

ASSIGNMENT 3: REPETITION I (Loops)

A. While loop

1. 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

- Prime numbers between 1 to 100
- 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

<pre> * * * * * * * * * * * * * * *</pre>	<pre> * * * * * * * * * * * * * * *</pre>
<pre> 1 1 2 1 2 3 1 2 3 4 1 2 3 4 5</pre>	<pre> 5 5 4 5 4 3 5 4 3 2 5 4 3 2 1</pre>
<pre> G E F G F E C D E F G F E D C A B C D E F G F E D C B A C D E F G F E D C E F G F E G</pre>	
<pre> A B C D E F G H I J</pre>	<pre> A B C D B C D C D D</pre>

23. Print Pascal Triangle

```

      1
    1 1
  1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1
1 7 21 35 35 21 7 1
1 8 28 56 70 56 28 8 1
1 9 36 84 126 126 84 36 9 1
1 10 45 120 210 252 210 120 45 10 1
```

Each term in Pascal triangle is binomial coefficient.

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

Where n is row number and r is column number.