Swarm Intelligence
Exercise 8

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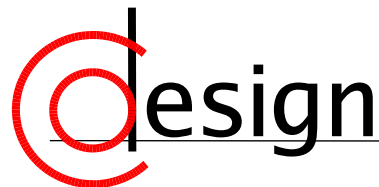
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Problem 19: Genetic Algorithm for Knapsack

Problem 20 (a)

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Devise appropriate mutation and crossover operators.

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Problem 20 (b)

Devise appropriate mutation and crossover operators.

- Mutation:

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What could be the coding of this problem for a Genetic Algorithm (i. e., the genotype)?

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Problem 20 (b)

Devise appropriate mutation and crossover operators.

- Mutation:
  - Random fill
  - Remove / add single items

Problem 20 (a)

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- Binary string

Problem 20 (b)

Devise appropriate mutation and crossover operators.

- Mutation:
  - Random fill
  - Remove / add single items
- Crossover:

Problem 20 (a)

What could be the coding of this problem for a Genetic Algorithm (i. e., the genotype)?

- List of indices of the items used
- Binary string

Problem 20 (b)

Devise appropriate mutation and crossover operators.

- Mutation:
  - Random fill
  - Remove / add single items
- Crossover:
  - One half from each parent
  - Selection by probabilities

Problem 20 (c)

Does your approach allow the construction of invalid individuals? If so, how do you deal with them?

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Yes, crossover might exceed the limit of $8kg$. Solutions:

- Remove randomly chosen items until valid
- Remove items with a low cost / benefit ratio until valid

Problem 20 (c)

Does your approach allow the construction of invalid individuals? If so, how do you deal with them?

Yes, crossover might exceed the limit of $8kg$. Solutions:

- Remove randomly chosen items until valid
- Remove items with a low cost / benefit ratio until valid
- Mixture of both strategies

Thank you for your attention! Any Questions?