CS 202 Homework 0

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Source Code Link: `https://github.com/siddhartha-crypto/cs202/tree/master/hw0`

1 Design

1.1 Temperature

For this assignment, I am trying a new style of error input that I discovered via stackexchange.com. This style of error input checking uses the `try` and `catch` methods, as well as a few other error checking options.

1.2 Winter Break

Over the winter semester, I completed a C programming course on Udemy. One of the simple programs I completed uses C functions to display information about a variable. I am updating this program to allow the user to input the variable at the command prompt. I have not done this before in C, so using C with the command prompt is something new to learn.

2 Post Mortem

2.1 Temperature

I thought creating this program would be a quick process, but I ended up spending several hours. This is partly due to the fact that I'm in the mood to relax and my mind wandered a lot, but is also due to the fact that the aspect of using pointers in this `try...` method was challenging.

I spent about 3 or 4 hours on this, but it wasn't necessary. My mind was wandering.

2.2 Winter Break

This was not overly difficult, but I did have to spend some time deducing the correct method for capturing an argument at the command prompt and coverting this into a single character.

I spent about 1 or 2 hours on this, with much of the time wandering around in the process.

3 Answers to Questions

- In entertainment, one of the uses of software can be found in the way machine learning is gaining the capability of rendering painterly images. In the near future, moving pictures (film) will be able to have the complete painterly effect that is normally only found in still images.
- Technically, most software developers have two arms and two legs, a head, with lots of fingers.
- 120GB on my laptop SSD, 1TB on my desktop SSD, with a few backup drives. Memory for both is 16GB.
  - Automated food farming (such as the software found in Farmbot)
  - Video walkie-talkie (Marco Polo)

  - 3D CNC Drilling (metal 3D printing)
  - Blockchain!
  - Natural Language Processing: This is the one on which I am currently focused. I hope to be able to perform simple ML tasks with Python by the end of the year – hopefully by the end of the summer. I would like to be able to utilize this type of software, as I love mythology and symbolism. The world is connected not by atoms and molecules, but by symbols and stories.

- There are four binary digits in one hexadecimal digit and four also in a decimal digit.

4 Sample Output

4.1 Temperature

```
$ ./temperature
Please provide a farenheit temperature as a double
$ ./temperature aaa
Welcome to the temperature conversion engine
Trailing characters after number: aaa
$ ./temperature 10.00a
Welcome to the temperature conversion engine
Trailing characters after number: 10.00a
$ ./temperature -275
Welcome to the temperature conversion engine
Please provide a temperature value higher than absolute zero.
$ ./temperature 32
Welcome to the temperature conversion engine
Using C Function: 0
Using CPP Function: 0
$ ./temperature 15.15892
Welcome to the temperature conversion engine
Using C Function: -9.3561556
Using CPP Function: -9.3561556
```

4.2 Winter Break

```
Please provide a character as an input
$ ./prog a
Value of letter: a
Address of letter: 0x7fff43f0fe67

pLetter's address: 0x7fff43f0fe68
Size of pLetter: 8
Value of pLetter: 0x7fff43f0fe67
Value pLetter points to: a
$ ./prog easdf
Value of letter: e
Address of letter: 0x7ffd44cc2ea7

pLetter's address: 0x7ffd44cc2ea8
Size of pLetter: 8
Value of pLetter: 0x7ffd44cc2ea7
Value pLetter points to: e
```

5 My Programs

5.1 Temperature

```
/*
 * main.cpp
 * CS 202
 * January 19, 2020
 * Bryan Beus
 * Main file for temperature main project in hw0
 */

#include <iostream>
#include <iomanip>
#include <string>
#include <cstdlib>
#include <stdexcept>
#include <stdio.h>
#include <stdlib.h>

#include "Miscellaneous.hpp"

using std::string;
using std::cout;
using std::cin;
using std::endl;
using std::getline;
```

```cpp
using std::left;
using std::size_t;
using std::stod;
using std::cerr;

// C++ Function to convert command line input from farenheit to celsius
double cpp_ftoc(const char* str) {

    // Initiate variables
    string userInput = str;
    double x;

    try {

        // Attempt to cast the value to the x double
        size_t pos;
        x = stod(userInput, &pos);

        // If the position of the end of the number is less than the total length of the user input, indicate that there are errors and end the program
        if (pos < userInput.size()) {
            cerr << "Trailing characters after number: " << userInput << endl;
            exit(EXIT_FAILURE);
        }

    // If there are any other issues with the attempt, end the program
    } catch (std::invalid_argument const &ex) {
        cerr << "Invalid number: " << userInput << endl;
        exit(EXIT_FAILURE);
    } catch (std::out_of_range const &ex) {
        cerr << "Number out of range: " << userInput << endl;
        exit(EXIT_FAILURE);
    }

    // Ensure that the farenheit value is valid scientifically
    if (x < -273) {
        cout << "Please provide a temperature value higher than absolute zero." << endl;
        exit(EXIT_FAILURE);
    }

    // Perform the conversion
    x = (x - 32.00) * 5/9;
    return x;
}

double c_ctof(const char* str) {

    // Initiate variables
```

```
71      string userInput = str;
72      double x;
73
74      // Attempt to cast the c string to the double x value
75      // If the *end variable has a value other than a null
        ↪  character, there must be trailing characters
76      try {
77          char* end;
78          x = strtod(str, &end);
79          if (*end != '\0') {
80              cerr << "Trailing characters after number: " <<
                ↪  userInput << endl;
81              exit(EXIT_FAILURE);
82          }
83
84      // End the program, if needed for any other reason
85      } catch (std::invalid_argument const &ex) {
86          cerr << "Invalid number: " << userInput << endl;
87          exit(EXIT_FAILURE);
88      } catch (std::out_of_range const &ex) {
89          cerr << "Number out of range: " << userInput << endl;
90          exit(EXIT_FAILURE);
91      }
92
93      // Test that the value is scientifically valid
94      if (x < -273) {
95          cout << "Please provide a temperature value higher than
                ↪  absolute zero." << endl;
96          exit(EXIT_FAILURE);
97      }
98
99      // Perform the conversion
100     x = (x - 32.00) * 5/9;
101     return x;
102 }
103
104 int main(int argc, char** argv) {
105
106     // Check for the appropriate number of command prompts
107     if (argc < 2) {
108         cout << "Please provide a farenheit temperature as a
                ↪  double" << endl;
109         exit(EXIT_FAILURE);
110     }
111
112     // Inform user of the nature of the software
113     cout << "Welcome to the temperature conversion engine" <<
        ↪  endl;
114
115     // Iniate values and make calls to functions
116     double x = c_ctof(argv[1]);
117     double y = cpp_ftoc(argv[1]);
118
```

```
    // Print results
    cout << "Using C Function: " << std::setprecision(8) << x <<
    ↪  endl;
    cout << "Using CPP Function: " << std::setprecision(8) << y
    ↪  << endl;

    return 0;
}
```

5.2 Winter Break

```
/*
 * main.c
 * CS 202
 * January 19, 2020
 * Bryan Beus
 * Main file for winter-break project in hw0
 */

#include <stdio.h>
#include <string.h>
#include <ctype.h>
#include <stddef.h>

int main(int argc, char *argv[]) {
    if (argc < 2) {
        printf("Please provide a character as an input\n");
        return 0;
    }
    char* command = argv[1];
    char letter = command[0];
    char *pLetter = NULL;

    printf("Value of letter: %c\n", letter);
    printf("Address of letter: %p\n\n", &letter);

    pLetter = &letter;

    printf("pLetter's address: %p\n", (void*)&pLetter);
    printf("Size of pLetter: %zd\n", sizeof(pLetter));
    printf("Value of pLetter: %p\n", pLetter);
    printf("Value pLetter points to: %c\n", *pLetter);

    return 0;
}
```

6 Commit Histories

```
e1443b8 (HEAD -> master, origin/master) remove logic error when inputting values in temperature hw0
cf57007 adjust winter-break program to accept input from commandline
46145e2 adjust file name for winter-break in hw0
1656280 remove CPP style file from hw0 winter-break, stick with C file
e9dec77 adjusting files for C
1d2e21e correct project comment headers in hw0
a6c32ff rename main file in winter-break hw0
cf26c33 make clean in hw0 winter-break
0166319 remove old folders, and add winter-break project, based on work done previously, to hw0
8e77a9c add comments to hw0 temperature
7a84c47 account for failure to enter any input at all in temperature hw0 assignment
891e45c resolve char to size_t for pos variable in C++ version of conversion for temp, hw0
15806a3 create c function for conversion, begin cpp version of same function
542f0e3 Check for absolute zero in hw0 temperature
f3b1751 initiate temperature project, initiate command line argument error tests
```