Top-20 Training Program
(Data Structures)
Assignment-2

1) Given a single linked list that consists of 'R' and 'B' values only, write an efficient function to find the maximum sequence length of any color. What are the time and space complexities of your solution?
Function prototype:
int FindMaxSeq(Node head)

Input: R B R B B R R R R B B B R
Output: 4

2) Write an efficient function which divides the list into two equal sublists and put the second sublist at front of first sublist in single pass only. If the number of elements is odd, extra element go into the first sublist. What is the space complexity of your solution?
Function Prototype:
void SplitList(Node head)

Input: 2 4 5 3 8 7 6 1 9
Output: 7 6 1 9 2 4 5 3 8

Input: 1 3 5 7 2 4 6 8
Output: 2 4 6 8 1 3 5 7

3) Given a linked list, where each node contains one more extra field called as random pointer (other than the normal "next" pointer) which could point to any other node or itself i.e., there could be loops. Write an efficient function to duplicate this linked list. What are the time and space complexities of your solution?
Function Prototype:
Node DuplicateList(Node head)

Assume the following declaration for a node:

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```
class Node
{
   int element;
   Node next;
   Node random;
}
```

4) Write an efficient function to sort elements of a single linked list. Assume that there might be external applications which points to some of the nodes of given linked list, so you are not allowed to just copy the elements of one node to other. What are the time and space complexities of your solution?
Function prototype:
  void SortList(Node head)