ESC101 : Fundamental of Computing
Lab 11 for 7th November 2008

Note : The solution of the assignment has to be submitted by 5:00 PM on 7th November itself. No late submission is allowed. This is because there is lab test next week and this is the last lab assignment.

You have to design a program for *telephone directory.* You might combine many methods which we have discussed previously in the class to solve this problem. In particular, you might use binary search, generating permutations, reading from a file, and string comparisons.

1. **Creating file of names and telephone numbers** (marks = 3) First you have to create a file, say **directory** whose first line should contain the total number of persons whose telephone numbers will be there in the directory. From the next line onwards, there are names and telephone numbers such that telephone number of a person is mentioned on the line following his/her name. For simplicity, you may assume that all names will be of single word and all the numbers will be eight digit numbers. For example a sample file is the following :

   ```
   4
   Abhilash
   21234322
   Rajeshwari
   12332341
   Nagesh
   34212001
   Apratim
   99182940
   ```

   Here first line indicates that there will be four persons whose details will be in the telephone directory. `Abhilash` has phone number 21234322, `Rajeshwari` has phone number `12332341`, and so on. Your program has to employ permutation program to generate the names and may use random number generator for generating telephone numbers. There should be around 1000 to 5000 records (names and telephone numbers) in the file **directory**.

2. **Searching for telephone number for a name : sequential search** (Marks = 3)
   You have to write another program which builds telephone directory from file **directory** created as solution to problem 1 (given above). It should implement sequential search for searching phone number of a person. It should prompt the user with the message :
   Enter the name whose telephone number you wish to find or enter 'quit' to quit the program ?
   For the name entered, if there is a number in the directory, it should report that number on the terminal, else it should print the message :
   Sorry, there is no person with this name in the directory
   After this, the program should print the following message :
   Enter the name whose telephone number you wish to find or enter 'quit' to quit the program ?
   And so, on ...

3. **Searching for telephone number for a name : binary search** (Marks = 4)
   Same as the problem 2 given above, except that you have to use binary search for searching the telephone number for a name. Compare the two implementations, and make careful observations. Do you notice any difference in the time taken to answer a query by the two programs (one which uses sequential search and another which uses binary search) ?