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DECISION ANALYSIS – EXERCISES XII – EVOLUTIONARY ALGORITHMS FOR MULTIPLE OBJECTIVE OPTIMIZATION

I. Indicate the truth (T) or falsity (F) for the below statements.

a) The impact of the mutation on the evolutionary search is exploitative rather than explorative	T
b) Tournament selection belongs to the class of ordinal selection methods	T
c) VEGA applies a generation model of managing the population	F
d) SPEA2 includes the archive members in the selection process	T

II. Given the two below presented chromosomes in the binary encoding:

1	0	1	1	0	0

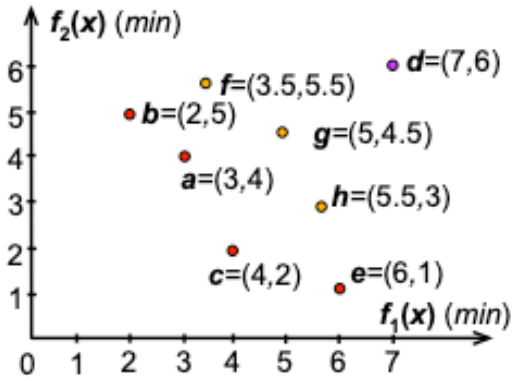
0	1	1	0	0	1

present a pair of chromosomes obtained after applying 2-point crossover with crossover points after the second and fifth genes:

1	0	1	0	0	0

0	1	1	1	0	1

III. Consider a set of solutions ***a***-***h*** in the objective space with two minimized objectives (see figure below).



a) Show the Pareto fronts used by NSGA-II as the primary sorting criterion.

Front 1: R = {b, a, c, e}
Front 2: R = {f, g, h}
Front 3: R = {d}

b) For solution ***a***, compute its raw fitness (sum of strengths of dominating solutions) according to the rules of SPEA2.

R(a) = 0 (no dominating solutions)

c) Which solution: ***a*** or ***c*** would be found more favorable by SMS EMOA (assume $d=z^{ref}$)? c (greater contribution to hypervolume)