- COSC 120 Lab 5 Report
  Charles Reigle

Lab 5.1

Source Code

Exercise 2:

```cpp
// Charles Reigle

#include <iostream>
using namespace std;

int main()
{
    char letter = 'a';

    while (letter != 'x')
    {
        cout << "Enter in any letter. If you enter an \'x\', the program will shut down." << endl;
        cin >> letter;

        cout << "The letter you entered is " << letter << endl;
    }

    return 0;
}
```

Exercise 4:

```cpp
// Charles Reigle

#include <iostream>
using namespace std;

int main()
{
    int month = 1;
    float total = 0, rain;

    cout << "Enter the total rainfall for month " << month << endl;
    cout << "Enter -1 when you are finished" << endl;

    cin >> rain;

    while (rain != -1) {
        total += rain;

        month++;

        cout << "Enter the total rainfall in inches for month "
            << month << endl;
        cout << "Enter -1 when you are finished" << endl;

        cin >> rain;
    }

    if (month == 1)
        cout << "No data has been entered" << endl;

    else
        cout << "The total rainfall for the " << month - 1
            << " months is " << total << " inches." << endl;

    return 0;
}
```

Output

Exercise 4:

```
Enter the total rainfall for month 1
Enter -1 when you are finished
7
Enter the total rainfall in inches for month 2
Enter -1 when you are finished
3
Enter the total rainfall in inches for month 3
Enter -1 when you are finished
5
Enter the total rainfall in inches for month 4
Enter -1 when you are finished
-1
The total rainfall for the 3 months is 15 inches.
```

Exercise 5:

```
Enter the total rainfall for month 1
Enter -1 when you are finished
-1
No data has been entered
```

```
Enter the total rainfall for month 1
Enter -1 when you are finished
7
Enter the total rainfall in inches for month 2
Enter -1 when you are finished
3
Enter the total rainfall in inches for month 3
Enter -1 when you are finished
0
Enter the total rainfall in inches for month 4
Enter -1 when you are finished
-1
The total rainfall for the 3 months is 10 inches.
```

Answers:
Exercise 1: The program is not usr friendly, because it does not explain what it aims to achieve, so the user does not know what is happening.

Exercise 3: The program is not affected by a do-while loop. It still works the same as always, if you enter an 'x', even on the first run, it will shut down, otherwise it will keep going.

Exercise 5: By entering in -1 instantly, it prompts you that no data was input for calculations. If you input 0 in for rainfall in a month, it still calculates the average properly. Values you shouldn't input are things like negative numbers or characters/strings, because these can mess with the calculations to get an accurate response. For instance, entering a character puts the program into an infinite loop that floods console asking for rainfall.

Exercise 6: By putting the if (month == 1) line, it is checking if the months were ever iterated through. If the month never increased from 1, that means data was never input, meaning there is nothing to calculate, and it makes sure to tell you so.

Lab 5.2

Source Code

Exercise 1:

```cpp
int main()
{

    int number;
    float cost;
    char beverage;

    bool validBeverage;

    cout << fixed << showpoint << setprecision(2);

    do
    {
        cout << endl << endl;
        cout << "Hot Beverage Menu" << endl << endl;
        cout << "A: Coffee  $1.00" << endl;
        cout << "B: Tea $ .75" << endl;
        cout << "C: Hot Chocolate   $1.25" << endl;
        cout << "D: Cappuccino  $2.50" << endl << endl << endl;

        cout << "Enter the beverage A,B,C, or D you desire" << endl;
        cout << "Enter E to exit the program" << endl << endl;

        cin >> beverage;

        switch (beverage)
        {
            case 'a':
            case 'A':
            case 'b':
            case 'B':
            case 'c':
            case 'C':
            case 'd':
            case 'D': validBeverage = true;
                break;
            default: validBeverage = false;
        }

        if (validBeverage == true)
        {
            cout << "How many cups would you like?" << endl;

            cin >> number;
        }
```

```
    switch (beverage)
    {
        case 'a':
        case 'A':
            cost = number * 1.0;
            cout << "The total cost is $" << cost << endl;
            break;

        case 'b':
        case 'B':
            cost = number * 1.25;
            cout << "The total cost is $" << cost << endl;
            break;

        case 'c':
        case 'C':
            cost = number * 0.75;
            cout << "The total cost is $" << cost << endl;
            break;

        case 'd':
        case 'D':
            cost = number * 2.50;
            cout << "The total cost is $" << cost << endl;
            break;

        case 'e':
        case 'E':
            cout << " Please come again" << endl;
            break;

        default:
            cout << "The letter you input is not a valid drink." << endl;
            cout << " Try again please" << endl;
    }

} while ((beverage != 'e') && (beverage != 'E'));

return 0;
```

Output

Exercise 1:

```
Hot Beverage Menu

A: Coffee        $1.00
B: Tea  $ .75
C: Hot Chocolate         $1.25
D: Cappuccino    $2.50


Enter the beverage A,B,C, or D you desire
Enter E to exit the program

a
How many cups would you like?
1
The total cost is $1.00
```

```
Hot Beverage Menu

A: Coffee          $1.00
B: Tea  $ .75
C: Hot Chocolate          $1.25
D: Cappuccino    $2.50


Enter the beverage A,B,C, or D you desire
Enter E to exit the program

b
How many cups would you like?
4
The total cost is $5.00
```

```
Hot Beverage Menu

A: Coffee          $1.00
B: Tea  $ .75
C: Hot Chocolate          $1.25
D: Cappuccino    $2.50


Enter the beverage A,B,C, or D you desire
Enter E to exit the program

e
 Please come again
```

Answers
Exercise 2: By inputting a letter that isnt A-E, it indicates to you that there was an invalid input, and you need to try again.
Exercise 3: No, there is no difference in executing the code. This is because if you don't put ==
true, it will analyze the value of the bool inside the parentheses, and if the bool is true it will work the same way.

Lab 5.3

Exercise 3:

```cpp
6      #include <iostream>
7      using namespace std;
8
9      int main()
10     {
11         int value;      // value is some positive number n
12         int total = 0;  // total holds the sum of the first n positive numbers
13         int number;
14         float mean;     // the average of the first n positive numbers
15         int end;
16
17         cout << "Please enter a positive starting integer" << endl;
18         cin >> value;
19         cout << "Please enter a positive ending integer" << endl;
20         cin >> end;
21
22         if (value > 0)
23         {
24             for (number = value; number <= end; number++)
25             {
26                 total = total + number;
27
28             }   // curly braces are optional since there is only one statement
29
30             mean = static_cast<float>(total) / ((end - value) + 1); // note the use of the typecast
31                                                      // operator here
32
33             cout << "The mean average of the numbers " << value << " through " << end << " is " << mean << endl;
34         }
35
36         else
37             cout << "Invalid input - integer must be positive" << endl;
38
39         return 0;
40     }
```

Output
Exercise 1 With type cast:

```
Please enter a positive integer
1234567
The mean average of the first 1234567 positive integers is 1514.09
```

Exercise 1 Without type cast:

```
Please enter a positive integer
1234567
The mean average of the first 1234567 positive integers is 1514
```

Exercise 2:

```
Please enter a positive integer
2.99
The mean average of the first 2 positive integers is 1.5
```

Exercise 1: The static cast ensures that when dividing the numbers, the result is a floating point number. Otherwise, the division would result in a whole number and wouldn't be completely accurate.

Exercise 2: It takes in the integer value of 2.99 and truncates it to 2.

Lab 5.4

Source Code
Exercise 1:

```cpp
 7    using namespace std;
 8
 9    int main()
10    {
11        int numStudents;
12        float numHours, total, average;
13        int student, ndays, day = 0;     // these are the counters for the loops
14
15        cout << "This program will find the average number of hours a day"
16            << " that a student spent programming over a long weekend\n\n";
17        cout << "How many students are there ?" << endl << endl;
18        cin >> numStudents;
19        cout << "How many days are there? " << endl << endl;
20        cin >> ndays;
21
22        for (student = 1; student <= numStudents; student++)
23        {
24            total = 0;
25
26            for (day = 1; day <= ndays; day++)
27            {
28                cout << "Please enter the number of hours worked by student "
29                    << student << " on day " << day << "." << endl;
30                cin >> numHours;
31
32                total = total + numHours;
33            }
34
35            average = total / ndays;
36
37            cout << endl;
38            cout << "The average number of hours per day spent programming by "
39                << "student " << student << " is " << average
40                << endl << endl << endl;
41        }
42
43        return 0;
44    }
```

Exercise 2:

```cpp
// Charles Reigle

#include <iostream>
using namespace std;

int main()
{
    int numStudents;
    float numHours, pTotal, bTotal, pAverage, bAverage;
    int student, ndays, day = 0;    // these are the counters for the loops

    cout << "This program will find the average number of hours a day"
         << " that a student spent programming over a long weekend\n\n";
    cout << "How many students are there ?" << endl << endl;
    cin >> numStudents;
    cout << "How many days are there? " << endl << endl;
    cin >> ndays;

    for (student = 1; student <= numStudents; student++)
    {
        pTotal = 0;
        bTotal = 0;

        for (day = 1; day <= ndays; day++)
        {
            cout << "Please enter the number of hours student "
                 << student << " spent on programming on day " << day << "." << endl;
            cin >> numHours;

            pTotal += numHours;

            numHours = 0;

            cout << "Please enter the number of hours student "
                 << student << " spent on biology on day " << day << "." << endl;
            cin >> numHours;

            bTotal += numHours;
        }

        pAverage = pTotal / ndays;
        bAverage = bTotal / ndays;

        cout << endl;
        if (bAverage > pAverage) cout << "On average, student " << student << " spent more time working on Biology." << endl;
        else if (pAverage > bAverage) cout << "On average, student " << student << " spent more time working on Programming." << endl;
        else if (pAverage == bAverage) cout << "On average, student " << student << " spent the same amount of time working on Programming an Biology" << endl;

        cout << endl;

        cout << "Student " << student << " Programming time average: " << pAverage << endl;
        cout << "Student " << student << " Biology time average: " << bAverage << endl;


    }

    return 0;
}
```

Exercise 2:

```
This program will find the average number of hours a day that a student spent programming over a long weekend

How many students are there ?

1
How many days are there?

2
Please enter the number of hours student 1 spent on programming on day 1.
4
Please enter the number of hours student 1 spent on biology on day 1.
4
Please enter the number of hours student 1 spent on programming on day 2.
6
Please enter the number of hours student 1 spent on biology on day 2.
6

On average, student 1 spent the same amount of time working on Programming an Biology

Student 1 Programming time average: 5
Student 1 Biology time average: 5
```

```
This program will find the average number of hours a day that a student spent programming over a long weekend

How many students are there ?

1
How many days are there?

2
Please enter the number of hours student 1 spent on programming on day 1.
4
Please enter the number of hours student 1 spent on biology on day 1.
9
Please enter the number of hours student 1 spent on programming on day 2.
6
Please enter the number of hours student 1 spent on biology on day 2.
12

On average, student 1 spent more time working on Biology.

Student 1 Programming time average: 5
Student 1 Biology time average: 10.5
```

```
This program will find the average number of hours a day that a student spent programming over a long weekend

How many students are there ?

1
How many days are there?

2
Please enter the number of hours student 1 spent on programming on day 1.
10
Please enter the number of hours student 1 spent on biology on day 1.
4
Please enter the number of hours student 1 spent on programming on day 2.
15
Please enter the number of hours student 1 spent on biology on day 2.
2

On average, student 1 spent more time working on Programming.

Student 1 Programming time average: 12.5
Student 1 Biology time average: 3
```

Lab 3.5

```cpp
#include <fstream>
#include <iomanip>
using namespace std;

int main()
{
    ifstream dataIn;      // defines an input stream for a data file
    ofstream dataOut;     // defines an output stream for an output file
    int quantity;         // contains the amount of items purchased
    float itemPrice;      // contains the price of each item
    float   totalBill;    // contains the total bill, i.e. the price of all items

    dataIn.open("transaction.dat"); // This opens the file.
    dataOut.open("bill.out");


    dataOut << setprecision(2) << fixed << showpoint;    // formatted output

    dataIn >> quantity >> itemPrice;

    totalBill = quantity * itemPrice;

    dataOut << "Total Bill: " << totalBill << endl;

    return 0;
}
```

Output

transaction - Notepad

File Edit Format View Help

22
10.98

bill - Notepad

File Edit Format View Help

Total Bill: 241.56

Lab 5.6 (Option 1)

Source Code

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

int main()
{
    int coff = 0, tea = 0, coke = 0, oj = 0, opt = 0, person = 1;
    cout << "Menu: " << endl << "1. Coffee" << endl << "2. Tea" << endl << "3. Coke" << endl << "4. Orange Juice" << endl << endl;
    do {
        cout << "Please input the favorite beverage of Person #" << person << ": Chose 1, 2, 3, or 4 from the menu above,"
             << " or -1 to exit the program." << endl;
        cin >> opt;
        switch (opt)
        {
        case 1:
            coff++;
            break;
        case 2:
            tea++;
            break;
        case 3:
            coke++;
            break;
        case 4:
            oj++;
            break;
        default: break;
        }
        person++;
    } while (opt != -1);

    cout << "Beverage" << setw(25) << "Number of Votes" << endl;
    cout << "*********************************" << endl;
    cout << "Coffee" << setw(13) << coff << endl;
    cout << "Tea" << setw(16) << tea << endl;
    cout << "Coke" << setw(15) << coke << endl;
    cout << "Orange Juice" << setw(7) << oj << endl;
}
```

Output

```
Menu:
1. Coffee
2. Tea
3. Coke
4. Orange Juice

Please input the favorite beverage of Person #1: Chose 1, 2, 3, or 4 from the menu above, or -1 to exit the program.
4
Please input the favorite beverage of Person #2: Chose 1, 2, 3, or 4 from the menu above, or -1 to exit the program.
1
Please input the favorite beverage of Person #3: Chose 1, 2, 3, or 4 from the menu above, or -1 to exit the program.
3
Please input the favorite beverage of Person #4: Chose 1, 2, 3, or 4 from the menu above, or -1 to exit the program.
1
Please input the favorite beverage of Person #5: Chose 1, 2, 3, or 4 from the menu above, or -1 to exit the program.
1
Please input the favorite beverage of Person #6: Chose 1, 2, 3, or 4 from the menu above, or -1 to exit the program.
-1
Beverage          Number of Votes
*********************************
Coffee            3
Tea               0
Coke              1
Orange Juice      1
```

```
1. Coffee
2. Tea
3. Coke
4. Orange Juice

Please input the favorite beverage of Person #1: Chose 1, 2, 3, or 4 from the menu above, or -1 to exit the program.
1
Please input the favorite beverage of Person #2: Chose 1, 2, 3, or 4 from the menu above, or -1 to exit the program.
1
Please input the favorite beverage of Person #3: Chose 1, 2, 3, or 4 from the menu above, or -1 to exit the program.
4
Please input the favorite beverage of Person #4: Chose 1, 2, 3, or 4 from the menu above, or -1 to exit the program.
4
Please input the favorite beverage of Person #5: Chose 1, 2, 3, or 4 from the menu above, or -1 to exit the program.
2
Please input the favorite beverage of Person #6: Chose 1, 2, 3, or 4 from the menu above, or -1 to exit the program.
4
Please input the favorite beverage of Person #7: Chose 1, 2, 3, or 4 from the menu above, or -1 to exit the program.
1
Please input the favorite beverage of Person #8: Chose 1, 2, 3, or 4 from the menu above, or -1 to exit the program.
-1
Beverage           Number of Votes
*********************************
Coffee             3
Tea                1
Coke               0
Orange Juice       3
```