

**National University of Computer & Emerging Sciences**  
**Karachi Campus**  
**Data Structures (CS201)**  
**Programming Assignment #2**

***Instructions***

***Each Problem of 15 points***

**Due Date:** The assignment is due by 10<sup>th</sup> October 2008, 11:59 PM

**Submission:** The assignment has to be submitted via e-mail. You must submit the source code as well as the executable file. You should mail the assignment to cs201@nu.edu.pk, preferably from the institute mail account. With subject like: "Assignment # 2 – 07-0033"

**Sample Input and Output files:** The sample input and output files are available from Khi website in course section. Make sure that you have tested your programs against all the available input files and EXACT output file is produced.

**Problem # 1    Polynomial**

Someone suggested you to hold a polynomial in a linked list with a node structure that contains < Coefficient, Base, Exponent>. Your polynomial class can hold any polynomial in a single variable (base) and in non-decreasing order of exponents. The polynomials are read from file as described in input file. The addition operator+ must be overload to perform addition of two polynomials. Consider the given polynomial

$$1X^8+5X^6-2X^5+4X^4-2X^3+3X^0=0$$

```
Class termNode{} // to hold a term of polynomial
Class Polynomial {} //hold polynomial
//polynomial contains termNode Linked List,
//you can use linked list object
```

You are only required to produce the sum of two polynomials successfully and stored it into the same format in the output file.

## **Problem # 2 Permuterm**

General problems of generating all possible permutations are considered a combinatorial problem. Example of generating a permutation of <A,B,C> will produced the following six cases:

1. <A,B,C>
2. <A,C,B>
3. <B,A,C>
4. <B,C,A>
5. <C,A,B>
6. <C,B,A>

One of the simple methods of generating these permutations systematically is by utilizing a CircularSinglyLinkedList, just detached head and enumerates all valid permutations of the rest of the list. After this add the detached head at the last of the list. Doing this for all the list node would generate all the permutations. You are required to generate permutations of the objects, for example let three persons Abbot, Babot and Cobat are names entered through input file. Construct a Singly Circular Linked List of the names and by using the same method enumerate all the permutations of the names.

## **Problem # 3 Doubly-Linked words**

Most of the word processor like MS Words provides you editing facilities lines by line, this software's usually maintain a doubly linked list of all the words in a sentence, similarly a linked list of all the sentences to hold a paragraph, and a linked list of all the paragraphs to hold page. You are only required to read a valid sentence from the input file in a doubly linked list and produced the forward and backward navigations through next and previous pointers into the output file.

**<The End>**