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
   1. 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;

}

* 1. 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;

}

* 1. 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.

**-52**

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

**-56**

**??**

**-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;

}

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

}

* 1. 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 |

1. 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;

}

1. This section is related to Strings:
2. 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;

}

1. 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

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

E.g. If a user enters the following names Zita

Bita Bin

It should be sorted and displayed as Zita

Bin Bita68+

1. 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;

}