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## Warm up Exercises on Loop structure

1. Write a program to display the first 10 natural numbers.

Expected Output :  
1 2 3 4 5 6 7 8 9 10

2. Write a program to find the sum of first 10 natural numbers.

Expected Output :  
The first 10 natural number is :  
1 2 3 4 5 6 7 8 9 10  
The Sum is : 55

3. Write a program to display n terms of natural number and their sum.

Test Data : 7

Expected Output :  
The first 7 natural number is : 1 2 3 4 5 6 7  
The Sum of Natural Number up to 7 terms : 28

4. Write a program to read 10 numbers from keyboard and find their sum and average.

Test Data :  
Input the 10 numbers:  
Number-1: 2  
Number -10 : 2

Expected Output :  
The sum of 10 no is : 55  
The average is : 5.500000

5. Write a program to display the cube of the number upto the given integer.

Test Data :  
Input number of terms : 5

Expected Output :  
Number is : 1 and the cube of the 1 is : 1  
Number is : 2 and the cube of the 2 is : 8  
Number is : 3 and the cube of the 3 is : 27  
Number is : 4 and the cube of the 4 is : 64  
Number is : 5 and the cube of the 5 is : 125

6. Write a program to display the multiplication table of a given integer.

Test Data :  
Input the number : 15

Expected Output :  
15 X 1 = 15  
15 X 10 = 150

7. Write a program to display the multiplication table vertically from 1 to n.

Test Data :  
Input upto the table number starting from 1 : 8  
Expected Output :  
Multiplication table from 1 to 8  
1x1 = 1, 2x1 = 2, 3x1 = 3, 4x1 = 4, 5x1 = 5, 6x1 = 6, 7x1 = 7, 8x1 = 8

..  
1x10 = 10, 2x10 = 20, 3x10 = 30, 4x10 = 40, 5x10 = 50, 6x10 = 60, 7x10 = 70, 8x10 = 80

8. Write a program to display the n terms of odd natural number and their sum.

Test Data :  
Input number of terms : 10

Expected Output :  
The odd numbers are :1 3 5 7 9 11 13 15 17 19  
The Sum of odd Natural Number upto 10 terms : 100

9. Write a program to display the pattern like right angle triangle using an asterisk.

The pattern like :

```
*  
**  
***  
****
```

10. Write a program to display the pattern like right angle triangle with a number.

The pattern like :

```
1
12
123
1234
```

11. Write a program to make such a pattern like right angle triangle with a number which will repeat a number in a row.

The pattern like :

```
1
22
333
4444
```

12. Write a program to make such a pattern like right angle triangle with number increased by 1.

The pattern like :

```
1
2 3
4 5 6
7 8 9 10
```

13. Write a program to make such a pattern like a pyramid with numbers increased by 1.

```
1
2 3
4 5 6
7 8 9 10
```

14. Write a program to make such a pattern like a pyramid with an asterisk.

\*

```
* *  
* * *  
* * * *
```

15. Write a C program to calculate the factorial of a given number.

Test Data : Input the number : 5

Expected Output :  
The Factorial of 5 is: 120

16. Write a program to display the n terms of even natural number and their sum.

Test Data : Input number of terms : 5

Expected Output :  
The even numbers are :2 4 6 8 10  
The Sum of even Natural Number upto 5 terms : 30

17. Write a program to make such a pattern like a pyramid with a number which will repeat the number in the same row.

```
1  
2 2  
3 3 3  
4 4 4 4
```

18. Write a program to find the sum of the series [  $1 - X^2/2! + X^4/4! - \dots$  ].

Test Data : Input the Value of x :2  
Input the number of terms : 5

Expected Output :  
the sum = -0.415873  
Number of terms = 5  
value of x = 2.000000

19. Write a program to display the n terms of harmonic series and their sum.  $1 + 1/2 + 1/3 + 1/4 + 1/5 \dots 1/n$  terms

Test Data : Input the number of terms : 5

Expected Output :  
 $1/1 + 1/2 + 1/3 + 1/4 + 1/5 +$   
Sum of Series upto 5 terms : 2.283334

20. Write a program to display the pattern like a pyramid using asterisk and each row contain an odd number of asterisks.

```
  *
 ***
*****
```

21. Write a program to display the sum of the series [ 9 + 99 + 999 + 9999 ...].

Test Data : Input the number or terms :5

Expected Output :  
9 99 999 9999 99999  
The sum of the saries = 111105

22. Write a program to print the Floyd's Triangle.

```
 1
 01
 101
 0101
 10101
```

23. Write a program to read user input using "getchar()". "getchar()" returns the ascii code of what you type in. So, if you type in '5', you are really getting a numeric value of 53. Now, you will write a program to read from user and convert it to numeric value, and print that value out using:

```
int num;
.. your code ...
printf("You have entered: %d\n", number);
```

Test Data : Input the number : 2500

Expected Output : 2500

24. Just like previous question, but you will enter a number with decimal places:

```
float num;
.. your code ...
printf("You have entered: %f\n", number);
```

Test Data : Input the number : 25.12

Expected Output : 25.12

25. Write a program to find the sum of the series [  $x - x^3 + x^5 + \dots$  ].

Test Data : Input the value of x :2  
Input number of terms : 5

Expected Output :  
The values of the series:  
2  
-8  
32  
-128  
512  
The sum = 410

26. Write a program to display the n terms of square natural number and their sum. 1 4 9 16 ... n Terms

Test Data : Input the number of terms : 5

Expected Output :  
The square natural upto 5 terms are :1 4 9 16 25  
The Sum of Square Natural Number upto 5 terms = 55

27. Write a program to find the sum of the series 1 +11 + 111 + 1111 + .. n terms.

Test Data : Input the number of terms : 5

Expected Output :  
1 + 11 + 111 + 1111 + 11111  
The Sum is : 12345

28. Write a program to check whether a given number is a perfect number or not.

----- example 1

Input the number : 28  
Expected Output :  
The positive divisor : 1 2 4 7 14  
The sum of the divisor is : 28  
So, the number is not perfect.

( Since  $1 + 2 + 4 + 7 + 14 = 28$ , number 28 is a perfect number.)

----- example 2

Input the number : 56  
Expected Output :  
The positive divisor : 1 2 4 7 8 14 28  
The sum of the divisor is : 64  
So, the number is not perfect.

Since  $1 + 2 + 4 + 7 + 8 + 14 + 28 \neq 56$ , number 56 is not a perfect number.

29. Write a c program to find the perfect numbers within a given number of range.

Test Data : Input the starting range or number : 1  
Input the ending range of number : 50

Expected Output :  
The Perfect numbers within the given range : 6 28

30. An Armstrong number of three digits is an integer such that the sum of the cubes of its digits is equal to the number itself. For example, 153 is an Armstrong number since  $1^{**3} + 5^{**3} + 3^{**3} = 153$ .

Write a C program to find the Armstrong number for a given range of number.

Test Data : Input starting number of range: 1  
Input ending number of range : 1000

Expected Output :  
Armstrong numbers in given range are: 1 153 370 371 407

31. Write a program to display the pattern like a diamond.

```
  *
 ***
*****
*****
*****
*****
*****
***
  *
```

32. Write a C program to display Pascal's triangle.

Test Data : Input number of rows: 5

```
  1
 1 1
1 2 1
1 3 3 1
1 4 6 4 1
```

33. Write a program to display the first n terms of Fibonacci series.

Fibonacci series 0 1 2 3 5 8 13 .....

Test Data : Input number of terms to display : 10

Expected Output :  
Here is the Fibonacci series up to 10 terms :  
0 1 1 2 3 5 8 13 21 34



34. Write a program to display the such a pattern for n number of rows using a number which will start with the number 1 and the first and a last number of each row will be 1.

```
    1
   121
  12321
```

35. Write a program to display the number in reverse order.

Test Data : Input a number: 12345

Expected Output :  
The number in reverse order is : 54321

36. Write a program to check whether a number is a palindrome or not.

Test Data : Input a number: 121

Expected Output :  
121 is a palindrome number.

37. Write a program to find the number and sum of all integer between 100 and 200 which are divisible by 9.

Expected Output :  
Numbers between 100 and 200, divisible by 9 :  
108 117 126 135 144 153 162 171 180 189 198  
The sum : 1683

38. Write a C Program to display the pattern like pyramid using the alphabet.

```
    A
   A B A
  A B C B A
 A B C D C B A
```

39. Write a program to convert a decimal number into binary without using an array.

Test Data : Enter a number to convert : 25

Expected Output :  
The Binary of 25 is 11001.

40. Write a program to convert a binary number into a decimal (based-10) number without using array, function and while loop.

Test Data : Input a binary number :1010101

Expected Output :  
The Binary Number : 1010101  
The equivalent Decimal Number : 85

41. Write a C program to find GCF (Greatest Common Factor) of two numbers using Euclid Algorithm. (You can look it the Euclid algorithm in chapter 7).

Test Data :  
Input 1st number for GCF: 24  
Input 2nd number for GCF: 28  
Expected Output :  
GCD(24 , 28) = 4

42. Write a program to find LCM of any two numbers using HCF.

Test Data :  
Input 1st number for LCM: 15  
Input 2nd number for LCM: 20

Expected Output :  
The LCM of 15 and 20 is : 60

43. Write a program to find LCM of any two numbers.

Test Data :  
Input 1st number for LCM: 15  
Input 2nd number for LCM: 20

Expected Output :

The LCM of 15 and 20 is : 60

44. Write a program to convert a binary number into a decimal number input (using getchar()).

Test Data : Input the binary number :1010100

Expected Output :

The Binary Number : 1010100

The equivalent Decimal Number is : 84

45. Strong number is such that the sum of factorial of its digits is the number itself. E.g. number 145 is strong because factorial of  $1! + 4! + 5! = 145$ . Write a program to check whether a number is a Strong Number or not.

Your Test Data :

Input a number to check whether it is Strong number: 15

Expected Output :

15 is not a Strong number.

Your Test Data :

Input a number to check whether it is Strong number:

Expected Output :

15 is not a Strong number.

46. Write a c program to find out the sum of an Arithmetic Progression series.

Test Data :

Input the starting number of the A.P. series: 1

Input the number of items for the A.P. series: 10

Input the common difference of A.P. series: 4

Expected Output :

The Sum of the A.P. series are :

$1 + 5 + 9 + 13 + 17 + 21 + 25 + 29 + 33 + 37 = 190$

...

47. Write a program to convert a decimal number into octal without using an array.

Test Data : Enter a number to convert : 79

Expected Output :  
The Octal of 79 is 117.

48. Write a program to convert an octal number to a decimal without using an array.

Test Data : Input an octal number (using digit 0 - 7) :745

Expected Output :  
The Octal Number : 745  
The equivalent Decimal Number : 485

49. Write a c program to find out the sum of an Geometric Progression series.

Test Data :  
Input the first number of the G.P. series: 3  
Input the number or terms in the G.P. series: 5  
Input the common ratio of G.P. series: 2

Expected Output :  
The numbers for the G.P. series:  
3.00 6.00 12.00 24.00 48.00  
The Sum of the G.P. series : 93.00

50. Write a program to convert a binary number to octal.

Test Data : Input a binary number :1001

Expected Output :  
The Binary Number : 1001  
The equivalent Octal Number : 11

51. Write a program to convert an octal number into binary.

Test Data : Input an octal number (using digit 0 - 7) :57

Expected Output :  
The Octal Number : 57  
The equivalent Binary Number : 101111

52. Write a program to convert a decimal number to hexadecimal.

Test Data : Input any Decimal number: 79

Expected Output :

The equivalent Hexadecimal Number : 4F

53. Write a program to print a string in reverse order.

Test Data : Input a string to reverse : Welcome

Expected Output :

Reversed string is: emocleW

54. Write a C program to find the length of what you have entered.  
(without using the library function).

Test Data : Input a word: welcome

Expected Output :

The word contains 7 characters.

55.