

Python Assignment

Resources: [TDK NTCG163JF103FT1 RT Characteristic](#)

Thermistor characteristics are often provided by manufacturers in CSV format (Comma Separated Values). You are provided with one such RT characteristic document. The document contains some general information, and a table which shows the relationship between the ambient temperature and the resistance of the thermistor. The first row of the table contains the names of the columns, and the second row contains the units of measurement for each of the columns. The first column is named “Temp” which stands for Temperature and is given in degrees Celsius (indicated by “degC” in the second row). The third column is named “Nom” which stands for Nominal resistance and is given in kOhms. The goal of this assignment is to create a simplified output file which contains nominal resistances for a certain set of temperatures. The temperatures of interest are:

- Between 0 degrees Celsius and 100 degrees Celsius, including those values.
- Divisible by 5 (let’s just say 0 is divisible by 5 and save the discussion for later)

Detailed description

The solution needs to be provided in one Python script called *interview_solution.py*. The preferred Python version is 3. You can use whatever Python module you like. If you are using an advanced, non-standard module, please provide the name and version of that module in a text document or create a *requirements.txt* file. Note that the problem is easily solved using standard modules that come with Python3 by default.

The script needs to be called from the terminal with one required input argument. The input argument contains the file name and is indicated by **-c**. The correct way of running the script with the given CSV file is:

```
python interview_solution.py -c NTCG163JF103FT1.csv
```

or

```
python3 interview_solution.py -c NTCG163JF103FT1.csv
```

depending on how your environment is set up. The script should not have the file name hard coded anywhere in the code, it should always use the parsed input argument as the file name. **HINT:** *Put the RT characteristic file in the same folder as the script.*

The script needs to successfully detect that the required input argument is not provided. It also needs to make sure the input argument contains a CSV file name, and that the file exists. The script needs to print a help string when called with an optional argument **-h** or **--help**. The help string needs to provide the user with a list of arguments that need to be provided and the method of providing them. **HINT:** *Python has built-in modules that can assist you with parsing arguments from the command line.*

The script needs to output the temperature-resistance pairs in JSON format. The JSON needs to be indented with 4 spaces. The output file should be named the same as the input file, with the extension

“.csv” replaced by “.json”. For the given RT characteristic file, the script should create a file called “NTCG163JF103FT1.json”. The output file should only contain temperature-resistance pairs which satisfy the conditions stated in the problem formulation. The output file should be structured as follows:

```
{  
  "temp1": res1,  
  "temp2": res2,  
  "temp3": res3  
}
```

The example only shows the structure and does not reflect the correct number of elements or the correct values. The keys (temp1, temp2, temp3) are temperatures in degrees Celsius, and the values (res1, res2, res3) are nominal resistances in kOhm. The numbers that represent temperatures and resistances should be written as floating point numbers (meaning 0 is written as 0.0).

Submission

You do not need to provide the output JSON file. You only need to provide the solution script. If you used proprietary modules that need to be installed in order to run your solution, make sure you create a *requirements.txt* file. Upload your final solution to a public repository on GitHub with all the notes regarding your code written in a short README file. Feel free to add your thought process and any other comments that will help us understand what you tried to achieve with your code. **The submission deadline is the August 9th 2020.**