



EVOLUTIONARY ALGORITHMS

HOMEWORK

First task

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<http://www.github.com/csp98>

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1. Let us suppose, that the run-time of an algorithm is monotone increasing in n , which is the length of the input. Investigate the following statements:
 - (a) If we plot the run-time on log-log scale than we obtain a monoton increasing function.
 - (b) If the run-time is not only monotone increasing, but also convex, then the plot on log-log scale will be convex.

Prove the true statement(s) and give counterexample(s) to the false one(s).

2. Let us suppose, that two possible solution are coded with 0101010 and 0001000. If they are the parents can any of their offspring be:
 - 0101010
 - 1111111
 - 0000000

in case we use:

- onepoint-crossover ?
- multiplepoints-crossover ?
- uniform-crossover ?

Offspring	Onepoint-crossover	Multiplepoints-crossover	Uniform-crossover
0101010	Yes, if we put the breakpoint in the first position (0 101010 + 0001000)		
1111111			
0000000			

3. How can we represent with a fixed length 0-1 series the solutions of the following problem?
 We have an $n \times n$ sized grid, and on each edge a real positive number. We are looking for a path from the upper left corner point to the lower right point, which goes only to the right or down, where the sum of the numbers along the path is minimal. Write a program (using your favorite programming language) to solve this problem using a suitable genetic algorithm.

Bibliography

- [1] Course Webpage
<http://math.bme.hu/safaro/evolalgen.html>