

Exercise 4 Preliminary Explorations

Due date: Wednesday, 15 November 2023, 2:30 pm.

To Turn In: A file called lastnameE4.txt containing the answers to the questions in Part 1 Step 6 and Part 2 Steps 4, 8 and 12.

For Exercise 4 you will be using the PL460 commands “read” and “eof?”. For Exercise 5, you will be fully implementing and testing the input and output operators for a new C++ class called “Money”. This preliminary exercise is designed to assist you in exploring the details of C++ input and output for standard types.

For **Exercise 4 Part 1**, you are to test the 6 C++ programs using no input and the 3 input files in the folder Exercise4-1 in the course pickup folder.

1. Copy the folder Exercise4Prelim from ~tiawatts/cs460pickup. Included files are:
E4a.cpp E4b.cpp E4c.cpp E4d.cpp E4e.cpp E4f.cpp
input.em input.np input.vi
2. Compile each of these 6 C++ programs.
3. Create a table for your observed results:

	(no input)	input.em	input.np	input.vi
E4a.cpp				
E4b.cpp				
E4c.cpp				
E4d.cpp				
E4e.cpp				
E4f.cpp				

4. Run each of the programs without providing the input file name as an argument.
5. Run each of the programs using each of the 3 input files as input. The name of the input file should be entered as a command line argument when executing the program.
6. Why do the results vary?

For **Exercise 4 Part 2**, you are to test the 6 C++ programs using no input and the 3 input files in the folder Exercise4Prelim in the course pickup folder.

1. Enter the following C++ program into a file called E4g.cpp.

```
// Program : Exercise 4 G
// Description: This program will be used to explore how C++ handles
// input and output for integer values.

// Three data values will be read from the standard input stream
// Results will be written to the standard output stream

#include <iostream>

// cin and cout will be used
using namespace std;

int main ()
{
    // the variable, v, will be used to store the current input value
    int v;

    cout << "Enter the data set input: ";

    for (int i = 1; i <= 3; i++)
    {
        cin >> v;
        cout << "The input value is " << v << "; the fail flag is ";
        if (cin.fail() == true)
        {
            cout << "true" << endl;
        }
        else
        {
            cout << "false" << endl;
        }
    }
    return 0;
}
```

2. Predict the output of the program for each of the data sets in the following table.

Case	Input data	Predicted Output
1.	5 12 15	
2.	0005 -12 15	
3.	5 a 12	
4.	5.13 -12 15	
5.	abc 5 12	

3. Compile and run the program with each of the data sets in the following table (Enter all of the input in the data set the first time the program pauses for input).

Case	Input data	Observed Output
1.	5 12 15	
2.	0005 -12 15	
3.	5 a 12	
4.	5.13 -12 15	
5.	abc 5 12	

- How accurate were your predictions? Write 1 to 5 sentences describing your observations of the rules used by the input operator (>>) when it is used to read a int value.
- Copy your E4g.cpp program to a new file called E4h.cpp. Modify the program by changing the type of v from integer to float (a real value). The line

int v;
will become:
float v;

- Predict the output of the program for each of the data sets in the following table.

Case	Input data	Predicted Output
1.	5.1 12.05 15.23	
2.	5.1 -12.05 15.23	
3.	5 12 15.23	
4.	005.13 a 15	
5.	abc 5 12	

- Compile and run the program with each of the data sets in the following table (Enter all of the input in the data set the first time the program pauses for input).

Case	Input data	Observed Output
1.	5.1 12.05 15.23	
2.	5.1 -12.05 15.23	
3.	5 12 15.23	
4.	005.13 a 15	
5.	abc 5 12	

- How accurate were your predictions? Write 1 to 5 sentences describing your observations of the rules used by the input operator (>>) when it is used to read a float value.

9. Enter the following C++ program into a file called E4j.cpp.

```
// Program : Exercise 4 J
// Description: This program will be used to explore how C++ handles
// input and output for various data types.
// Four data values will be read from the standard input stream
// Results will be written to the standard output stream

#include <iostream>

// cin and cout will be used
using namespace std;

int main ()
{
    // these variables will be used to store the current input values
    int v1;
    float v2;
    char v3;
    string v4;

    cout << "Enter the data set input: ";

    cin >> v1;
    cout << "The input value is " << v1 << "; the fail flag is ";
    cout << (cin.fail() ? "true" : "false") << endl;

    cin >> v2;
    cout << "The input value is " << v2 << "; the fail flag is ";
    cout << (cin.fail() ? "true" : "false") << endl;

    cin >> v3;
    cout << "The input value is " << v3 << "; the fail flag is ";
    cout << (cin.fail() ? "true" : "false") << endl;

    cin >> v4;
    cout << "The input value is " << v4 << "; the fail flag is ";
    cout << (cin.fail() ? "true" : "false") << endl;

    return 0;
}
```

10. Predict the output of the program for each of the data sets in the following table.

Case	Input data	Predicted Output
1.	5 12.3 a xyz	
2.	512.3axyz	
3.	xyz a 12.3 5	
4.	5 12 15	
5.	5 12.3 45.6	

11. Compile and run the program with each of the data sets in the following table (Enter all of the input in the data set the first time the program pauses for input).

Case	Input data	Observed Output
1.	5 12.3 a xyz	
2.	512.3axyz	
3.	xyz a 12.3 5	
4.	5 12 15	
5.	5 12.3 45.6	

12. How accurate were your predictions? Write 1 to 5 sentences describing your observations of the rules used by the input operator (>>) when it is used to read values of varying types.