Function Related Problems
(Total 26 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>Write a function in C that takes a float x as the parameter and returns the value of 1/x2.

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>1.0</td><td>1.0</td></tr><tr><td>2.0</td><td>0.25</td></tr><tr><td>-3.5</td><td>0.081633</td></tr></table></td><td>*</td></tr>
<tr><td>4.</td><td>Write a function in C that takes two floats x and y as the parameters and returns the absolute value of their difference. You cannot use any library function.

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>3.3 7.4</td><td>4.1</td></tr><tr><td>4.0 1.5</td><td>2.5</td></tr></table></td><td>*</td></tr>
<tr><td>5.</td><td>Write the function greet that prints the message “Hello” n times.

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>3</td><td>Hello
Hello
Hello</td></tr><tr><td>1</td><td>Hello</td></tr></table></td><td>*</td></tr>
</table>

6. Write the function **greet** that prints the desired output. *

Sample input	**Sample output**
2 4	Hello 2 Hello 3 Hello 4
3 7	Hello 3 Hello 4 Hello 5 Hello 6 Hello 7

7. Write a function in C that takes the base and the height of a triangle as **two float parameters** and returns the **area of the triangle**. [Formula: Area = 0.5*base*height] *

Sample input	**Sample output**
2.0 5.0	5.0
4.25 4.0	8.5

8. 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

9. 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

<table>
<tr><td>10.</td><td>Function to swap two numbers.
(Restriction: Pass by value)

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>10 20</td><td>Value in func: 20 10
Value in main: 10 20</td></tr></table></td><td>*</td></tr>
<tr><td>11.</td><td>Function to swap two numbers.
(Restriction: Pass by reference)

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>10 20</td><td>Value in func: 20 10
Value in main: 20 10</td></tr></table></td><td>**</td></tr>
<tr><td>12.</td><td>Function to determine only even numbers in an array of input integers.

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>24 77 117 -512 1024</td><td>24 -512 1024</td></tr><tr><td>45 33 0 256</td><td>0 256</td></tr></table></td><td>*</td></tr>
<tr><td>13.</td><td>Function that finds and returns the minimum value in an array.

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>157 -28 -37 26 10</td><td>Minimum Value: -37</td></tr><tr><td>12 45 1 10 5 3 22</td><td>Minimum Value: 1</td></tr></table></td><td>**</td></tr>
<tr><td>14.</td><td>Function that multiplies the array elements by 2 and returns the array.

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>157 -28 -37 26 10</td><td>314 -56 -74 52 20</td></tr><tr><td>12 45 1 10 5 3 22</td><td>24 90 2 20 10 6 44</td></tr></table></td><td>*</td></tr>
<tr><td>15.</td><td>Function to sort and return an input array in ascending order.

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>10 22 -5 117 0</td><td>-5 0 10 22 117</td></tr></table></td><td>**</td></tr>
</table>

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

Sample argument	Sample return value	Sample output in main
1	0	Not prime
2	1	Prime
11	1	Prime
39	0	Not prime
101	1	Prime

17. You will be given exactly five positive integers. For each of the numbers, say N. you will print the smallest prime that is greater than N. **

Additional Constraints:
You have to write and use the following functions.

isPrime
parameter: an integer.
returns: 1 if the received integer is prime, 0 otherwise

nextPrime
parameter: an integer.
returns: the smallest prime that is greater than the received integer.
calls ***isPrime***

main
reads 5 integers with scanf
calls ***nextPrime***

Sample input	Sample output
1	2
2	3
3	5
8	11
21	23

18. 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

19. Function **"GenNthPrime()"** to compute the **Nth** prime number**,** where **N** is an integer input. ***

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

20. Program that 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. **

Sample input	**Sample output**
5 7	GCD: 1 LCM: 35
12 12	GCD: 12 LCM: 12
12 32	GCD: 4 LCM: 96

21. 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 0 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

22. 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 0 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

23. 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: -7 -16 -55 -13 -12 -12 -10 -52 0 -7 2 -1 -2 -4 -9

24. Program that implements function to perform operations on a 3X5 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: -7 -16 -55 -13 -12 -12 -10 -52 0 -7 2 -1 -2 -4 -9

25. 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)

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

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

26.	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** | **Sample output** 100 8 | 144 512 16 | 200 512 0 | Base not within proper range!	****