

ENGG 156 Project 2 Third Progress Report

Interfacing a Temperature Sensor

Streamlined C++ code

All of the functions of the program was consolidated into one project file as well as incorporating a user-command input interface where the user can choose the process that the program will process.

Removed Hex value converter and changed to built-in Hex parser in C++

```
else if (cmd == "adc")
{
    string hexNumber[10] = {"F9B8", "EB11", "CB00", "9A48", "6761",
                            "400F", "26C0", "1ABE", "12B9", "0D58"};
    for (int i = 0; i < 10; i++)
    {
        double decValue = stoi(hexNumber[i], 0, 16);
        double resistancevalue = ADCconvert(decValue);
        //Replace rVal with ADC resistance calc
        tempOut = (solveBeta(T_0)*T_0)/
            (((log(resistancevalue/rNull(T_0)))*T_0)+solveBeta(T_0));
        cout << "T_out = " << tempOut << " K;\t"
            <<Kelvin2Celsius(tempOut)<<"degree Celsius"<<endl;
    }
}
```

The Hex value converter function was removed and instead replaced by the built-in capabilities of the C++ program to parse them into the decValue variable automatically. This not only reduced the number of lines in the code, but also helped in streamlining the process for solving the tempOut values.

Streamlined Temperature Output Values

All temperature values as processed in the *adc* and *res* functions have their outputs in terms of °C and all resistance values have been streamlined in terms of Ω .

```
[CMD] : res
Temperature : -45C      ; 228.15K | R0 : 39759.3
Temperature : -25C      ; 248.15K | R1 : 11230
Temperature : -5C       ; 268.15K | R2 : 3830.2
Temperature : 15C       ; 288.15K | R3 : 1516.75
Temperature : 35C       ; 308.15K | R4 : 677.374
Temperature : 55C       ; 328.15K | R5 : 333.746
Temperature : 75C       ; 348.15K | R6 : 178.371
Temperature : 90C       ; 363.15K | R7 : 116.66
Temperature : 105C      ; 378.15K | R8 : 78.9135
Temperature : 120C      ; 393.15K | R9 : 54.9964
```

```
[CMD] : adc
Voltage: 4.87739 V      Current: 0.000122606 A
Resistnace: 39781  $\Omega$ 

T_out = 228.142 K;      -45.0079 °C
-----
Voltage: 4.59121 V      Current: 0.000408789 A
Resistnace: 11231.2  $\Omega$ 

T_out = 248.148 K;      -25.002 °C
-----
Voltage: 3.9649 V       Current: 0.0010351 A
Resistnace: 3830.47  $\Omega$ 

T_out = 268.149 K;      -5.00143 °C
-----
Voltage: 3.01335 V      Current: 0.00198665 A
Resistnace: 1516.8  $\Omega$ 

T_out = 288.149 K;      14.9992 °C
-----
Voltage: 2.01915 V      Current: 0.00298085 A
Resistnace: 677.374  $\Omega$ 

T_out = 308.15 K;       35 °C
-----
Voltage: 1.25116 V      Current: 0.00374884 A
Resistnace: 333.747  $\Omega$ 

T_out = 328.15 K;       54.9999 °C
-----
Voltage: 0.756847 V     Current: 0.00424315 A
Resistnace: 178.369  $\Omega$ 

T_out = 348.15 K;       75.0004 °C
-----
Voltage: 0.522316 V     Current: 0.00447768 A
Resistnace: 116.649  $\Omega$ 

T_out = 363.154 K;      90.0037 °C
-----
Voltage: 0.365682 V     Current: 0.00463432 A
Resistnace: 78.9075  $\Omega$ 

T_out = 378.153 K;      105.003 °C
-----
Voltage: 0.260624 V     Current: 0.00473938 A
Resistnace: 54.9912  $\Omega$ 

T_out = 393.154 K;      120.004 °C
-----
```

Conclusion

The project as of the moment is around 90% complete. Only a few more additions and revisions are to be made to complete the project. As of the moment, it is functioning as expected with little to no errors when doing test runs.

Task	Description	Status
Project Research	Research and familiarize software that would be suitable project	DONE
Project Outline	Create a draft document as a guide for the project paper	PARTIAL
Revision I	Following each progress report, provide the necessary corrections and apply feedback & revisions	DONE
Revision II	Following each progress report, provide the necessary corrections and apply feedback & revisions	ONGOING
Finalize Paper	Finish the paper and draw insights and conclusions on the Project	ONGOING