Lab Assingment-1

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QUES 1: Write a program to print ‘Hello World’.

SOLUTION:

```cpp
#include <iostream>
using namespace std;
int main()
{
    // 2005535
    // SAHIL SINGH
    cout << "Hello World!!!" << endl;
    return 0;
}
```

OUTPUT:

```
Hello World!!!
```

QUES 2: Write a program to read an employee's information from the user and print the same. Employee's information shall include employee ID (int), employee name (string) and employee salary (float).

SOLUTION:

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

struct Employee
{
    int employee_id_535;
    string employee_name_535;
    float employee_salary_535;
};

int main()
{
    // 2005535
    // SAHIL SINGH
    Employee e_535;

    cout << "Enter the employee ID: ";
    cin >> e_535.employee_id_535;

    cout << "Enter Employee Name: ";
    cin.ignore();
    getline(cin, e_535.employee_name_535);
```

```
    cout << "Enter the employee salary: ";
    cin >> e_535.employee_salary_535;

    cout << "\nEmployee Details" << endl;
    cout << "Employee ID : " << e_535.employee_id_535 << endl;
    cout << "Employee Name : " << e_535.employee_name_535 << endl;
    cout << "Employee Salary : " << e_535.employee_salary_535 << endl;
    return 0;
}
```

OUTPUT:

```
Enter the employee ID: 2005535
Enter Employee Name: Sahil Singh
Enter the employee salary: 564000

Employee Details
Employee ID : 2005535
Employee Name : Sahil Singh
Employee Salary : 564000
```

QUES 3: Write a program to take two integer inputs and output their sum, difference, product and division (quotient and remainder) as result based on a third input (operator).

SOLUTION:

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

int main()
{
    // 2005535
    // SAHIL SINGH
    int x_535, y_535, sum_535, difference_535, product_535, modulo_535;
    float quotient_535;
    char choice_535;

    cout << "Enter First Number: ";
    cin >> x_535;

    cout << "Enter Second Number: ";
    cin >> y_535;

    cout << "Enter Operator: ";
    cin >> choice_535;

    if (choice_535 == '+')
    {
        sum_535 = x_535 + y_535;
```

```
        cout << "\nSum = " << sum_535;
    }

    else if (choice_535 == '-')
    {
        difference_535 = x_535 - y_535;
        cout << "\nDifference  = " << difference_535;
    }

    else if (choice_535 == '*')
    {
        product_535 = x_535 * y_535;
        cout << "\nMultiplication = " << product_535;
    }

    else if (choice_535 == '/')
    {
        quotient_535 = (float)x_535 / y_535;
        cout << "\nDivision = " << quotient_535;
    }

    else
    {
        cout << "Please enter a valid input" << endl;
    }
    return 0;
}
```

OUTPUT:

```
Enter First Number: 25
Enter Second Number: 50
Enter Operator: -

Difference  = -25
```

QUES 4: Write program(s) to perform following conversions (and vice-versa):

a. Temperature in Celsius to Fahrenheit

b. Height in Centimeters to Feet and Inches

Your program(s) should take care that the output is formatted in any format chosen by you.

SOLUTION:

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

int main()
{
    // 2005535
```

```
    // SAHIL SINGH
    float fahrenheit_535, centimeter_535;
    int choice_535;

    cout << "1. Fahrenheit to celcius \n2. Centimeters to feet and inches \n\nEnter your choi
ce(1 or 2): ";
    cin >> choice_535;

    if (choice_535 == 1)
    {
        cout << "Enter the temperature in celsius: ";
        cin >> fahrenheit_535;

        fahrenheit_535 = (fahrenheit_535 * 1.8) + 32;
        cout << "It is " << fahrenheit_535 << " degree celcius" << endl;
    }
    else if (choice_535 == 2)
    {
        cout << "Enter the height in centimeters: ";
        cin >> centimeter_535;

        centimeter_535 = centimeter_535 / 2.54;
        cout << "It is " << centimeter_535 << " inches and " << centimeter_535 / 12 << " feet
" << endl;
    }
    else
    {
        cout << "Please enter a valid input" << endl;
    }
    return 0;
}
```

OUTPUT:

```
1. Fahrenheit to celcius
2. Centimeters to feet and inches

Enter your choice(1 or 2): 2
Enter the height in centimeters: 154
It is 60.6299 inches and 5.05249 feet
```

QUES 5: A perfect number is one whose divisors add up to the number. For example, 6 is a perfect number because 6 = 1 + 2 + 3. Write a program that prints all perfect numbers from 1 till 10000.

SOLUTION:

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

```
void find_perfect(int n_535)
{
    int i_535 = 1, sum_535 = 0;
    while (i_535 < n_535)
    {
        if (n_535 % i_535 == 0)
        {
            sum_535 = sum_535 + i_535;
        }
        i_535++;
    }

    if (sum_535 == n_535)
    {
        cout << i_535 << " is a perfect number\n";
    }
}

int main()
{
    // 2005535
    // SAHIL SINGH
    for (int n_535 = 1; n_535 < 10000; n_535++)
    {
        find_perfect(n_535);
    }
    return 0;
}
```

OUTPUT:

```
6 is a perfect number
28 is a perfect number
496 is a perfect number
8128 is a perfect number
```

QUES 6: Write a program to print all possible rearrangements of a given string input. For instance, if input string is "abc", output is "abc", "acb", "bac", "bca", "cab" and "cba".

SOLUTION:

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

void mixing(string inp_string_535, int left_index_535, int right_index_535)
{
    if (left_index_535 == right_index_535)
        cout << inp_string_535 << endl;
    else
    {
```

```
        for (int i_535 = left_index_535; i_535 <= right_index_535; i_535++)
        {
            swap(inp_string_535[left_index_535], inp_string_535[i_535]);
            mixing(inp_string_535, left_index_535 + 1, right_index_535);
            swap(inp_string_535[left_index_535], inp_string_535[i_535]);
        }
    }
}

int main()
{
    // 2005535
    // SAHIL SINGH
    string str_535;
    cout << "Enter string: ";
    cin >> str_535;

    int str_size_535 = str_535.size();
    mixing(str_535, 0, str_size_535 - 1);
    return 0;
}
```

OUTPUT:

```
Enter string: abc
abc
acb
bac
bca
cba
cab
```

QUES 7: Amicable Numbers: Two numbers N1 and N2 are called amicable if sum of proper divisors of N1 is equal to that of N2 and vice-versa. For instance, (220,284) are a pair of amicable numbers because sum of proper divisors of 220 (1 + 2 + 4 + 5 + 10 + 11 + 20 + 22 + 44 + 55 + 110 = 284) is 284 and sum of proper divisors of 284 (1 + 2 + 4 + 71 + 142 = 220) is 280. Write a program to output all amicable number pairs from 0 till 10000.

SOLUTION:

```
// Ques 7
#include <iostream>
using namespace std;

void find_amicable(int num1_535, int num2_535)
{
    int sum1_535 = 0, sum2_535 = 0;
    for (int i_535 = 1; i_535 <= num1_535 / 2; i_535++)
    {
        if (num1_535 % i_535 == 0)
```

```
        {
            sum1_535 = sum1_535 + i_535;
        }
    }
    for (int i_535 = 1; i_535 <= num2_535 / 2; i_535++)
    {
        if (num2_535 % i_535 == 0)
        {
            sum2_535 = sum2_535 + i_535;
        }
    }
    if (num1_535 == sum2_535 && num2_535 == sum1_535)
    {
        cout << "(" << num1_535 << "," << num2_535 << ")\n";
    }
}

int main()
{
    for (int i_535 = 0; i_535 < 10000; i_535++)
    {
        for (int j_535 = i_535 + 1; j_535 < 10000; j_535++)
        {
            if (i_535 != j_535)
            {
                find_amicable(i_535, j_535);
            }
        }
    }
    return 0;
}
```

OUTPUT:

```
(220,284)
(1184,1210)
(2620,2924)
(5020,5564)
(6232,6368)
```