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Lab 5

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Lab 5.1.1

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Source Code:

```cpp
#include <iostream>

using namespace std;


int main()

{

        char letter = 'a';

        cout << "This program will prompt you to enter a letter and repeat. The process will end when 'x' is entered. \n";


   do{

     cout << "Please enter a letter" << endl;

                cin >> letter;


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

   }

        while (letter != 'x');


        return 0;

}
```

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Output:

This program will prompt you to enter a letter and repeat. The process will end when 'x' is entered.

Please enter a letter

b

The letter you entered is b

Please enter a letter

x

The letter you entered is x

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Question Answer:

Exercise one states that this program is not user friendly. This is because there are not clear instructions output for the user to see. The program executes a while loop for every time the user inputs a letter that is not 'x'. The user will not know how to finish executing the program unless they happen to input 'x'. Exercise two wanted to add a statement that will make the program more user friendly. This was done with a cout statement outside of the while loop that told the user the program will continue to execute the loop until 'x' is entered. Exercise three wanted to change the while loop to a do while loop. This changes the way the loop runs because it executes the code inside the loop before checking the condition. The do while loop does not affect this program because it still executes the same way. This is because the loop breaks after 'x' is input by the user.

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Lab 5.1.2

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Source Code:

```
#include <iostream>

using namespace std;


int main()
{
   int month = 1;

        float total = 0, rain;
```

```cpp
        cout << "Enter the total rainfall for month " << month << endl;

        cout << "Enter -1 when you are finished" << endl;


    cin >> rain;


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

}
```

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Output:

Enter the total rainfall for month 1

Enter -1 when you are finished

10.52

Enter the total rainfall in inches for month 2

Enter -1 when you are finished

13.37

Enter the total rainfall in inches for month 3

Enter -1 when you are finished

-1

The total rainfall for the 2 months is 23.89 inches.

****

Question Answer:

Exercise 4 wanted to complete the code in the areas where there are comments in the code. The code was filled out. Exercise 5 wanted to input varying values into the program. Inputting a -1 first will output "no data has been entered". Entering zero was also instructed, but entering 0 for any months simply adds 0 to the value of total. Exercise 6 wanted to explain the purpose of the if statement after the while loop. The purpose of this is to inform the user that they did not enter a value for rainfall. Month is initialized with value of 1 and this value is assigned incremental values during execution of the while loop. If the user does not input a number not equal to -1, the value of month will not increment before the loop breaks. This is what causes the condition of the if statement to be true, and the if statement will execute and output "no data has been entered".

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Lab 5.2

Source Code:

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

int main()
{
    int number;
    float cost;
    char beverage;
        bool validBeverage;
```

```cpp
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;
```

```cpp
		}


		if (validBeverage)
		{
			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;
```

```cpp
                              break;

               default: cout << "We're sorry, but your input is invalid." << endl;

                         cout << " Try again please" << endl;

               }


        }

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


   return 0;

}
```

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Output:

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?

2

The total cost is $ 2.00

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

F

We're sorry, but your input is invalid.

 Try again please

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

****

Question Answer:

Exercise 1 wanted to complete the incomplete code to finish the program. Exercise 2 wanted to see if inputting a letter that is not a, b, c, d, or f will affect the program. There is an if statement that deal with this scenario. If the user input is any letter that is not included in the switch statement, the program will output "We're sorry ,but your input is invalid". Exercise 3 wanted to change (validBeverage == true) to (validBeverage). This did not seem to affect the way the program executed.

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Lab 5.3

Source Code:

include <iostream>

using namespace std;

int main()

{

        int value1;

        int value2;

        int value3;

        int total = 0;

        int number;

        float mean;

        cout << "Please enter a positive integer" << endl;

        cin >> value1;

        cout << "Please enter a positive integer greater than the first one" << endl;

        cin >> value2;

        value3 = value2 - value1;

```
        if (value1 > 0)

        {

                for (number = value1; number <= value2; number++)

                {

                        total = total + number;

                }


                mean = static_cast<float>(total) / (value3);


                cout << "The mean average of integers between " << value1 << " and " << value2 << " is
" << mean << endl;

        }


        else

                cout << "Invalid input" << endl;


        return 0;

}
```

****

Output:

Please enter a positive integer

2

Please enter a positive integer greater than the first one

4

The mean average of integers between 2 and 4 is 4.5

****

Question Answer:

Exercise 1 wanted to know why the type cast conversion operator is needed to convert the result of
total/value. This is because both variables have an int data type and will not be implicitly converted.
Thus, the type cast conversion is needed. Exercise 2 wanted to know what the output would be if 2.99

was entered into value. The int data type only assigned the 2 and did not assign the floating point .99 into the variable. Exercise 3 wanted to change the code to allow the user to input two integers and for the program to run for both of them.

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Lab 5.4

Source Code:

```cpp
#include <iostream>

using namespace std;


int main()
{
        int numStudents;
        float numHours1, numHours2, total, average;
        int student, day = 0;
        int days;


        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 << "Enter the amount of days worked" << endl;
        cin >> days;


        for (student = 1; student <= days; student++)
        {
                total = 0;


                for (day = 1; day <= numStudents; day++)
```

```cpp
		{
			cout << "Please enter the number of hours worked by student "
				<< student << " on day " << day << " in the subject of programming" <<
endl;
			cin >> numHours1;


			total = total + numHours1;
		}


	for (day = 1; day <= numStudents; day++)
		{
			cout << "Please enter the number of hours worked by student "
				<< student << " on day " << day << " in the subject of biology" << endl;
			cin >> numHours2;


			total = total + numHours2;
		}
		average = total / days;


		cout << endl;
		cout << "The average number of hours per day spent programming by "
			<< "student " << student << " is " << average
			<< endl << endl << endl;
	}


	return 0;
}
```
****

Output:

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 ?

2

Enter the amount of days worked

2

Please enter the number of hours worked by student 1 on day 1 in the subject of programming

1

Please enter the number of hours worked by student 1 on day 2 in the subject of programming

4

Please enter the number of hours worked by student 1 on day 1 in the subject of biology

2

Please enter the number of hours worked by student 1 on day 2 in the subject of biology

6

The average number of hours per day spent programming by student 1 is 6.5

Please enter the number of hours worked by student 2 on day 1 in the subject of programming

3

Please enter the number of hours worked by student 2 on day 2 in the subject of programming

1

Please enter the number of hours worked by student 2 on day 1 in the subject of biology

3

Please enter the number of hours worked by student 2 on day 2 in the subject of biology

2

The average number of hours per day spent programming by student 2 is 4.5

****

Question Answer:

Exercise 1 wanted to get the program to execute the loop n times instead of 3. This was changed by initializing a variable named days changing the condition to set day = days. Exercise 2 wanted to change the source code to take input for two classes, programming and biology.

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Lab 5.5

Source Code:

```
#include <fstream>

#include <iomanip>

#include <iostream>

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");


        // Fill in the appropriate code in the blank below


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

dataIn >> quantity >> itemPrice >> totalBill;

    // Fill in the input statement that brings in the

    // quantity and price of the item

    quantity = 22;

    itemPrice = 10.98;

totalBill = itemPrice * quantity;

    // Fill in the assignment statement that determines the total bill.

dataOut << "Total bill is $" << totalBill;

    // Fill in the output statement that prints the total bill, with a label,

    // to an output file

    cout << "Total bill is $" << totalBill;

    return 0;

}

****

Output:

Total bill is $241.56

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Question Answer:

Exercise 1 wanted to complete the program to input data into the file. Exercise 2 wanted to change the program to have the file output the total bill.

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Lab 5.6

Source Code:

#include <iostream>

using namespace std;

```cpp
int main()
{
    int choice;
    int coffee = 0;
    int tea = 0;
    int coke = 0;
    int juice = 0;

    do{
        cout << "Enter your favorite beverage" << endl;
        cout << "1 for coffee. 2 for tea. 3 for coke. 4 for orange juice" << endl;

        cin >> choice;

        if (choice == 1)
            coffee = coffee + 1;
        if (choice == 2)
            tea == tea + 1;
        if (choice == 3)
            coke = coke + 1;
        if (choice == 4)
            juice = juice + 1;
    }
    while (choice != -1);
    cout << "People who like coffee: " << coffee << endl;
    cout << "People who like tea: " << tea << endl;
    cout << "People who like coke: " << coke << endl;
    cout << "People who like orange juice: " << juice << endl;
    return 0;
```

}

****

Output:

Enter your favorite beverage

1 for coffee. 2 for tea. 3 for coke. 4 for orange juice

1

Enter your favorite beverage

1 for coffee. 2 for tea. 3 for coke. 4 for orange juice

1

Enter your favorite beverage

1 for coffee. 2 for tea. 3 for coke. 4 for orange juice

2

Enter your favorite beverage

1 for coffee. 2 for tea. 3 for coke. 4 for orange juice

3

Enter your favorite beverage

1 for coffee. 2 for tea. 3 for coke. 4 for orange juice

4

Enter your favorite beverage

1 for coffee. 2 for tea. 3 for coke. 4 for orange juice

4

Enter your favorite beverage

1 for coffee. 2 for tea. 3 for coke. 4 for orange juice

4

Enter your favorite beverage

1 for coffee. 2 for tea. 3 for coke. 4 for orange juice

-1

People who like coffee: 2

People who like tea: 0

People who like coke: 1

People who like orange juice: 4

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