Computer Science & Engineering Department

IIT Kharagpur

CS19003 Programming and Data Structures Lab

Spring 2022 Section 7

Week 4 Assignments 2 May 2022

4A. Write a C program which does the following: [4+4=8 marks]

1. Declare an array A of integers of size 100.
2. Read an integer n $(n \leq 100)$
3. Populate the array A with n random integer numbers between -100 and 100
4. You need to find the position x to split the array so that the sum of elements on both sides $A[0..x]$ and $A[x+1..n-1]$ are as close as possible. Print the value of i and the sums of both the subarrays
5. Print one of the closet pair of elements in the array. The distance between a pair of elements $A[i]$ and $A[j]$ is the absolute value of $A[i] - A[j]$.

Ex1: If A=[5, 1, 12, 7, 9, 11, 34, 22, 15],
the following will be the output:

Array split position is 5
The sums of the left and right subarrays are 45 and 81
One closest pair is 5 and 7

Ex2: If A=[-5, 1, 12, -7, 9, 11, -24, 22, -15],
the following will be the output:

Array split position is 3
The sums of the left and right subarrays are 1 and 1
One closest pair is 9 and 11

```
#include <stdlib.h>
… … …
int A[100];
srand (time(0));
for (i=0; i<n; i++)  {
\\ Generate a random number between 0 and 100
      A[i] = rand()%101;
\\ Generate a random number between -100 and 100
      A[i] = (rand()%201)-100;
```

4B. Given two strings S and Q, you need to check if Q can be formed from the letters in the string S. [8 marks]

Write a C program which does the following:

1. Read a string S as given by the user on a single line (length of the string must be less than 100).
2. In a loop, do the following:
   a) Read a query string Q comprising of the characters $a..z$ only
   b) If Q is "end", quit the program, otherwise print whether Q can be formed from S.

Example: Suppose S is "the lanes and bylanes of kolkata"

Q="baall" - Q can be formed from S.
Q="balloon" - Q cannot be formed from S.
Q="bybykk" - Q cannot be formed from S.
Q="bookin" - Q cannot be formed from S.

```
#include <stdio.h>
#include <stdlib.h>
… … …
int S[100], Q[100];

scanf("%[^\n]s",S);
scanf ("%s", Q);
```

Alternately, to read S

```
char c;
i=0;
while ((c=getchar()) != '\n' && c != EOF)
     S[i++] = c;
S[i] = '\0';
```