

Assignment # 2

Submission Date: 30th September 2022
Subject: CS4002- Applied Programming.

This part of assignment is from Arrays, strings. After submission a viva will be conducted. There will be some marks for using comments and clear style of coding.

1. Write C++ coding for each of the questions below

- a) Declare a 2-Dimensional array of integer numbers. The array consists of 4 rows and 5 columns. A diagram representation of the array is shown below and ask the user to input the numbers into the array


```
#include <iostream>
using namespace std;
```

```
int main()
{
    int a[4][5];
    for (int i = 0; i < 4; i++) {
        for (int j = 0; j < 5; j++)
        {
            cin>>a[i][j];
        }
    }

    for (int i = 0; i < 4; i++) {
        for (int j = 0; j < 5; j++)
        {
            cout<<a[i][j]<<"\t";
        }
        cout<<endl;
    }

    return 0;
}
```

- b) Find all those numbers which are divisible by 3 and 5 in each row. Display the result in the row wise format. You can suggest any numbers in the matrix.

34	56	15	33	30	??
60	35	67	23	54	??
67	42	75	76	90	??
56	78	14	79	30	??

```
#include <iostream>
using namespace std;
```

```
int main()
{
    int a[4][5];
    for (int i = 0; i < 4; i++) {
        for (int j = 0; j < 5; j++)
        {
            cin>>a[i][j];
        }
    }
    for (int i = 0; i < 4; i++) {
        for (int j = 0; j < 5; j++)
        {
            cout<<a[i][j]<<"\t";
        }
        cout<<endl;
    }

    return 0;
}
```

- c) Find out the sum of –ve numbers in each row and each column and also find out the largest number in –ve of each row and each column.

-34	56	20	33	-18	-52
89	35	67	-2	-54	-56
-44	42	56	-76	90	??
-56	78	-14	79	11	??
-100	??	??	??	??	

```

#include<iostream>
using namespace std;

int main()
{
    int i, j, rows, columns, sum;
    cout << "\nPlease Enter the Matrix
rows and Columns = ";
    cin >> i >> j;
    int sumRCArray[i][j];
    cout << "\nPlease Enter the Matrix
Items = ";
    for(rows = 0; rows < i; rows++)    {
        for(columns = 0; columns < i;
columns++)
        {
            cin >>
sumRCArray[rows][columns];
        }
    }
    for(rows = 0; rows < i; rows++)
    {
        sum = 0;
        for(columns = 0; columns < j;
columns++)
        {
            sum = sum +
sumRCArray[rows][columns];
        }
        cout << "\nThe Sum of Items in
" << rows + 1 << " Row of a Matrix = " <<
sum ;
    }

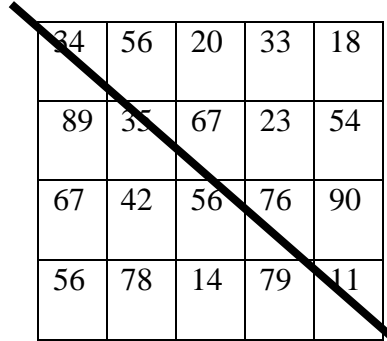
    for(rows = 0; rows < i; rows++)
    {
        sum = 0;
        for(columns = 0; columns < j;
columns++)
        {
            sum = sum +
sumRCArray[columns][rows];
        }
        cout << "\nThe Sum of Items
in Column of a Matrix = " << sum ;
    }

    return 0;
}

```

2. Write C++ coding for each of the questions below

- a) Declare a 2-Dimensional array of integer numbers. The array consists of 4 rows and 5 columns. Write a C++ program to find out the sum of all elements of 2D-array above and below the diagonal shown in the figure:



34	56	20	33	18
89	35	67	23	54
67	42	56	76	90
56	78	14	79	11

```
#include <iostream>
using namespace std;
```

```
int main()
{
    int arr[4][5],a=0,b=0,i,j,n;
    cout<<"Enter size of matrix(max 5):";
    cin>>n;
    cout<<"Enter the matrix:\n";
    for(i=0;i<n;++i)
        for(j=0;j<n;++j)
            cin>>arr[i][j];
    for(i=0;i<n;++i)
        for(j=0;j<n;++j)
            if(j>i)
                a+=arr[i][j];
            else
                if(i>j)
                    b+=arr[i][j];
    cout<<"\nSum of elements above the diagonal:"<<a;
    cout<<"\nSum of elements below the diagonal:"<<b;

    return 0;
}
```

- b) Write a C++ program to sort 2D-array in ascending order and display the sorted array. You have to use a pointer to solve this question. Suppose an array is given below:

34	56	20	33	18
89	35	67	23	54
67	42	56	76	90
56	78	14	79	11

The output should be

11	23	42	56	78
14	33	54	67	79
18	34	56	67	89
20	35	56	76	90

3. Write a program that reads numbers from an array at least 4 and graphs the information in the form of a bar chart or histogram --- each number is printed, then a bar consisting of that many asterisks is printed beside the number. Hint: use a for loop that draws the asterisks

For example

Array	values	Histogram
0	8	*****
1	3	***
2	4	****
3	5	*****

```
#include <bits/stdc++.h>
using namespace std;
```

```
void printHistogram(int arr[], int n)
{
    int maxEle = *max_element(arr, arr + n);

    for (int i = maxEle; i >= 0; i--) {
        cout.width(2);
        cout << right << i << " | ";
        for (int j = 0; j < n; j++)
        {
            if (arr[j] >= i)
                cout << " x ";
            else
                cout << "   ";
        }
        cout << "\n";
    }

    for (int i = 0; i < n + 3; i++)
        cout << "---";

    cout << "\n";
    cout << "   ";

    for (int i = 0; i < n; i++)
    {
        cout.width(2);
        cout << right << arr[i] << " ";
    }
}

int main()
{
```

```

int arr[4] = { 8,3,4,5};
int n = sizeof(arr) / sizeof(arr[0]);
printHistogram(arr, n);
return 0;
}

```

4. This section is related to Strings:

- a. Write a program to display string from backward. Do use built-in function.

E.g. Input: Test

Output: tseT

```

#include<iostream>
using namespace std;

int main( )
{
    char str[80];

    cout<<"Enter string: ";
    cin.getline(str, 80);

    int l;
    for(l = 0; str[l] != '\0'; l++);
    for(int i = l - 1; i >= 0; i--)
    {
        cout << str[i];
    }
    return 0;
}

```

- b. Write a program that shows the count against each alphabet?

e.g. if a user enters a string “ This is test”

The output should be :

T: 3

H: 1

I : 2

S: 3

E: 1

- c. Write a Program that shows the arranged array of string:

E.g. If a user enters the following names

Zita

Bitu

Bin

It should be sorted and displayed as

Zita

Bin

Bitu

5. Write a program that input a string of text and reverse the line of text as given in the example below.

Line of Text: National University of Computer and Emerging Sciences

Output: **Sciences Emerging and Computer of University National**

```
#include <bits/stdc++.h>
using namespace std;
void reverseWords(string s)
{
    vector<string> tmp;
    string str = "";
    for (int i = 0; i < s.length(); i++)
    {
        if (s[i] == ' ')
        {
            tmp.push_back(str);
            str = "";
        }
        else
            str += s[i];
    }
    tmp.push_back(str);
    int i;
    for (i = tmp.size() - 1; i > 0; i--)
        cout << tmp[i] << " ";
    cout << tmp[0] << endl;
}

int main()
{
    string s = "National University of Computer and Emerging Sciences
    ";
    reverseWords(s);
    return 0;
}
```