

CSC-101 – HW4

Q1 (25 Points) The value of π can be approximated by using the following series:

$$\pi = 4 \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots + \frac{1}{2n-1} + \frac{1}{2n+1} \right)$$

The program in *main.cpp* uses this series to find the approximate value of π . However, the statements are in the incorrect order, and there is also a bug in this program.

Rearrange the statements and remove the bug so that this program can be used to approximate π .

```
#include <iostream>
#include <iomanip>

using namespace std;

int main()
{
    double pi = 0;
    long i;
    long n;

    cin >> n;
    cout << "Enter the value of n: ";
    cout << endl;

    if (i % 2 == 0)
        pi = pi + (1 / (2 * i + 1));
    else
        pi = pi - (1 / (2 * i + 1));

    for (i = 0; i < n; i++)
    {
        pi = 0;
        pi = 4 * pi;
```

```

    }

    cout << endl << "pi = " << pi << endl;
    return 0;
}

```

Q2 (25 points) Write a program that uses `for` loops to perform the following steps:

1. Prompt the user to input two integers: `firstNum` and `secondNum`
 - (`firstNum` must be less than `secondNum`).
2. Output all odd numbers between `firstNum` and `secondNum`.
3. Output the sum of all even numbers between `firstNum` and `secondNum`.
4. Output the numbers and their squares between **1** and **10**.
 - Separate the numbers using any amount of spaces.
5. Output the sum of the square of the odd numbers between `firstNum` and `secondNum`.
6. Output all uppercase letters.

Q3 (25 Points) Jason typically uses the Internet to buy various items. If the total cost of the items ordered, at one time, is \$200 or more, then the shipping and handling is free; otherwise, the shipping and handling is \$10 per item. Design an algorithm that prompts Jason to enter the number of items ordered and the price of each item. The algorithm then outputs the total shipping and handling fee, and the billing amount. Your algorithm must use a loop (repetition structure) to get the price of each item. (For simplicity, you may assume that Jason orders no more than five items at a time.)

An example of the program is shown below:

Enter the number of items ordered: 3

Enter the price of item no. 1: 79.00

Enter the price of item no. 2: 23.50

Enter the price of item no. 3: 1.99

The shipping and handling fee is: \$30.00

The billing amount is: \$134.49

Since your program handles currency, make sure to use a data type that can store decimals with a decimal precision of 2.

Q4 (25 Points) To make telephone numbers easier to remember, some companies use letters to show their telephone number. For example, using letters, the telephone number **438-5626** can be shown as **GET LOAN**.

In some cases, to make a telephone number meaningful, companies might use more than seven letters. For example, **225-5466** can be displayed as **CALL HOME**, which uses eight letters.

Instructions

Write a program that prompts the user to enter a telephone number expressed in letters and outputs the corresponding telephone number in digits.

If the user enters more than seven letters, then process only the first seven letters.

Also output the - (hyphen) after the third digit.

Allow the user to use both uppercase and lowercase letters as well as spaces between words.

Moreover, your program should process as many telephone numbers as the user wants.

Use the dialpad below for reference:

1 OO	2 ABC	3 DEF
4 GHI	5 JKL	6 MNO
7 PQRS	8 TUV	9 WXYZ

The program should accept input and produce output similar to the example program execution below.

Enter Y/y to convert a telephone number from
letters to digits.
Enter any other letter to terminate the program.
Y
Enter a telephone number using letters: Hello world

The corresponding telephone number is:
435-5696
To process another telephone number, enter Y/y
Enter any other letter to terminate the program.
