CPSC 636-600 Homework 4 (Total 100 points)

See the course web page for the **due date** and **submission info**.

Instructor: Yoonsuck Choe

April 06, 2008

Problem 1 (Written: 10 pts): Solve exercise 9.3. **Hint**: see figure 9.18 (and slide09.pdf, page 24) to formulate your idea.

Problem 2 (Program: 30 pts): Fill in the two lines in the `som.m` skeleton code from the course web page, and run the 6 examples (1D vs. 2D, and three different inputs) and report your results.

`http://courses.cs.tamu.edu/choe/08spring/src/som.m`

Problem 3 (Program: 20 pts): Solve exercise 9.9 using the `som.m` function.

Problem 4 (Program: 20 pts): (1) Generate 20 random (x, y) points, and run a 1D-lattice SOM with 200 neurons to run a traveling salesman experiment. Adjust the learning rate and neighborhood radius update schedule appropriately.

(2) Write a simple function to calculated the tour distance based on the learned weights. **Hint**: Simply go through the weight matrix `w` from top row to the bottom row and calculate the sum of Euclidian distance between `w(n,:)` and `w(n+1,:)`.

(3) Run SOM with different initial weights (repeat this 5 times), and run it on the same 20 inputs. Calculate the tour distance for each run and compare the results. Discuss how optimal SOM can get, based on these results.

Problem 5 (Program: 20 pts): Solve exercise 9.11 using the `som.m` funtion.