COSC-120 Lab 4 Report
Charles Reigle

Lab 4.1

Source Code
Exercise 2:

```
// Charles Reigle

#include <iostream>
using namespace std;

int main()
{
    int num1, num2;


    cout << "Please enter an integer for value 1" << endl;
    cin >> num1;

    cout << "Please enter an integer for value 2" << endl;
    cin >> num2;

    cout << "num1 = " << num1 << " and num2 = " << num2 << endl;

    if (num1 == num2)
        cout << "Hey, that's a coincidence!" << endl;

    if (num1 != num2)
        cout << "The values are not the same" << endl;

    return 0;
}
```

Exercise 2:

```cpp
// Charles Reigle

#include <iostream>
using namespace std;

int main()
{
    int num1, num2;


    cout << "Please enter an integer for value 1" << endl;
    cin >> num1;

    cout << "Please enter an integer for value 2" << endl;
    cin >> num2;

    cout << "num1 = " << num1 << " and num2 = " << num2 << endl;

    if (num1 == num2) {
        cout << "The values are the same." << endl;
        cout << "Hey, that's a coincidence!" << endl;
    }
    if (num1 != num2) {
        cout << "The values are not the same" << endl;
    }

    return 0;
}
```

Exercise 4:

```cpp
// Charles Reigle

#include <iostream>
using namespace std;

int main()
{
    int num1, num2;


    cout << "Please enter an integer for value 1" << endl;
    cin >> num1;

    cout << "Please enter an integer for value 2" << endl;
    cin >> num2;

    cout << "num1 = " << num1 << " and num2 = " << num2 << endl;

    if (num1 == num2) {
        cout << "The values are the same." << endl;
        cout << "Hey, that's a coincidence!" << endl;
    } else {
        cout << "The values are not the same" << endl;
    }

    return 0;
}
```

<u>Output</u>

Exercise 2:

```
Please enter an integer for value 1
1
Please enter an integer for value 2
2
num1 = 1 and num2 = 2
The values are not the same
```

```
Please enter an integer for value 1
2
Please enter an integer for value 2
2
num1 = 2 and num2 = 2
Hey, that's a coincidence!
```

Exercise 4:

```
Please enter an integer for value 1
-1
Please enter an integer for value 2
2
num1 = 1 and num2 = 2
The values are not the same
```

```
Please enter an integer for value 1
6
Please enter an integer for value 2
6
num1 = 6 and num2 = 6
The values are the same.
Hey, that's a coincidence!
```

Answers

Exercise 1: The program does not output what is expected. This is because in the original if statement, there is only one '=' for the comparison operator, when in fact it should be '=='. As a result, the values are compared wrong.

Lab 4.2

Source Code

Exercise 2:

```cpp
// Charles Reigle

#include <iostream>
using namespace std;

int main()
{
    float average;  // holds the grade average

    cout << "Input your average:" << endl;
    cin >> average;

    if (average >= 60)
        cout << "You Pass" << endl;
    else
        cout << "You Fail" << endl;

    return 0;
}
```

Exercise 3:

```cpp
// Charles Reigle

#include <iostream>
using namespace std;

int main()
{
    //The while loop is just so I could keep running the program
    //Without having to restart it, for the sake of the output screenshots.
    while (true) {
        float average;  // holds the grade average

        cout << "Input your average:" << endl;
        cin >> average;

        if (average > 100)
            cout << "Invalid Data" << endl;
        else if (average >= 90)
            cout << "A" << endl;
        else if (average >= 80)
            cout << "B" << endl;
        else if (average >= 60)
            cout << "You pass" << endl;
        else
            cout << "You fail" << endl;

    }
    return 0;
}
```

Output

Exercise 3:

```
Input your average:
101
Invalid Data
Input your average:
100
A
Input your average:
89
B
Input your average:
79
You pass
Input your average:
60
You pass
Input your average:
59
You fail
Input your average:
-12
You fail
Input your average:
```

Answers

Exercise 1: Nothing happens when you enter 60, because neither of the if statements of n >60 or n < 60 are true.

Exercise 3: Inputting a negative value results in a failing grade. This can be resolved by checking if the input value n < 0.

Lab 4.3

Source Code

Exercise 3:

```cpp
// Charles Reigle

#include <iostream>
using namespace std;

int main()
{
    char year;
    float gpa;

    cout << "What year student are you ?" << endl;
    cout << "Enter 1 (freshman), 2 (sophomore), 3 (junior), or 4 (senior)"
    << endl << endl;
    cin >> year;

    cout << "Now enter your GPA" << endl;
    cin >> gpa;

    if (gpa >= 2.0 || year == '4')
        cout << "It is time to graduate soon" << endl;

    else if (year != '4' && gpa <2.0)
        cout << "You need more schooling" << endl;

    return 0;
}
```

Exercise 4:

```cpp
// Charles Reigle

#include <iostream>
using namespace std;

int main()
{
    char year;
    float gpa;

    cout << "What year student are you ?" << endl;
    cout << "Enter 1 (freshman), 2 (sophomore), 3 (junior), or 4 (senior)"
    << endl << endl;
    cin >> year;

    cout << "Now enter your GPA" << endl;
    cin >> gpa;

    if (gpa >= 2.0 && year == '4')
        cout << "It is time to graduate soon" << endl;

    else
        cout << "You need more schooling" << endl;

    return 0;
}
```

Output

Exercise 3:

```
What year student are you ?
Enter 1 (freshman), 2 (sophomore), 3 (junior), or 4 (senior)

4
Now enter your GPA
1.0
It is time to graduate soon
```

```
What year student are you ?
Enter 1 (freshman), 2 (sophomore), 3 (junior), or 4 (senior)

1
Now enter your GPA
4.0
It is time to graduate soon
```

Exercise 4:

```
What year student are you ?
Enter 1 (freshman), 2 (sophomore), 3 (junior), or 4 (senior)

4
Now enter your GPA
3.0
It is time to graduate soon
```

```
What year student are you ?
Enter 1 (freshman), 2 (sophomore), 3 (junior), or 4 (senior)

2
Now enter your GPA
4.0
You need more schooling
```

Answers

Exercise 1: You could rewrite the statement to use the NOT operator by putting !(gpa <= 2.0). This way, it will inverse the value, meaning if gpa <= 2.0 == true, it flips to false, and the if statement is evaluated as false.

Exercise 2: You cannot replace year != '4' with year < 4 // year <= 3 because the data type of 'year' is a char, meaning numerically it is represented by a value that isn't actually 4, and the numerical comparison operator wouldn't work properly.

Exercise 3: Any studen with a GPA > 2.0 regardless of year or any 4th year regardless of GPA student will be graduating.
Exercise 4: Yes, you can replace the else if statement with a singular else statement.

Lab 4.4

Source Code
Exercise 2:

```
// Charles Reigle

#include <iostream>
using namespace std;

int main()
{
    char grade;

    cout << "What grade did you earn in Programming I ?" << endl;
    cin >> grade;

    switch (grade)  // This is where the switch statement begins
    {
        case 'A':
        case 'B':
        case 'C':
        case 'D': cout << "YOU PASSED!" << endl;
                  break;
        case 'F': cout << "you failed - better luck next time" << endl;
                  break;
        default: cout << "You did not enter an A, B, C, D, or F" << endl;
    }

    return 0;
}
```

Exercise 3:

```
// Charles Reigle

#include <iostream>
using namespace std;

int main()
{
    char grade;

    cout << "What grade did you earn in Programming I ?" << endl;
    cin >> grade;

    if (grade == 'A' || grade == 'B' || grade == 'C' || grade == 'D')
        cout << "YOU PASS!" << endl;
    else if (grade == 'F')
        cout << "You failed" << endl;
    else
        cout << "Invalid input for a grade" << endl;

    return 0;
}
```

Output

Exercise 2:

```
What grade did you earn in Programming I ?
A
YOU PASSED!
```

```
What grade did you earn in Programming I ?
D
YOU PASSED!
```

```
What grade did you earn in Programming I ?
F
you failed - better luck next time
```

Answers

Exercise 1: By removing the break statements, the switch find the valid branch, execute it, and then also execute all the branches below it.

Exercise 3: I used a trailing else to send a prompt anytime the grade doesn't equal A B C D or F. This replaces the default statement in the switch statement.

Lab 4.5 (Option 3)

Source Code

```
// Charles Reigle

#include <iostream>
using namespace std;

int main()
{
    char res, rm;
    int bill = 0;
    cout << "Please input \"I\" if you are in-state or \"O\" if you are out-of-state:" << endl;
    cin >> res;
    while ((res != 'O') && (res != 'I')) {
        cout << "Invalid input, needs to be \"I\" or \"O\". Try Agin: " << endl;
        cin >> res;
    }

    cout << "Please input \"Y\" if you require room and board and \"N\" if you do not:" << endl;
    cin >> rm;
    while ((rm != 'Y') && (rm != 'N')) {
        cout << "Invalud input, needs to be \"Y\" or \"N\". Try again: " << endl;
        cin >> rm;
    }

    if (res == 'I') {
        bill += 3000;
        if (rm == 'Y') {
            bill += 2500;
        }
    } else {
        bill += 4500;
        if (rm == 'Y') {
            bill += 3500;
        }
    }

        cout << "Your total bill for this semester is $" << bill << endl;

}
```

Output

```
Please input "I" if you are in-state or "O" if you are out-of-state:
I
Please input "Y" if you require room and board and "N" if you do not:
N
Your total bill for this semester is $3000
```

```
Please input "I" if you are in-state or "O" if you are out-of-state:
O
Please input "Y" if you require room and board and "N" if you do not:
Y
Your total bill for this semester is $8000
```

```
Please input "I" if you are in-state or "O" if you are out-of-state:
m
Invalid input, needs to be "I" or "O". Try Agin:
I
Please input "Y" if you require room and board and "N" if you do not:
b
Invalud input, needs to be "Y" or "N". Try again:
Y
Your total bill for this semester is $5500
```