Programming Assignment 6
Recursion
Due Date : Monday April 4th , 2016
@ 3:30 pm Section 2 & 5:00 pm section 3

Problem:

Write a C++ program that Accepts a **positive** integer (***n***) that is greater than 9 from the keyboard. Then :

- Write a recursive function that returns **true** if the digits of that integer ***n*** are in increasing order ; otherwise , the function returns **false**.
- Write a recursive function that takes that integer ***n*** and returns the numbers with the digits reversed.
- Write a recursive function that takes that integer ***n*** and returns the sum of the digits of the integer.
- Write a function that returns the sums of squares of the numbers from 0 to the number ***n*** .
- Write a function that displays the number ***n*** vertically .

Validations:

The program accepts only integer data type when selecting from the menu (1 or 9). Everything else should be rejected with an invalid option message.

NOTES:

- Just one .cpp file with 5 individual recursive functions plus main for testing.
- Do not use global variable.
- `Replace My name (Husain Gholoom) with your first and last name.`
- `Your program's format and messages must match the output provided`

Output Formats and Messages

```
*** Welcome to My Program Using Recursions  ***

The function of this program is to
accepts from the keyboard
a positive integer that is  > 9.
The program then does the following  :

   1- Returns true if the digits of that integer n
      are in increasing order; otherwise ,
      the function returns false.
   2- Returns the numbers with the digits reversed.
   3- Returns  the sum of the digits of the integer.
   4- Returns the sum of squares of the numbers from  0  to the number n.
   5- Displays the number vertically .

Select from the following menu
1.  Enter a positive integer >  9.
9.   Terminate the program.    1


Enter a positive integer >  9.    59

The digits of 59 are in increasing order.


The Original Digits are  59 ---    Digits reversed = 95


Sum of digits of the number  59   is   =   14

Sum of squares from 0  to  59   =   70210

59   Displayed Vertically
5
9
```

```
Select from the following menu
1.  Enter a positive integer >  9.
9.  Terminate the program.    1


Enter a positive integer >  9.    95

The digits of 95 are not in increasing order.


The Original Digits are  95 ---    Digits reversed = 59


Sum of digits of the number  95   is   =   14

Sum of squares from 0  to  95   =   290320

95   Displayed Vertically
9
5


Select from the following menu
1.  Enter a positive integer >  9.
9.  Terminate the program.    3

Invalid Option

Select from the following menu
1.  Enter a positive integer >  9.
9.  Terminate the program.    1


Enter a positive integer >  9.    -10


Invalid Number - Number must be > 9



Select from the following menu
1.  Enter a positive integer >  9.
9.  Terminate the program.    9


Husain Gholoom - Tweak Programming Director
April 2016
```

Style Guidelines:

At the beginning of your program (and **before** the #include statement), include the following :

Header comments (file documentation block) should be at the top of each file and should contain: Author / s, Due Date, Assignment Number, Course number and section, Instructor, and a brief description of the purpose of the code in the file. For example :

```
//      Roster Number / s  :        xxxxxxxxx
//
//      Author / s : (Your name  here!!)
//      Due Date  :
//      Programming Assignment Number  6
//
//      Spring  2016  -  CS 3358  -  Your Section  Number
//
//      Instructor:   Husain Gholoom.
//
//       <Brief description of the  purpose of the program>
```

Variable names :

- Must be meaningful.
- The initial letter should be lowercase, following words should be capitalized, no other caps or punctuation (i.e. weightInPounds).
- Each variable must be declared on a separate line with a descriptive comment.

Named constants :

- Use for most numeric literals.
- All capitals with underscores (i.e. TX_STATE_SALES_TAX)
- Should occur at top of function, or global (only if necessary)

Line length of source code should be no longer than 80 characters (no wrapping of lines).

Indentation :

- Use 2-4 spaces (but be consistent throughout your program).
- Indent blocks, within blocks, etc.
- Use blank lines to separate sections.

Comments for variables :

All variable definitions should be commented as follows:

```
int  gender;    // integer value for the gender,
                        // 1 = Male , 2 = Female ,
```

Rules : In order to get a full mark :

1. Your program **must compile** and run.
2. Your program must be **documented according the style above . See the website for the sample programming style program.**
3. Must **use functions (prototypes and definitions) with recursive calls .**
4. You must use the appropriate libraries in writing this program.
5. Must properly format the output as it is shown on the sample run above. Replace my name with your name
6. You must name your program as :

    - **LastName_FirstName_PG6.cpp**

    Where LastName is your Last Name and FirstName is your First Name. For example , the file name should look something like : Gholoom_Husain_PG6.cpp (not .cbp)

7. Everyone must upload the electronic version of the program no later than the starting of class time on the due date. **No late assignments will be accepted. DO NOT** send your assignment solution via email. **Group members must upload identical copy of the assignment.**

    To upload your program , go to the CS department's website, click on resources , then select homework upload.

8. You must **also** turn in hard copy of your source code no later than the starting of class time on the due date . should the hard copy consist of more than one page , then , the hard copy must be **stapled**. if you are unable to turn in a printout during class, you can take the program to the computer science department and hand it to the front desk personal (Comal 211) before the deadline. Make sure that the front office stamps the program. Make sure that include the date and time. Finally ,make sure that they place the program in my mailbox. **Only one copy per group.**

    DO NOT slide your program under my office door – It will **NOT** be accepted

9. **Violating any item from the above rules will result in Grade ZERO for the entire assignment.**

    NO EXCEPTIONS.