DSA BOOTCAMP ASSIGNMENT

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```
// Q1 - Write a C++ program to Swap two numbers

#include<iostream>
using namespace std;

int main() {
    int a=10;
    int b=20;
    int temp=0;

    // view values of a and b before swap
    cout << "a: " << a << endl;
    cout << "b: " << b << endl;

    // perform swap
    temp=a;
    a=b;
    b=temp;

    // view values of a and b after swap
    cout << "a: " << a << endl;
    cout << "b: " << b << endl;

    return 0;
}
```

```
a: 10
b: 20
a: 20
b: 10
```

```
/*  Q2 - Write a program to find the largest number among
    three numbers entered by the user.
*/
```

```
#include <iostream>

using namespace std;

// define function
int max(int x, int y, int z) {
  if(x > y && x > z) {
      return x;
  } else if (y > x && y > z) {
      return y;
  } else {
      return z;
  }
}

int main() {
    int x, y, z;

    cout << "Enter x: ";
    cin >> x;

    cout << "Enter y: ";
    cin >> y;

    cout << "Enter z: ";
    cin >> z;

    cout << "The largest number is: " << max(x, y, z) << endl;

    return 0;
}
```

```
PS C:\Users\diane\OneDrive\Desktop\DianeGrangerWork\dsa-cplusplus-project>
cd
"c:\Users\diane\OneDrive\Desktop\DianeGrangerWork\dsa-cplusplus-project\"
; if ($?) rive\Desktop\DianeGrangerWork\dsa-cplusplus-project\" ; if ($?)
{ g++ q2_dsa_project.cpp -o q2_dsa_project } ; if ($?) { .\q2_dsa_project
}
Enter x: 30
Enter y: 25
Enter z: 15
```

```
The largest number is: 30
PS C:\Users\diane\OneDrive\Desktop\DianeGrangerWork\dsa-cplusplus-project>
```

```
/*  Q3 - Write a program to check whether a
    year entered by a user is a Leap year or not
*/

#include <iostream>
using namespace std;

bool leapYear(int year);

int main() {
   int year;

   cout << "Please enter a year to test: ";
   cin >> year;

   bool test = leapYear(year);
   if(test == true)
      cout << year << " is a Leap Year";
   else
      cout << year << " is not a Leap Year";
   return 0;
}

// Function to calculate if Year is a Leap Year or not
bool leapYear(int yr) {
   bool isLeapYr = false;   // initially isLeapYr is not a Leap Year
   if (yr % 4 == 0) {
      if (yr % 100 == 0) {
         if (yr % 400 == 0) {
            isLeapYr = true;
         }
      }
      else isLeapYr = true;
   }
   return isLeapYr;
```

```
PS C:\Users\diane\OneDrive\Desktop\DianeGrangerWork\dsa-cplusplus-project> cd
"c:\Users\diane\OneDrive\Desktop\DianeGrangerWork\dsa-cplusplus-project\" ; if ($?)
{ g++ q3_dsa_project.cpp -o q3_dsa_project } ; if ($?) { .\q3_dsa_project }
Please enter a year to test: 2020
2020 is a Leap Year
PS C:\Users\diane\OneDrive\Desktop\DianeGrangerWork\dsa-cplusplus-project> cd
"c:\Users\diane\OneDrive\Desktop\DianeGrangerWork\dsa-cplusplus-project\" ; if ($?)
{ g++ q3_dsa_project.cpp -o q3_dsa_project } ; if ($?) { .\q3_dsa_project }
Please enter a year to test: 2021
2021 is not a Leap Year
PS C:\Users\diane\OneDrive\Desktop\DianeGrangerWork\dsa-cplusplus-project>
```

```
/*  Q4 - Write a program to display the
    Fibonacci Series up to the nth term (Using loops)
*/

#include<iostream>
using namespace std;

int main() {
    int num1 = 0, num2 = 1, num3, i, num;

    cout << "Enter a number for printing Fibonacci Series of: ";
    cin >> num;
    cout << "Fibonacci Series for the number " << num << ":" << endl;
    cout << num1  << endl;
    cout << num2 << endl;

    // start loop at 2, 0 and 1 already displayed
    for(i = 2; i < num; ++i) {
        num3 = num1 + num2;
        cout << num3 << endl;
        num1 = num2;
        num2 = num3;
    }
return 0;
}
```

```
Enter a number for printing Fibonacci Series of: 10
```

```
Fibonacci Series for the number 10:
0
1
1
2
3
5
8
13
21
34
PS C:\Users\diane\OneDrive\Desktop\DianeGrangerWork\dsa-cplusplus-project>
```

```
//  Q6 - Write a program to print this pattern of *s using loops for n=5

#include <iostream>
using namespace std;

int main()
{
   int num_rows, i, j, space;

   cout << "Enter number of rows of stars to print: ";
   cin >> num_rows;

   for(i = 1; i <= num_rows; i++)
   {
      // displaying space
      for(space = i; space < num_rows; space++)
      {
         cout << " ";
      }
      // print number of stars equal to row number
      for(j = 1; j <= (2 * i - 1); j++)
      {
         cout << "*";
      }

      cout << "\n";
   }

   return 0;
}
```

```
PS C:\Users\diane\OneDrive\Desktop\Shape AI\DSA using C++\project> cd
"c:\Users\diane\OneDrive\Desktop\Shape AI\DSA using C++\project\" ; if
($?) { g++ q6_dsa_project.cpp -o q6_dsa_project } ; if ($?) {
.\q6_dsa_project }
Enter number of rows of stars: 5
    *
   ***
  *****
 *******
*********
PS C:\Users\diane\OneDrive\Desktop\Shape AI\DSA using C++\project>
```

```
/*  Q7 - Write a program that takes n elements from the user
    and displays the second largest element of an array.
*/

#include<iostream>

using namespace std;

int main() {
   int n, i, arr[100], lrg, seclrg;
   cout << "Enter the number of elements in the array: ";
   cin >> n;

   cout<<"Enter "<< n <<" Array Elements: ";

   for(i=0; i < n; i++)
      cin >> arr[i];
   lrg = arr[0];
   for(i=0; i < n; i++) {
      if(lrg < arr[i])
         lrg = arr[i];
   }
   seclrg = arr[0];
   for(i=0; i < n; i++) {
      if(seclrg < arr[i]) {
         if(arr[i] != lrg)
            seclrg = arr[i];
      }
   }
   cout << "\nThe second largest element in the array is "<< seclrg;
   cout << endl;
   return 0;
}
```

```
Enter the number of elements in the array: 5
Enter 5 Array Elements:
4
7
9
2
1

The second largest element in the array is 7
PS C:\Users\diane\OneDrive\Desktop\Shape AI\DSA using C++\project>
```

```
// Q8 - HackerRank rotateLeft array problem

#include <stdio.h>
#include <iostream>

using namespace std;

void rotateLeft(int arr[], int n, int d) {
  int temp[d], i, j = 0;

  for (i = 0; i < d; i++)
    temp[i] = arr[i];

  for (i = d; i < n; i++)
    arr[i - d] = arr[i];

  for (i = n - d; i < n; i++)
```

```
    arr[i] = temp[i - (n - d)];

  for (i = 0; i < n; i++) {
    cout << arr[i] << " "; //print output
  }
}

int main() {
  int n = 5, d = 2, i;
  int arr[n] = { 1, 2, 3, 4, 5 };

  cout << "Input array: ";
  for (i = 0; i < n; i++) {
    cout << arr[i] << " ";
  }
  cout << endl;

  cout << endl << "Number of Left Rotations to perform: " << d << endl;
  cout << "Left Rotated Array: ";
  rotateLeft(arr, n, d);

  return 0;
}
```

```
Input array: 1 2 3 4 5

Number of Left Rotations to perform: 2
Left Rotated Array: 3 4 5 1 2
```

```
// Q9 - HackerRank gradingStudents problem

#include <bits/stdc++.h>

using namespace std;

string ltrim(const string &);
string rtrim(const string &);
```

```
/*
 * Complete the 'gradingStudents' function below.
 *
 * The function is expected to return an INTEGER_ARRAY.
 * The function accepts INTEGER_ARRAY grades as parameter.
 */

vector<int>& gradingStudents(vector<int>& grades) {
  for (int& grade : grades)
    if (grade >= 38) grade += ((grade % 5) >= 3) ? (5 - (grade % 5))
: 0;
    return grades;
}

int main()
{
    ofstream fout(getenv("OUTPUT_PATH"));

    string grades_count_temp;
    getline(cin, grades_count_temp);

    int grades_count = stoi(ltrim(rtrim(grades_count_temp)));

    vector<int> grades(grades_count);

    for (int i = 0; i < grades_count; i++) {
        string grades_item_temp;
        getline(cin, grades_item_temp);

        int grades_item = stoi(ltrim(rtrim(grades_item_temp)));

        grades[i] = grades_item;
    }

    vector<int> result = gradingStudents(grades);

    for (size_t i = 0; i < result.size(); i++) {
        fout << result[i];
        if (i != result.size() - 1) {
            fout << "\n";
        }
    }

    fout << "\n";

    fout.close();

    return 0;
}

string ltrim(const string &str) {
    string s(str);

    s.erase(
        s.begin(),
        find_if(s.begin(), s.end(), not1(ptr_fun<int, int>(isspace)))
    );

    return s;
}

string rtrim(const string &str) {
    string s(str);

    s.erase(
        find_if(s.rbegin(), s.rend(), not1(ptr_fun<int,
int>(isspace))).base(),
        s.end()
    );

    return s;
}
```

Input (stdin)

Download

```
4
73
67
38
33
```

Expected Output

Download

```
75
67
40
33
```

```
// Q10 - HackerRank camelcase problem

#include <bits/stdc++.h>

using namespace std;

/*
 * Complete the 'camelcase' function below.
 *
 * The function is expected to return an INTEGER.
 * The function accepts STRING s as parameter.
 */

int camelcase(string s) {
    int words = 0;

    for (char& c : s)
        if (int(c) >= 65 && int(c) <= 90) words++;
    return ++words;
}
```

```
int main()
{
    ofstream fout(getenv("OUTPUT_PATH"));

    string s;
    getline(cin, s);

    int result = camelcase(s);

    fout << result << "\n";

    fout.close();

    return 0;
}
```

Compiler Message

Success

Input (stdin)

Download

```
saveChangesInTheEditor
```

Expected Output

Download

```
5
```