Function Related Problems

(Total 27 questions)

<table>
<tr><th>SL</th><th>Problem statement</th><th>Difficulty levels</th></tr>
<tr><td>1.</td><td>Function to print a custom message.

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td></td><td>This is a function</td></tr></table></td><td>*</td></tr>
<tr><td>2.</td><td>Function to print an input character value.

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>3</td><td>Value received from main: 3</td></tr><tr><td>A</td><td>Value received from main: A</td></tr></table></td><td>*</td></tr>
<tr><td>3.</td><td>Function to determine if a number is even or odd.

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>3</td><td>odd</td></tr><tr><td>8</td><td>even</td></tr></table></td><td>*</td></tr>
<tr><td>4.</td><td>Function to determine if a number is positive, negative or zero.

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>3</td><td>positive</td></tr><tr><td>-5</td><td>negative</td></tr><tr><td>0</td><td>zero</td></tr></table></td><td>*</td></tr>
<tr><td>5.</td><td>Function that takes two numbers as input and determines if the first number is greater than, equal to or less than the second number.

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>5 4</td><td>5 is greater than 4</td></tr><tr><td>2 6</td><td>2 is less than 6</td></tr><tr><td>8 8</td><td>8 is equal to 8</td></tr></table></td><td>*</td></tr>
</table>

6. Function to calculate the sum of **n** numbers coming from the console. *

Sample input	**Sample output**
80 33 27	Sum In Function: 140 Sum In Main: 140
100 -100	Sum In Function: 0 Sum In Main: 0

7. Function to calculate the sum of **n** numbers coming from the console and stored in an array. *

Sample input	**Sample output**
3 80 33 27	Sum In Function: 140 Sum In Main: 140
2 100 -100	Sum In Function: 0 Sum In Main: 0

8. Function that takes an array of n integer numbers as input and prints them in reverse order. *

Sample input	**Sample output**
3 4 8 2	2 8 4
7 5 12 34 8 43 21 9	9 21 43 8 34 12 5

9. Function to calculate the factorial of a number. *

Sample input	**Sample output**
3	6
5	120

10. Function to take two positive numbers x and y as input and calculate x to the power y. *

Sample input	**Sample output**
3 4	3 to the power 4 is 81
10 3	10 to the power 3 is 1000

11. Function to take a string as input and find its length. *

Sample input	Sample output
hello world	11
I love my country	17

12. Function to swap two numbers.
(**Restriction:** Pass by value) *

Sample input	Sample output
10 20	Value in func: 20 10 Value in main: 10 20

13. Function to swap two numbers.
(**Restriction:** Pass by reference) **

Sample input	Sample output
10 20	Value in func: 20 10 Value in main: 20 10

14. Function to determine only even numbers in an array of input integers. *

Sample input	Sample output
24 77 117 -512 1024	24 -512 1024
45 33 0 256	0 256

15. Function that finds and returns the minimum value in an array. **

Sample input	Sample output
157 -28 -37 26 10	Minimum Value: -37
12 45 1 10 5 3 22	Minimum Value: 1

16. Function that multiplies the array elements by 2 and returns the array. *

Sample input	Sample output
157 -28 -37 26 10	314 -56 -74 52 20
12 45 1 10 5 3 22	24 90 2 20 10 6 44

17. Function to sort and return an input array in ascending order. **

Sample input	Sample output
10 22 -5 117 0	-5 0 10 22 117

18. Function **"IsPrime()"** to determine whether a number is prime or not. **

Sample input	*Sample output*
1	Not prime
2	Prime
11	Prime
39	Not prime
101	Prime

19. Function **"GeneratePrime()"** to compute the prime numbers less than **N,** where **N** is an input integer. **GeneratePrime()** uses **IsPrime()** to check whether a number is prime or not. ***

Sample input	Sample output
5	Prime less than 5: 2, 3
10	Prime less than 10: 2, 3, 5, 7
40	Prime less than 17: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37

20. Function **"GenNthPrime()"** to compute the **N^{th}** prime number**,** where **N** is an integer input. ***

Sample input	Sample output
5	5th Prime: 11
10	10th Prime: 29
40	40th Prime: 173

21. Implement the following functions and calculate standard deviation of an array whose values come from the terminal- ***

TakeInput()

CalcMean(array, num_of_elem)

Calc_Std_deviation(array, num_of_elem)

Formula: $\sigma = \sqrt{\frac{\sum (x - M)^2}{N}}$

Sample input	**Sample output**
4 5 5 4 4 2 2 6	1.32
600 470 170 430 300	147.32

22. Function **find_substr( )** that takes two string arrays (**a, b**) as parameters, returns 1 if string **b** is found anywhere in string **a**, or returns –1 if no match is found. **

(Assuming, strlen(a)>strlen(b))

Sample input (a, b)	**Sample output**
madam adam	1
telescope less	0
101010 101	1

23. Function **find_substr( )** that takes two string arrays (**a, b**) as parameters, uses function **str_length()** to determine the lengths of the strings, and then looks for the smaller string anywhere in the bigger string. It returns 1 if the substring is found, or returns –1 if no match is found. ***

[Restriction: str_length() cannot uses built-in strlen() function]

Sample input (a, b)	**Sample output**
madam adam	1
telescope less	0
101010 101	1

24. Program that continuously takes two positive integers as inputs and uses two functions to find their GCD (greatest common divisor) and LCM (least common multiple). Both functions take parameters and returns desired values. **

[**Hint:** Use infinite loop to process inputs]

Sample input	***Sample output***
5 7	GCD: 1 LCM: 35
12 12	GCD: 12

	LCM: 12
12 32	GCD: 4 LCM: 96

25. Program that implements function to perform operations on a 3X5 matrix: ***

InputMatrix()
ShowMatrix()
ScalarMultiply()

Sample input	**Sample output**
7 16 55 13 12 12 10 52 0 7 -2 1 2 4 9 2	Original: 7 16 55 13 12 12 10 52 0 7 -2 1 2 4 9 Multiplied by 2: 14 32 110 26 24 24 20 104 0 14 -4 2 4 8 18
7 16 55 13 12 12 10 52 0 7 -2 1 2 4 9 -1	Original: 7 16 55 13 12 12 10 52 0 7 -2 1 2 4 9 Multiplied by -1: -14 -32 -110 -26 -24 -24 -20 -104 0 -14 4 -2 -4 -8 -18

26. Program that implements function to perform operations on a **MXN** matrix: ****

InputMatrix()
ShowMatrix()
ScalarMultiply()

Sample input	Sample output
2 2 7 16 12 10 2	Original: 7 16 12 10 Multiplied by 2: 14 32 24 20
3 5 7 16 55 13 12 12 10 52 0 7 -2 1 2 4 9 -1	Original: 7 16 55 13 12 12 10 52 0 7 -2 1 2 4 9 Multiplied by -1: -14 -32 -110 -26 -24 -24 -20 -104 0 -14 4 -2 -4 -8 -18

27. Program to convert a positive integer to another base using the following functions- ****

I. Get_Number_And_Base () : Takes number to be converted (N) and base value (B) from user. Base must be between 2 and 16.

II. Convert_Number () : Does the conversion

III. Show_Converted_Number() : Displays the converted value.

Sample input(N,B)	Sample output
100 8	144
512 16	200
512 0	Base not within proper range!