

Question 1:

Write a C++ program that reads from the user array of numbers. Then reverse the values of the array. The output should be in main.

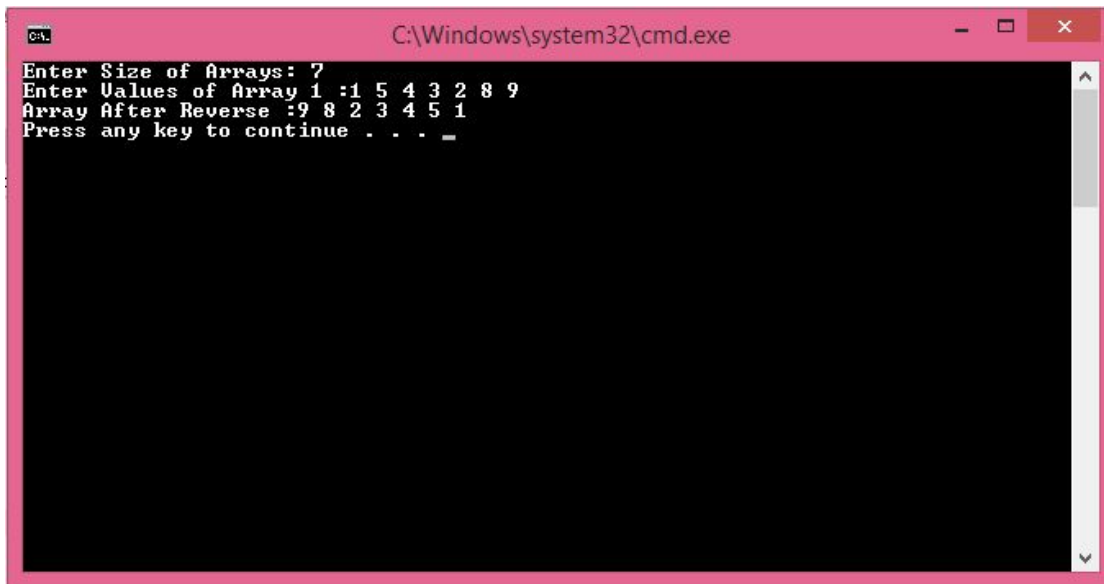
Hint: Use dynamic arrays, no Global variable.

Do not use any built-in functions, and the display MUST be in main

Use the following function:

```
void Reverse_Array (int * Arr , int Size)
```

Sample of Execution:



```
C:\Windows\system32\cmd.exe
Enter Size of Arrays: 7
Enter Values of Array 1 :1 5 4 3 2 8 9
Array After Reverse :9 8 2 3 4 5 1
Press any key to continue . . . _
```

Question 2:

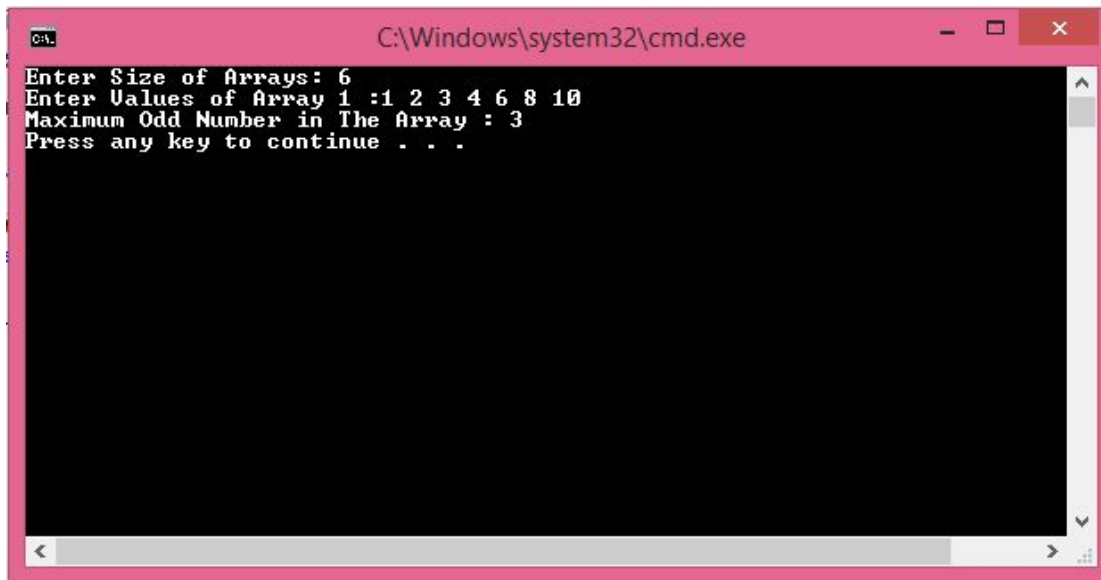
Write a C++ program that reads from the user array of positive numbers. Then display the maximum odd number found in the array. The output should be in main

Hint: Use dynamic arrays.

Use the following function:

```
int Max_Odd (int* Arr, int Size)
```

Sample of Execution:



```
C:\Windows\system32\cmd.exe
Enter Size of Arrays: 6
Enter Values of Array 1 :1 2 3 4 6 8 10
Maximum Odd Number in The Array : 3
Press any key to continue . . .
```

Question 3:

Write a C++ program to trim extra spaces from a string.

Your program should implement void Trimsapces(string Statement) function that takes a string as an input and process it to remove the extra spaces. Display the results in the main function.

Sample input:

Enter any string: There were some extra spaces here

Sample Output:

String after trimming: There were some extra spaces here

Hint: include <string> library.

Use length() function to return str actual length by writing str.length()

Also use getline(cin , string str) where str is the input string.

Question 4:

Write a program that asks the user to type n string and save them in dynamic array, and then ask him to input a keyword and search for it; the program should display all the word that equal to or contains the keyword.

By using the following functions

- Void input(string *arr, int size)
- Void SearchAll(string *arr, int size , string Keyword)

Note : Use pointer to make array , can use any build in function.

Hint: include <string> library.

Use Str.find(string sub) that search of sub in str and returns string::npos if not found and its position if found

Sample Run :

Enter the size : **6**

Enter the 6 strings :

Player

Introduction

Math

Employer

Employee

Finder

Enter the keyword to search for : **er**

All word that have er:

Player

Employer

Finder

Question 5:

Write a C++ program to read a dynamic matrix and check whether it is a sparse matrix or not.

A matrix is called sparse when the zeros count in it is greater than or equal half the number of the elements. The output should be in main. The program should continue to check matrix till the user chose to exit.

Use dynamic arrays Only, no global variables.

Hint: Please use the following function

Bool isSparse(int** arr,int row,int cols);

void input(int** arr,int row,int cols);

Sample Run:

Input matrix rows: 3

Input matrix columns: 3

Input the matrix :

1	0	3
0	0	4
6	0	0

It's a sparse Matrix.

Do you want to continue (y/n)? y

Input matrix rows: 2

Input matrix columns: 3

Input the matrix :

3	4	0
0	1	2

It's not a sparse Matrix

Do you want to continue (y/n)? n

Question 6:

Write a C++ code that should read a square matrix from the user and find the sum of its inverted diagonal. The output should be in main. The program should continue to check matrix till the user chose to exit.

Use dynamic arrays Only, no global variables.

use the following functions:

int Sumdiagonal(int** arr,int row,int cols);

void input(int** arr,int row,int cols);

Sample Run :

Enter the size: 3

Enter the matrix:

1	2	<u>3</u>
4	<u>5</u>	6
<u>7</u>	8	3

Sum of inverted diagonal elements = 15

Do you want to continue (y/n)? y

Enter the size: 4

Enter the matrix:

1	5	2	<u>7</u>
9	4	<u>6</u>	3
6	<u>10</u>	9	8
<u>2</u>	5	1	2

Sum of inverted diagonal elements = 25

Do you want to continue (y/n)? n

Question 7:

Write a function that checks whether all elements in a dynamic array are unique or not. The function will take the array and its size as input and return a boolean variable equals true if all elements are unique and false otherwise. The output should be in Main. The program should continue to check matrix till the user chose to exit.

Use dynamic arrays only, no global variables.

Sample run

```
Please enter array size: 5
Enter array elements: 3 4 6 1 2
All elements are unique.
Do you want to Continue (y/n): y
Please enter array size: 7
Enter array elements: 3 1 4 3 9 3 2
All elements are Not unique.
Do you want to Continue (y/n): n
```

Question 8:

Write a program that asks the user for the size and dynamic array of divisors then asks for the size and a dynamic array of values. The Program should check for each element in array of divisors, how many elements in array of values is divided by them and print them.

Use dynamic arrays only, no global variables.

Sample run

Enter the size of divisors list: **3**

Enter the divisors list: **2 3 5**

Enter size of values list: **6**

Enter the values list: **5 10 6 8 9 3**

The list 10 6 8 is divided by 2

The list 6 9 3 is divided by 3

The list 5 10 is divided by 5

Question 9: //Aya Rephrase in on struct

Write a program that takes from the user n lab array, each lab has an ID, max no of students , Lablength , Labwidth)) and then calculate for each lab the max no of students it can take where $\text{max no of students} = \text{Area of Lab} * 10/2$;

The program should take from user certain number of students and outputs labs that has number of students price larger than or equal this number.

The program uses the following function:

void calculateStudents (Lab *arr ,int n)

void findLabs(Lab *arr , int n, int studs)

Use structure Lab and dynamic Arrays and no global variables.

Sample Run :

Enter the number of Lab: 3

Enter the ID: 5

Enter the Lab length: 4

Enter the Lab width: 3

Enter the ID : 6

Enter the Lab length: 2

Enter the Lab width: 2

Enter the ID : 7

Enter the Lab length: 3

Enter the Lab width: 3

Enter the Number of students: 30

The Lab with students higher than or equal to the students:

Lab ID: 5 Max Students: 60

Lab ID: 7 Max Students: 45

Question 10:

Write a C++ program that represents a student as a structure. The student has name, id and address. The program should store the information of several students so you should take from the user the size of your dynamic array . Your program should display the students that have same address.

Use dynamic arrays only, no global variables.

Hint: include <string> library.

Use getline(cin , string str) where str is the input string.

Sample run

Enter the number of students:

3

Student #1:

Name: **ali**

Id: **12**

Address #: **86 mg road**

Student #2:

Name: **ahmed**

Id: **19**

Address #: **96 njl road**

Student #3:

Name: **islam**

Id: **39**

Address #: **86 mg road**

----- result-----

Ali and islam have the same address "86 mg road "