**Question#1**

Write a function named "subtotal" takes as its arguments the following:

(1) an array of floating point values;

(2) an integer that tells the number of cells in the array.

The function should replace the contents of each cell with the sum of the contents of all the cells in the original

array from the left end to the cell in question. Thus, for example, if the array passed to the function looks like

this:

0 1 2 3 4

5.8 | 2.6 | 9.1 | 3.4 | 7.0

then when the function returns, the array will have been changed so that it looks like this:

0 1 2 3 4

5.8 | 8.4 | 17.5 | 20.9 | 27.9

because 5.8 + 2.6 = 8.4 and 5.8 + 2.6 + 9.1 = 17.5 and so on. Note that the contents of cell 0 are not

changed. The function should return the average of elements of original array.

**Question#2**

An array of numbers is called UNIMODAL if and only if it can be split into an increasing sequence followed by a decreasing sequence.

Following are examples of UNIMODEL arrays

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 2 | | 3 |  | 4 |  | 8 | 10 | 9 | | 6 | | 5 |  | 0 | |  |  | | |  |  |  | |  |  | |  | |  |  | | | 1 | 2 4 | | |  | 8 | 16 | | 32 | 64 | | 128 | | 256 | 512 | | |  |  | | |  |  |  | |  |  | |  | |  |  | | | 10 | 20 | | | 18 |  | 16 | | 15 | 14 | | 9 | |  | 5 | | |  |  | | |  |  |  | |  |  | |  | |  |  | | | 30 |  | 20 | | 18 |  | 16 | | 15 |  | 14 |  | 9 |  | 5 | |   The Largest value of the array is UNIMODEL value. |

whereas following arrays are NOT UNIMODEL

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 2 | 3 | 4 | 8 | 10 | 9 | 12 | 5 | 0 | | 1 | 2 | 4 | 8 | 16 | 32 | 64 | 128 | 100 | 256 | |

In this problem you are required to write a C++ program that

1. fills the entire array using numbers input from the user, size=10
2. decides if the array is UNIMODEL
3. if the array is UNIMODEL then show a message that ARRAY IS UNIMODEL and the values of array on console, one number on one line, with the mode of the array highlighted using \* else show a message that the ARRAY IS NOT UNIMODEL and the values of array on console.
4. do this taks in the function.

Sample Inputs/Outputs

|  |  |
| --- | --- |
| Inputs | Outputs |
| |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 2 | 3 | 4 | 8 | 10 | 9 | 6 | 5 | 0 | | ARRAY IS UNIMODEL  1  2  3  4  8  10\*  9  6  5  0 |
| |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 1 | 2 | 4 | 8 | 16 | 32 | 64 | 128 | 100 | 256 | | ARRAY IS NOT UNIMODEL  1  2  4  8  16  32  64  128  100  256 |

**Question#3**

Write C++ program that takes 10 integers from user and sort it using selection sort and then ask the user to enter a number and search the number from the sorted array using binary search. Marks will only be awarded if you have used selection sort and binary search in this taks.

void selectionSort(int data[], int size)

int binarySearch(int data[], int size) //returns index of data cell if found and -1 otherwise

You can concern your notes or reference material provided with the lab for selection sort and binary search techniques.