PDS LAB – 6 (Section-5) Date: 6th March 2017;

Recursion & Pointers

Tutorial Problems

1. Write a C program to check whether the given pair of numbers are co-prime or not. (Hint: Pair of numbers are said to be co-prime if their GCD (Greatest Common Divisor) is equal to one.) Write a C function to compute GCD using recursive calls, and use the GCD function in the main program to check the co-prime property.
2. Write a C function (using recursive calls) to compute the sum of N natural numbers. Through main () function enter the value of N and print the sum by calling the above function.
3. Write a C function to find the sum of the elements of an array by passing the pointer of the array as argument and return the sum to a main () function. Using main () function enter the length of the array and call the above function and print the returned sum value in the main program.

Assignment Problems (For All Students)

1. Expression to evaluate binomial coefficient is as follows:

$$\binom{n}{r} = \begin{cases} 1, if\ r = 0 \\ 1, if\ n = r \\ \binom{n-1}{r} + \binom{n-1}{r-1}\ Otherwise \end{cases}$$

   Write a C function to compute binomial coefficient using recursive calls. Through main function evaluate $\binom{n}{r}$ by inputting the values of n and r through key board. Also analyse the number of calls to evaluate $\binom{n}{r}$ and repetitions.
2. Write a C function to recursively compute the sum of digits of a positive integer. Demonstrate its applicability through main () function.
3. Write a C function to compute x^n using recursive calls. Demonstrate its applicability through main () function.
4. Write a C function to determine cos(x) using the following expression $\left(1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \cdots\right)$. In this problem you are required to use recursive calls of cos function, factorial function and power function. Through main () function provide the value of x in 'degrees' and number of terms to be considered for computation. Demonstrate the C function by calling through main program.
5. Write a C function to sort the array using recursive calls. Using main () enter the size and elements of an array and print the array before and after sorting.