Introduction to Intelligent Systems: The Travelling Salesperson Problem

For this assignment you can start from the TSP code provided through Nestor. Modify the code in such a way that your program:

- runs the Metropolis version of the optimization for a number of N cities, but at constant temperature parameter T.
- performs (at least) 100 x N single steps, i.e. set the parameter maxsteps=100 in the code.
- calculates the mean value $< l >$ and the variance $\text{var}(l) = < l^2 > - < l >^2$ where averages are computed over the last 50 measured values
- outputs the results <l> and var(l)

A reasonable value for the number of cities should be N=50. It is probably useful to switch off the graphics (animation).
Obtain $< l >$ and var(l) for (at least) the following values of T: 0.5, 0.2, 0.1, 0.05, 0.02, and 0.01. Generate a plot showing <l> vs. T
Use symbols to display the mean values, potentially connected by lines, as in `plot(x,y,'ko-')`, for instance. Display the standard deviation sqrt[var(l)] in the same graph as 'errorbars' around the mean. To this end, use the Matlab command `errorbar(x,y,e)`.
You should hand in a brief report including

- a headline and opening paragraph briefly explaining the problem, a couple of sentences is sufficient
- a plot as described above, it should have axes labels and a brief caption
- a brief discussion of the T-dependence in your own words and potential conclusions you draw

The grading will be based on the following aspects (ordered acc. to importance):
a) completeness of the report and correctness/plausibility of the results
b) readability, layout, formatting of the text
c) appearance of the plot, e.g. axes labels, brief caption
d) language/English issues

In principle, a grade "10" could be achieved by submitting a report which satisfies the above criteria 100% perfectly. Potential deficits relating to (b,c,d) could be compensated for by considering one of the following suggestions:
- use larger values of N or more values of T
- perform several simulation runs per temperature
- obtain the (additional) average over these runs
- implement / consider ideas of your own.