3NLPHO/3HO4: Heuristic Optimisation: Class test 1 feedback

The performance of the students on this class test was very good. The average mark is 70.47. Eight students got full marks. It was important for students to understand the tested material, because it covered the fundamentals needed for the rest of the course.

Question 1: Most of the students could select the correct answer.

Question 2: Only about 2/3 of the students could select the correct answer. The most common error is selecting (b). Even though local search focuses on a neighbourhood of some particular solution, it works on complete solutions.

Question 3: Only about 2/3 of the students could select the correct answer. The most common error is selecting (c). The correct answer can be found on page 33 of the lecture notes.

Question 4: Most of the students found the correct answer.

Question 5a: Most students selected this question, and performed well. Most students got the full marks of Question 5a).

Question 5b: Most students answered correctly the first part of this question. However, only few students could determine the size of the feasible region of the search space when one road is blocked.

Question 6a: About 3/4 students selected this question. Most of the students can find out the main differences between exhaustive search and local search (Global optimum/local optimum, and search space). But many of them failed to mention that the impracticability of exhaustive search when the search space is very large.

Question 6b: Only 1/3 students answered this question correctly. The gradient-based methods for NLP are important, because they are the most commonly used methods for solving NLP problems. The correct answer is that the evaluation function should be smooth and unimodal, and it is mentioned twice on page 34 of the lecture notes.

Question 7a: About 3/4 students selected this question. However, only a few students could answer it correctly. Most of the students answered this question by using the difference between local search and exhaustive search. However, both exhaustive search and local search are algorithms evaluating complete solutions. Algorithms evaluating complete solutions can always find a solution (even though this solution may not be optimal) at any time we stop the algorithm. However, algorithms evaluating incomplete solutions cannot be stopped any time to give us a solution, because they construct the solution step by step. They work on a subset of the original search space, given by a fixed property, and assume that the solution constructed step by step will share this property.

Question 7b: The answer to this question is much better than the answer to question 7a). Most of the students mentioned that the advantage of greedy algorithm is being fast. Also, most of the students mentioned that the disadvantage is that it cannot guarantee the overall optimum. However, many students missed that greedy is short sighted, in the sense that bad decisions made early cannot be changed later, because at each step greedy is only considering the most promising current decision.