CS19003 Programming and Data Structures
Assignment 6

General instruction to be followed strictly

1. Do not use any global variable unless you are explicitly instructed so.

2. Use proper indentation in your code and comment.

3. Name your file as `<roll_no>_<assignment_no>`. For example, if your roll number is 14CS10001 and you are submitting assignment 3, then name your file as `14CS10001_3.c` or `14CS10001_3.cpp` as applicable.

4. Write your name, roll number, and assignment number at the beginning of your program.

5. Make your program as efficient as possible.

Part-I

Submit one (single) C program.

Definitions

1. A positive integer is called a PDS number if the number is equal to the sum of the factorial of its digits. For example, 1 (1 = 1!), 2 (2 = 2!), 145 (145 = 1! + 4! + 5!) are PDS numbers.

2. A positive integer is called a LAB number if the number is equal to the sum of its divisor except itself. For example, 6 (6 = 1 + 2 + 3), 28 = (1 + 2 + 4 + 7 + 14) are LAB numbers.

3. An n-bow pattern is a pattern of height $2n - 1$, where the first row has n stars, second row has $n-1$ stars, etc., $n-1^{\text{th}}$ row has 2 stars, n^{th} row has 1 star, $n+1^{\text{th}}$ row has 2 stars, etc., and $2n-1^{\text{th}}$ row has n stars.
   * * *
   **
   *
   **
   * * *
   The above pattern is a 3-bow pattern.

 Write a C program to perform the following tasks.

1. Take as input an integer n.

2. Write a recursive function the determines if an input integer m is a PDS number or not.

3. Write a recursive function to determine if an input integer m is a LAB number or not.

4. Write a recursive function to print all PDS numbers from 1 to n.

5. Write a recursive function to print all LAB numbers from 1 to n.

6. Write a recursive function such that if the number n is both a PDS number and a LAB number then an n-bow pattern is printed.

You may need to use math library function: #include $<$ math.h $>$

If you want to compile useing the terminal then use the command

gcc ./program.c -lm

Proper commenting, indentation and output commands carry marks.

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