Phys234, 2018, Problem set #6: In-lab questions, Thursday lab

Question 1:

Write a function `newlinterp.m` which performs a piecewise linear interpolation between data points. This function should be similar to the function `mylinterp.m` that we saw in class, except that instead of computing the interpolation based on the *Lagrange interpolating polynomials* ($L1$ and $L2$), your function should be based on the linear interpolation as we have seen in class, that is in terms of coefficients a and b such that for $x_i \leq \hat{x} \leq x_{i+1}$, where x_i are the location of the data points,

$$y(\hat{x}) = a + b \cdot (\hat{x} - x_i)$$

Recall that the coefficients a and b can be found by the condition that the interpolating function should be continuous at data points.
Your m-function `newlinterp.m` should have the same inpout/output structure as `mylinterp.m`, that is,

```
function yhat = newlinterp(x,y,xhat)
```

Write a function `ps6q1.m` to test your function with the following data set:

i	1	2	3	4	5	6	7	8	9	10	11
x	-3.0	-2.4	-1.8	-1.2	-0.6	0	0.6	1.2	1.8	2.4	3.0
y	0.2545	0.4193	0.7784	1.4480	1.5894	1.3715	2.5612	4.9576	1.5744	0.6154	0.3253

Your function `ps6q1.m` should produce a plot showing both the data points and your interpolation function. Your plot should include axis labels and a legend.

Question 2:

Write a function `ps6q2.m` that produces a cubic-spline interpolation with the "not-a-knot" end condition using the same data (or support points) given in the previous question. Produce a plot that includes: 1) the data points (as circles), 2) your cubic spline interpolation function, and 3) the linear interpolation of the previous question.Your plot should include axis labels and a legend.