ESC101 : Fundamental of Computing

Lab 11 for 4th November 2008

Note : The solution of the assignment has to be submitted by 5:00 PM on 4th November itself. No late submission is allowed. This is because there is lab test next week and this is the last lab asignment.

1. (Marks = 5)

   Design an interactive program of binary search. Build the set by first prompting the user to enter the size of the set. It should then create an array of type `int` of that size. It should then prompt the user to enter the numbers one by one. The program should store these numbers in the array, and finally sorts them. It should then ask the user to enter the number which he/she wants to search. It should print the message -

   ```
   Enter the number you wish to search :
   ```

   It should read the number and then execute Binary search for that number. It should then print appropriate message on console depending upon whether the number is present in the set. It should also inform about the number of comparisons made during the binary search. After this, it should print the message

   ```
   Do you want to continute ?  If yes, enter the number else press 'q'.
   ```

   If the resonse is `'q'`, the program should terminate else it should do a binary search for the the number entered, and continue ...

   Hint : You may consider the sample programs given on the course webpage for getting input from the console.

2. (Marks = 5)

   There are n boxes and m balls It is given that $m \geq n$. The boxes are placed in a straight line from left to right. All the balls are identical. We want to print all distinct distributions of m balls into n bins so that no bin is empty. We can display a particular distribution on the console using characters |'s and o's where | denotes the boundary between two bins, and o denotes a ball. For example, if the $n = 3, m = 5$, then there are distinct distributions:

   ```
   |oo|o|oo|
   |oo|oo|o|
   |o|oo|oo|
   |ooo|o|o|
   |o|ooo|o|
   |o|o|ooo|
   ```

   Write a program which prompts the user to enter the value of n and m flashing the message that m must be greater than or equal to n. If should then print all different distributions on the console.

   Hint : You should understand the problem of printing all strings with n bars and m stars discussed in the class, and then try to extend it suitably.