ASSIGNMENT 3: REPETITION I (Loops)

A. While loop

Write a program to accept a character and a number, and print the character number times
 Input:

```
Character: *
Number: 6
Output:
*****
```

2. Write a program to print table of given number.

```
Input: 9
Output:

9 x 1 = 9
9 x 2 = 18
9 x 3 = 27
9 x 4 = 36
9 x 5 = 45
9 x 5 = 54
9 x 7 = 63
9 x 8 = 72
9 x 9 = 81
9 x 10 = 90
```

3. Write a program to accept a number and

a. Calculate sum of digits of integer

```
Input: 9362
Output: 9 + 3 + 6 + 2 = 20
```

b. Reverse the number

Input: 9362 Output: 2639

c. Check whether given number is numeric palindrome or not

```
Input: 9362
```

Output: 9362 is not a numeric palindrome

Input: 36963

Output: 36963 is a numeric palindrome

d. Check whether it is Armstrong no. (when sum of cube of all digits of equals the number then the number is called as Armstrong number)

```
Example: 153
(1 * 1 * 1)+(5 * 5 * 5)+(3 * 3 * 3) = 1 + 125 + 27 = 153
Input: 936
Output: 936 is not an Armstrong number
Input: 153
Output: 153 is an Armstrong number
```

4. Write a program to find factorial of given number.

```
Input: 5
Output: 1 * 2 * 3 * 4 * 5 = 120
```

5. Write a program to find factorial of given number.

```
Input: 5
Output: 5 * 4 * 3 * 2 * 1 = 120
```

6. Write a program to accept a number and print all factors excluding the number

```
Input: 24
Output: all factors: 1, 2, 3, 4, 6, 8, 12
```

7. Write a program to accept a number and print unique pairs of numbers such that multiplication of the pair is given number

```
Input: 24
Output:

1 * 24 = 24
2 * 12 = 24
3 * 8 = 24
4 * 6 = 24
```

8. Write a program to accept a number and print its prime factors.

```
Input: 180
Output: 180 = 2 * 2 * 3 * 3 * 5
```

9. Write a program to accept two numbers and find its GCD (greatest common divisor) using Euclidean algorithm. The following example explains the algorithm. GCD of 123 and 36 is 3

```
123 % 36 = 15
36 % 15 = 6
15 % 6 = 3
6 % 3 = 0
GCD = 3

Input:
no1: 123
no2:36

Output:
123 % 36 = 15
36 % 15 = 6
15 % 6 = 3
GCD of 123 and 36 is 3
```

- B. For loop
- 10. Write a program to print table of given number.
- 11. Write a program to find factorial of given number.
- 12. Write a program to accept integer values of base and index and calculate power of base to index.

```
Input: base: 2 index: 5
Output: 32
Input: base: 8 index: 3
Output: 512
```

13. Write a program to display n terms of Fibonacci series

```
Input: 6
Output: 1, 1, 2, 3, 5, 8
```

- 14. Write a program to accept a number and check whether it is Prime no.
- C. Do while loop
- 15. Modify the menu driven program for four function calculator. Add a menu item to choose option exit. The program continues till user chooses option exit.
- 16. Write a program to develop a very simple version of the "guess the magic number" game. The program generates a random magic number between 1 and 1000. Ask user to guess the number. If guess is correct then print message "congrats! You won." if the guess is less than magic number print the message ** left ** otherwise print the message ** right **. Repeat the procedure till player give accurate guess. Give maximum 10 chances to user.

 Note: generates the magic number using the standard random number generator rand(), which returns an arbitrary number between 0 and RAND_MAX (which defines an integer value that is 32,767 or larger). The rand() function requires the header <stdlib.h>.

ASSIGNMENT 3: REPETITION II (Nested Loops)

17. Print following pattern

- 18. Write a program to print the tables of the numbers from 1 to 10.
- 19. Modify above program (18) to accept a range i.e. two numbers and print tables of numbers within the range.

```
Input: 3 6
Output:
3 4 5 6
6 8 10 12
9 12 15 18
12 16 20 24
15 20 25 30
18 24 30 36
21 28 35 41
24 32 40 48
27 36 45 54
30 40 50 60
```

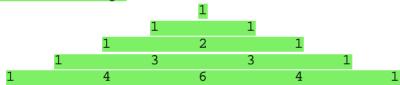
- 20. Write a program to display
 - a. Prime numbers between 1 to 100
 - b. Armstrong Numbers between 1 to 500
- 21. Write a program to display First 5 prime numbers after a given number.

```
Input: 7
Output: 11 13 17 19 23
```

22. Print following patterns

a. Frint following patterns	
* * *	* * * * *
* * *	* * *
* * * *	* *
* * * * *	*
1	5
1 2	5 4
1 2 3	5 4 3
1 2 3 4	5 4 3 2
1 2 3 4 5	5 4 3 2 1
	G
	EFGFE
	CDEFGFEDC
	ABCDEFGFEDCBA
	CDEFGFEDC
	EFGFE
	G
A	A B C D
ВС	B C D
D E F	C D
G H I J	D
	l 🚾

23. Print Pascal Triangle



Each term in Pascal triangle is binomial coefficient.

$$\frac{n!}{r! \times (n-r)!}$$

 $\frac{r! \times (n-r)!}{\text{Where n is row number and r is column number.}}$