**Programming Fundamentals**

**Assignment # 2: LOOPS**

**NOTE:**

* **Keep input validation in mind. Don’t allow input less than 0 and less than or greater than required limit to be the input.**
* **Don’t use built-in functions unless specified in the task**
* **Don’t cheat from internet and don’t share code with your fellows**
* **Try to solve the task by yourself without trying to copy from internet.**
* **Enjoy ☺**

**Task 1:**

Write a program inputs a number ‘N’ from user and then calculates the sum first ‘N’ terms of the following series.

Series: 1, 2, 4, 7, 11, 16, 22 …..

**Sample Run**:

Enter a Number: 5

Sum is: 25

**Task 2:**

Strong numbers are the numbers whose sum of factorial of digits is equal to the original number. **Example: 145** is a strong number because **1! + 4! + 5! = 145**. Your task is to write a program that checks whether a given number is a strong number or not.

**Task 3:**

Take input **‘N’** from the user, and display the pattern shown in example.

Example:

|  |  |
| --- | --- |
| Input a number: | Input a number: |
| 4 | 15 |
| A G L P  A G L  A G  A | A G L P S U V B G K N P Q W B  A G L P S U V B G K N P Q W  A G L P S U V B G K N P Q  A G L P S U V B G K N P  A G L P S U V B G K N  A G L P S U V B G K  A G L P S U V B  A G L P S U V  A G L P S U  A G L P S  A G L P  A G L  A G  A |

Hint: Max gap between characters is of 5. e.g. A-5-G-4-L…..

**Task 4:**

Write a program which takes input of a number, and then display the equivalent binary number of it.

For Example: If entered number is **11** then the answer will be **1101**.

Also check if the number is sparse, if it is not then show the next sparse number.

Note: A number is Sparse if there are no two adjacent 1's in its binary representation.

For example **5(binary representation 101) is sparse**, but **6 (binary representation 110) is not sparse**.

**Task 5:**

Take integer input from user and check whether the input is palindrome or not.

A Palindrome number is a number whose reverse is same as original number.

**Sample Run**:

Enter a Number: 123478

Number is not Palindrome.

Enter a Number: 78687

Number is Palindrome.

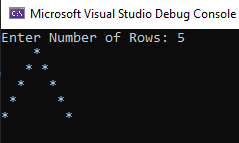
**Task 6:**

Take number of rows from the user and print pattern triangle as shown:

**Sample:**

Input number of rows: 5

Output:



**Task 7:**

Write a program to find power of a number. Take base and exponent as input.

**Sample:**

Input the base: 2  
Input the exponent: 5

Result: 32

**Task 8:**

Write a program to produce a square matrix with 0's down the main diagonal, 1's in the entries just above and below the main diagonal, 2's above and below that, etc.

**Sample Output:**

Input number or rows: 8

0 1 2 3 4 5 6 7

1 0 1 2 3 4 5 6

2 1 0 1 2 3 4 5

3 2 1 0 1 2 3 4

4 3 2 1 0 1 2 3

5 4 3 2 1 0 1 2

6 5 4 3 2 1 0 1

7 6 5 4 3 2 1 0

**Task 9:**

Write a program to print following pattern:

1\*3\*5\*7\*9

1\*3\*5\*7

1\*3\*5

1\*3

1

**Task 10:**

Write code to create a checkerboard pattern with the words "black" and "white".

**Sample Output:**  
Input number of rows: 5  
black-white-black-white-black  
white-black-white-black-white  
black-white-black-white-black  
white-black-white-black-white  
black-white-black-white-black

**BONUS TASK:**

**Task 11:**

Print your name ☺. Use setw(); or any required function to produce your output.

**Sample:**

Muhammad

Nadeem

Majeed