National University of Computer and Emerging Sciences

Lab Manual 12
Programming Fundamentals

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Section	E
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Problem1:

Write a recursive function, **vowels**, that returns the number of vowels in a string. Also, write a program to test your function.

Sample Output:
Enter String: I am a boy
Number of vowels: 3

Problem 2:

Write a recursive function that finds and returns the sum of the elements of an int array. Also, write a program to test your function.

Sample Output:
Enter 10 Array Elements: 1
2
3
4
5
6
7
8
9
10

Sum = 55

Problem 3:

A palindrome is a string that reads the same both forward and backward. For example, the string "madam" is a palindrome. Write a program that uses a recursive function to check whether a string is a palindrome. Your program must contain a value-returning recursive function that returns true if the string is a palindrome and false otherwise. Do not use any global variables; use the appropriate parameters.

Sample Output:

Enter String: abcba

Yes a palindrome

Problem 4:

(Greatest Common Divisor) Given two integers x and y, the following recursive definition determines the greatest common divisor of x and y, written gcd(x,y).

$$\gcd(x, y) = \begin{cases} x & \text{if } y = 0 \\ \gcd(y, x\%y) & \text{if } y \neq 0 \end{cases}$$

Note: In this definition, % is the mod operator.

Write a recursive function, **gcd,** that takes as parameters two integers and returns the greatest common divisor of the numbers. Also, write a program to test your function.

Sample Output:

Enter value of X: 15
Enter value of Y: 20

GCD = 5