National University of Computer and Emerging Sciences

Mandatory Homework

for

Programming Fundamentals

Course Instructor	Ms. Tazeem Haider Ms. Anoosha Khan Mr. Usama Hassan
Lab Instructor(s)	Mr. Muhammad Adeel Mr. Junaid Hussain Ms. Aysha Ejaz
Section	
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Department of Computer Science

FAST-NU, Lahore, Pakistan

Objective:

This is mandatory homework and must be submitted on Sunday, this is a graded activity and there will be quizzes from it. If you do solve it before the exam, it will prepare you well.

- 1D integer array
- Character Array
- C strings
- Passing Array into the function

Problems

NOTE: Handle invalid conditions.

Question No 1. Write a C++ function to find and print all unique elements of a given 1 D array of integers.

Question No 2. Function to cyclically rotate an array by a given factor d

Input:

arr[] = {1, 2, 3, 4, 5, 6, 7}, d = 2

Output: *3 4 5 6 7 1 2*

Input: *arr[] = {3, 4, 5, 6, 7, 1, 2}, d=2*

Output: *5 6 7 1 2 3 4*

Question No 3:

Write c++ program function ReverseString() which takes string as user input and finds the reverse of that string word by word. Note: **Implement through 1D character arrays.**

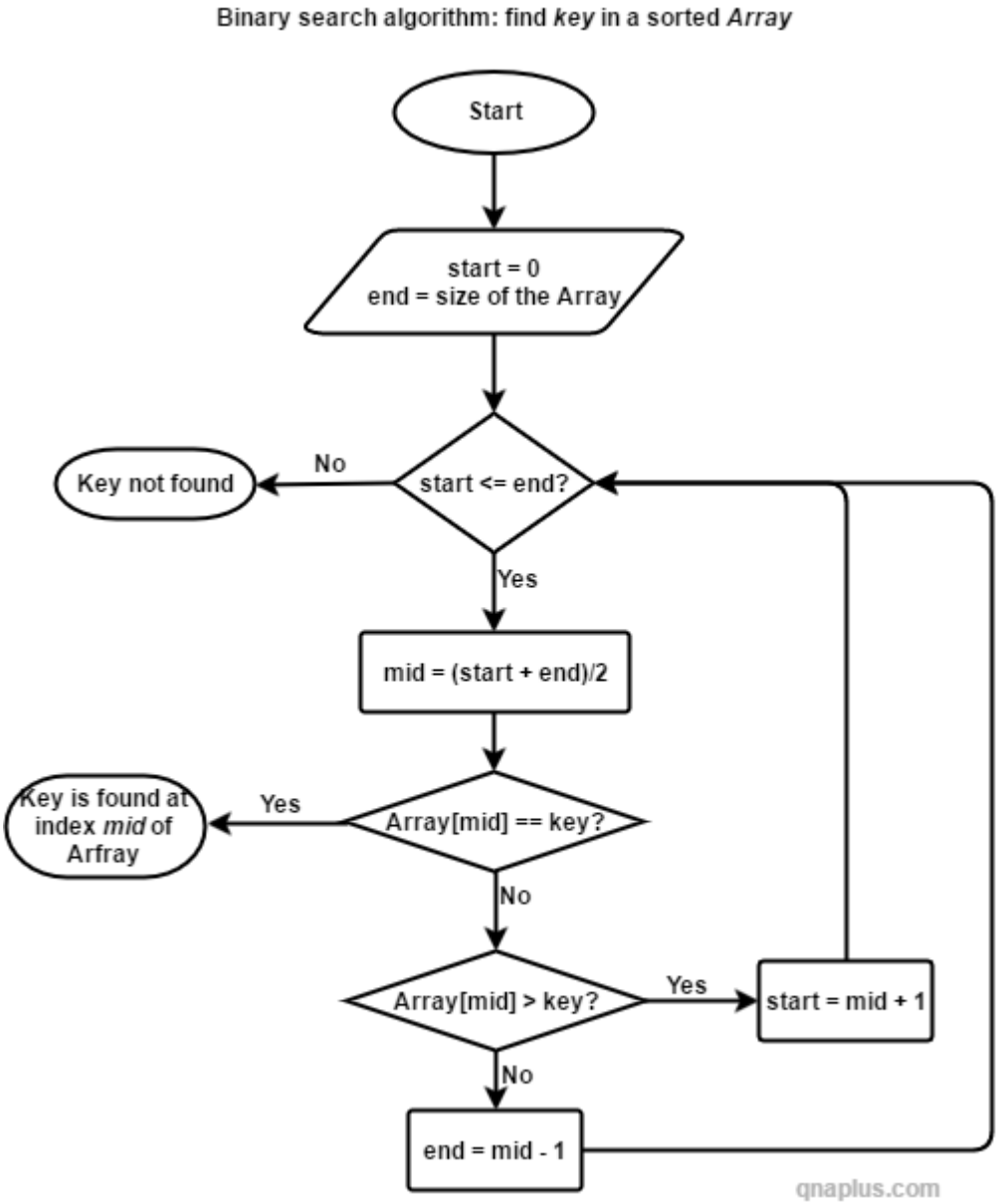
OUTPUT:

Enter the string: Fast University

tsaF ytisrevinU

Question No 4:

Write c++ program function which returns the index for a given key, implement only using binary search in the given flow chart.



Question No 5:

Write c++ program to implement bubble sort as per the given flow chart.

Input: *arr[] = {5, 1, 4, 2, 8}*

First Pass:

Bubble sort starts with the very first two elements, comparing them to check which one is greater.

- *(**5 1** 4 2 8) –> (**1 5** 4 2 8), Here, algorithm compares the first two elements, and swaps since 5 > 1.*
- *(1 **5 4** 2 8) –> (1 **4 5** 2 8), Swap since 5 > 4*
- *(1 4 **5 2** 8) –> (1 4 **2 5** 8), Swap since 5 > 2*
- *(1 4 2 **5 8**) –> (1 4 2 **5 8**), Now, since these elements are already in order (8 > 5), algorithm does not swap them.*

Second Pass:

Now, during the second iteration it should look like this:

- *(1 **4** 2 5 8) –> (1 **4** 2 5 8)*
- *(1 **4** **2** 5 8) –> (1 **2** **4** 5 8), Swap since 4 > 2*
- *(1 2 **4** **5** 8) –> (1 2 **4** **5** 8)*
- *(1 2 4 **5** **8**) –> (1 2 4 **5** **8**)*

Third Pass:

- *Now, the array is already sorted, but our algorithm does not know if it is completed.*
- *The algorithm needs one **whole** pass without **any** swap to know it is sorted.*
  - *(1 **2** 4 5 8) –> (**1** **2** 4 5 8)*
  - *(1 **2** **4** 5 8) –> (1 **2** **4** 5 8)*
  - *(1 2 **4** **5** 8) –> (1 2 **4** **5** 8)*
  - *(1 2 4 **5** **8**) –> (1 2 4 **5** **8**)*

		0	1	2	3	4	5	6	7
i = 0	j								
	0	5	3	1	9	8	2	4	7
	1	3	5	1	9	8	2	4	7
	2	3	1	5	9	8	2	4	7
	3	3	1	5	9	8	2	4	7
	4	3	1	5	8	9	2	4	7
	5	3	1	5	8	2	9	4	7
	6	3	1	5	8	2	4	9	7
i=1	0	3	1	5	8	2	4	7	9
	1	1	3	5	8	2	4	7	
	2	1	3	5	8	2	4	7	
	3	1	3	5	8	2	4	7	
	4	1	3	5	2	8	4	7	
	5	1	3	5	2	4	8	7	
i=2	0	1	3	5	2	4	7	8	
	1	1	3	5	2	4	7		
	2	1	3	5	2	4	7		
	3	1	3	2	5	4	7		
	4	1	3	2	4	5	7		
i=3	0	1	3	2	4	5	7		
	1	1	3	2	4	5			
	2	1	2	3	4	5			
	3	1	2	3	4	5			
i=4	0	1	2	3	4	5			
	1	1	2	3	4				
	2	1	2	3	4				
i=5	0	1	2	3	4				
	1	1	2	3					
i=6	0	1	2	3					
		1	2						

Question No 6:

Write a C++ function, which will take a static array as input, array size and a number as parameters. The function will loop through the array to find if that array contains the number. If found, the function will return that index number on which that number is found, otherwise return -1. The function prototype will be: int Search(int arr[], int size,int num). **Sample Output:**

```
Input array: 4 5 6 7 8 10 Number to be found: 10 The value 10 is present at index 5
```

Question No 7:

Write a C++ function which will take static array as input and then return true if the string is palindrome otherwise return false and also display the suitable message. The function prototype shall be:

bool PalindromeString (char arr[],int size) **Sample Output:**

```
Input array: 12344321 The input string 12344321 is a palindrome

Input array: 12345321 The input string 12345321 is not a palindrome

Input array: Afifa The input string Afifa is a palindrome

Input array: Atiqa The input string Atiqa is not a palindrome
```

Question No 8:

Write a C++ function, which will take a constant static array and an array size as parameters. The function should update the array which contains numbers equals to the sum of numbers from 1 to the number on each index on array which is passed as a parameter. The function prototype will be:
void binomSum(const int arr[],int size)

Sample Output:

```
Input array: 6 4 1 3 0 Output Array: 21 10 1 6 0
```

Note: Arrays in C++ are always passed as reference (even if you have not used a & sign) if you want to restrict them to be not changed, you have to use a const keyword. So, a constant array cannot be changed.

----------GOOD LUCK----------