Lab exercise: basics in Matlab, continued

Conversion table, Fahrenheit to Celsius

You plan to travel to the USA on a vacation. There, you will get temperature information in Fahrenheit, and you think it would be useful to bring along a table with Fahrenheit values and the corresponding Celsius values. You use Matlab to generate and print the table and at the same time draw the corresponding information as a graph with Fahrenheit values on the x-axis and the Celsius values on the y-axis. Below you will find step by step guidelines on how to write the table and the draw the graph.

The formula for conversion of Fahrenheit to Celsius is \( C = \frac{5}{9}(F-32) \).

Below, you will get the steps to create such a table and graph.

**To do**

1. **Create a vector with Fahrenheit values.**
   You would like the content of the table to include the integers values from 32 to 132 degrees Fahrenheit (equivalent to 0 and approximately 55 degrees Celsius). The easiest way to create a table of values from 32 to 132 is through the command (we store the vector in a variable `Fdegrees`):

   \[ Fdegrees = 32:132 \] (or \[ Fdegrees = 32:1:132 \])

   Create the vector in the Command window.

   (It is also possible to use `linspace`, but it is harder here as you need to calculate how many numbers it will be in the vector).

2. **Create the corresponding Celsius vector.**
   Now, calculate the corresponding Celsius values and store it i a vector `Cdegrees`:

   \[ Cdegrees = \frac{5}{9}*(Fdegrees-32) \]

3. **Display the vectors in a tabular on the screen**
   In order to lookup Fahrenheit degrees and corresponding Celsius degrees we need a table. The easiest the way to do that is to put `Fdegrees` and `Cdegrees` next to each other as columns in a matrix:

   \[ [Fdegrees' \ Cdegrees'] \]

   Try it!
   Remember that the single quote ‘ is the transpose (flip the row vectors to column vectors).
   The brackets defines the matrix.
Also, add
disp(’Fahrenheit to Celsius table:’)
prior to
[Fdegrees´ Cdegrees´]

and you get a little title before the table.

4. **Plot the table.**
Finally, make a graph with Fahrenheit values as the x-axis, and Celsius as the y-axis:

```
plot(Fdegrees,Cdegrees)
```

Add title and labels:

```
title(’Fahrenheit and Celsius degrees’) 
xlabel(’Fahrenheit’) 
ylabel(’Celsius’)
```

Add a grid to make it easier to read the graph:
```
grid on
```

5. **Modifying the graph**
Just for fun, change color and line type by

```
plot(Fdegrees,Cdegrees,’:’); 
and 
plot(Fdegrees,Cdegrees,’r:’);
```

What happens? You can find available colors and line types in the help documentation:  
`doc plot` or `help plot`.  
Play around a little with different line types and colors.