Study Session 2: Introduction to Python and NumPy

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Figure 1 - Vacuum oven for annealing process

Problem:
You are running a process on a vacuum oven like the one pictured in Figure 1. This process requires the oven to be maintained at 200 °C for 3 days. Any deviation from this temperature will result in the failure of your process.

After two attempts you see that your process is continually failing. However, you are not sure if the temperature of the oven is causing this. Therefore, you set-up a temperature monitor that will record the temperature in one-hour intervals for the entire three-day process.

This temperature monitor produces a text file named 'tempdata.txt' that has all the temperature recordings for each hour timepoint for each day. You are tasked with analyzing this temperature data in order to determine if the process temperature remains within an acceptable range of $\pm$ 3 °C.

Set-up:
In order to solve this problem you must write a program in python that imports the data into a NumPy array from the 'tempdata.txt' file, returns the daily average temperature along with its standard deviation, and creates an alert if the $\pm$ 3 °C threshold is crossed during any of the hours of the process.

To do this you will need to utilize NumPy arrays for data storage, for loops to iterate through the array, and if statements to determine if the threshold is met.

Helpful Hint:
Using NumPy you can read a text file into an array using the `numpy.genfromtxt()` function. This function needs two arguments: the first argument is the path of the text file, and the second is the delimiter of the text file.

For this example, you can use:

```
array_name = numpy.genfromtxt('filepath\filename.txt',delimiter = ',')
```