

Seventh problem set

Due date: 2019.04.11, 9.00

Topic: permutation representation

You have to send your solutions via email (evolalghf@gmail.com). You have to solve them unassisted, unless it's marked with a star. The problems marked * can be solved in groups of two. You can get maximum 10 points.

1. (3 points) What's the type of the following problems (FOP, CSP, COP)? Justify your answer!
 - (a) Find the biggest full subgraph in the graph
 - (b) Find the minimum of the function $x^2 + 3y^4 - 5xy^2$ on integers
 - (c) Find a coloring of a graph with 5 colors.
2. (7 points) Design the representation and the fitting genetic operators for the following problem: in a school there are 16 classes (=group of students). For each subject it's given that which teacher holds it, how many times a week. The lectures are from Monday to Friday in 8 possible times. Make a schedule, which tells, what lectures is attended by a given class in a given time. There can be no conflicts, that is one teacher holds one lecture at a time, and one class can attend only one lecture at a time. Let us suppose we want to avoid holes in the schedule for the classes. How do we modify our algorithm?
3. (10 points)* We have a G graph, it's defined by it's adjacency matrix. Find out, using genetic algorithm, that at least how many colors is needed to color it. You can find test graphs on the web page. You also have to send the permutation, that defines a correct coloring, for each graph you could solve the problem. (Hint: 50 colors is enough for each).