**AI**

**Genetic algorithyms –**

**Knapsack Problem**

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# Introduction

The main goal of this assignment consists of develop a genetic algorithm, using python, to solve the knapsack problem and its variant, the multi-size knapsack problem.

The multi-size knapsack states that:

*Given a list of items L, where each item has a weight associated with it, the problem is to find a partition of the items into several subsets associated with multiple knapsacks, in such a way that the free space in the knapsacks is minimized.*

*We will assume that we can use a finite number of sizes for the knapsacks (the list of allowed sizes/capacities should be provided as input).*

*We will assume that we can use an arbitrary number of knapsacks of the same size.*

In this report I will write about how the standard basic algorithm was made and how was modified to fulfill the multi-size algorithm. After that, I will show the graphics about how effective the algorithm was, what was the best solution found and the statistics.

# Implementation of the algorithm

## Representations

To represent this problem, we must define the individuals of the population:

* Genes: The genes that
* Chromosomes
* Population

And we must define the functions:

* Decode
* Fitness
* Crossover
* Mutation
* Tournament selection
* New generation

## Modifications for the multi-knapsack

## Instances considered

# Statistics

# Bibliography