

Student Name:

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Section:

Seat:

Instructor:

Q1- (a) (5 points) An integer number is said to be a *perfect number* if the sum of its factors, including 1 (but not the number itself), is equal to the number. For example, 6 is a perfect number, because $6 = 1 + 2 + 3$. Write a function *IsPerfect* that takes an integer *number* and returns true when *number* is a perfect number, false otherwise.

```

bool IsPerfect ( int X )
int A, B=0;
for ( A = 1 ; A < X ; A ++ )
    if ( X % A == 0 )
        B += A;
    if ( B == X )
        return true;
else
    return false;
}

```

Q1- (b) (5 points) In main function, ask the user to input two integers, then find and display the sum of perfect numbers inclusively between the two values (the two values included) that the user has input.

```

#include <iostream>
using namespace std;
void main ()
{
    int C, D, Sum1, Sum2; // Sum1, Sum2
    cin >> C;
    cin >> D;
    if ( C < D )
        for ( i = C ; C <= D ; C ++ )
            if ( IsPerfect ( C ) == 1 )
                Sum1 += C;
    cout << Sum1;
}

```

```

int C, D, Sum1, Sum2; // Sum1, Sum2
cin >> C;
cin >> D; // W1X
if ( C < D )
    Sum1 = 0;
    for ( i = C ; C <= D ; C ++ )
        if ( IsPerfect ( i ) == 1 )
            Sum1 += i;
        else if ( D < C )
            Sum2 = 0;
            for ( i = D ; D <= C ; D ++ )
                if ( IsPerfect ( i ) == 1 )
                    Sum2 += i;
                cout << "Sum1 = " << Sum1 << endl;
                cout << "Sum2 = " << Sum2 << endl;
}

```

Q2 (4 points) Write C++ code that will find and print the first integer which is greater than 1000, is divisible by 347, and is not divisible by 7

```

int X;
cin >> X;
if (X % 347 == 0)
{
    if (X % 7 != 0)
        cout << endl;
}
cin >> X;

```

```

#include <iostream>
using namespace std;
void main()
{
    int X;
    cin >> X;
    while (X > 1000)
    {
        if (X % 347 == 0)
            if (X % 7 != 0)
                cout << X << endl;
        break;
    }
    cin >> X;
}

```

Q3 (6 points) Find the output of the following code. The output should go in the box. If the program results in an infinite loop write INF. Assume all necessary libraries are included.

```

int Foo (int, int);
void Boo (int&);

int a = 5, b = 10;
void main ()
{
    int a = 10, c = 30;
    while (true)
    {
        Boo (b = Foo (a, b));
        cout << b << endl;
        if (b > c) break;
    }
}

```

20
INF

```

int Foo (int a, int c)      a | b
{
    return a + c;
}

```

loop a | b
5 | 10

incon a | b
10 | 30
5 | 10
10 | 10
c

```

void Boo (int& a)      b
{
    do      a
    {
        cout << a-- << endl;
        if (a < (b / 2)) break;
    } while (a > b);
}

```

b
= 9
20

2/2

Boo b
a
40
39