This assignment covers Modules 4 and 5. It is due on Fri, 29 June 2007 at 23:59:59 GMT+2. Please send me a PDF file (which may be obtained by scanning handwritten pages) via e-mail to hoos@cs.ubc.ca.

Feel free to discuss the problems and solution ideas with other students, but you need to work out and write down the actual solutions on your own.

Problem 1 (5+10+15=30 marks)

(a) In a population-based SLS algorithm, is it typically more beneficial to have a very diverse or a very homogenous population?

(b) How could population-diversity be measured in the case of the TSP?

(c) Suggest a mechanism for controlling population diversity in an evolutionary algorithm for the TSP, based on your answers to parts (a) and (b).

Note: If you wish, you may consult the literature when solving this problem; as always, if your answers are based on the work of others, you must give appropriate references.

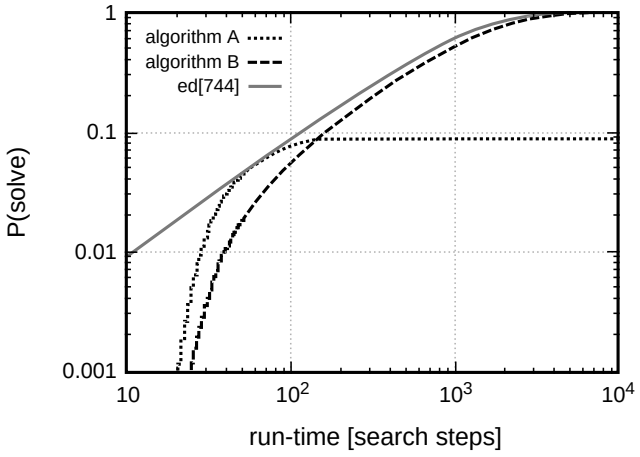
Problem 2 (10+5+10=25 marks)

(a) Briefly explain the difference between a qualified run-time distribution (QRTD), a solution quality distribution (SQD) and a "solution quality over time" (SQT) curve.

(b) Briefly explain and illustrate with an example how probabilistic dominance in the case of two optimisation Las Vegas algorithms (OLVAs) is reflected graphically in the relationship between respective SQT curves.

(c) Briefly explain and illustrate with an example why basing a performance comparison between two OLVAs solely on a single pair of SQT curves can be misleading. Your example should build on that from part (b).

Problem 3 (10+10=20 marks) You are comparing the performance of two SLS algorithms A and B for a combinatorial decision problem. Applied to a well-known benchmark instance, these algorithms were found to exhibit the RTDs shown on following next page.



(a) What can you learn from these RTDs?

(b) Which further experiments do you suggest to decide which algorithm is superior?