size
  {
        set square[y][x] by n
        set (nextx, nexty) by the lower right diagonal neighborhood of (x, y)

        if square[nexty][nextx] is not filled yet,
              update (x,y) with (nextx, nexty)
        otherwise
              update (x, y) with (x − 1, y)
  }

Problem 1

Ex) magic square of size 5

```
Input the width of magic square (default = 5): 5
5 x 5 magic square:
    11    10     4    23    17 :    65
    18    12     6     5    24 :    65
    25    19    13     7     1 :    65
     2    21    20    14     8 :    65
     9     3    22    16    15 :    65
____ ____ ____ ____ ____
    65    65    65    65    65
```

Problem 2

- **Write a program that shows phonebook.**
  - It reads phonebook data from a text file "phonebook.txt"
  - Print the names and phone numbers.
  - Repeat until the user presses CTRL-Z.
    - Ask a name.
    - Find the phone number for the specified name.
    - Print the name and the phone number.

- **A code skeleton is provided "Phonebook_skeleton.c"**
  - Complete two functions
    - int ReadPhoneBook(char *filename);
    - int FindName(char *name);
      - Use the strcmp() function declared in string.h

Problem 3

- **Define your own goal, design an algorithm to achieve the goal, and implement it.**
  - You must not use any source code written by others, except for the codes provided in this course.

- **Explain the goal and usage of your program in the source file as a comment.**

  Ex)

  /*

      Goal:

      Usage:

  */