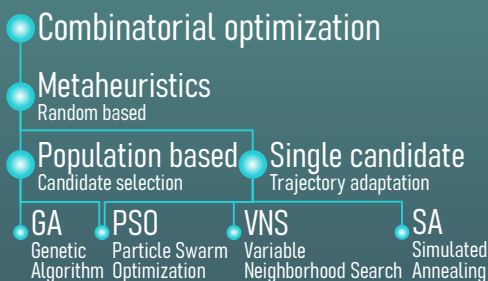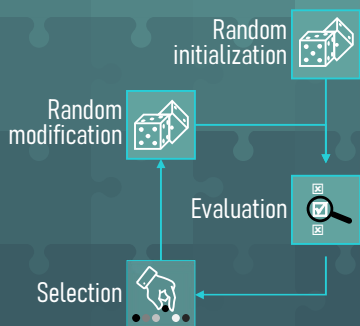# Machine Learning
Metaheuristic algorithms

" Combinatorial optimization algorithm using trade-off of randomization and local search to spare time but without guarantee that optimal solutions will be reached "
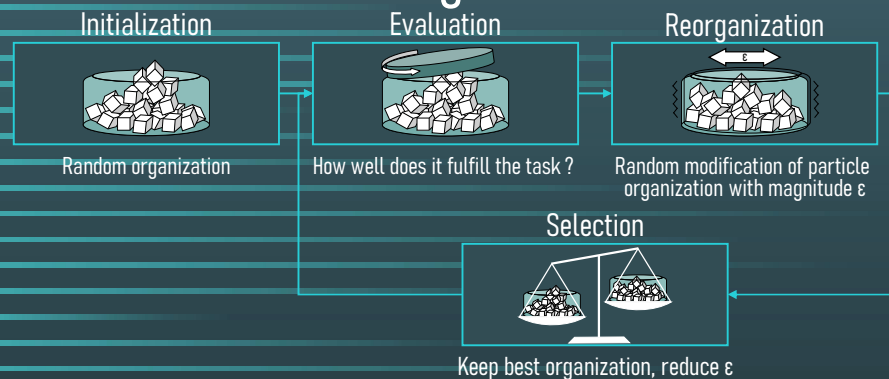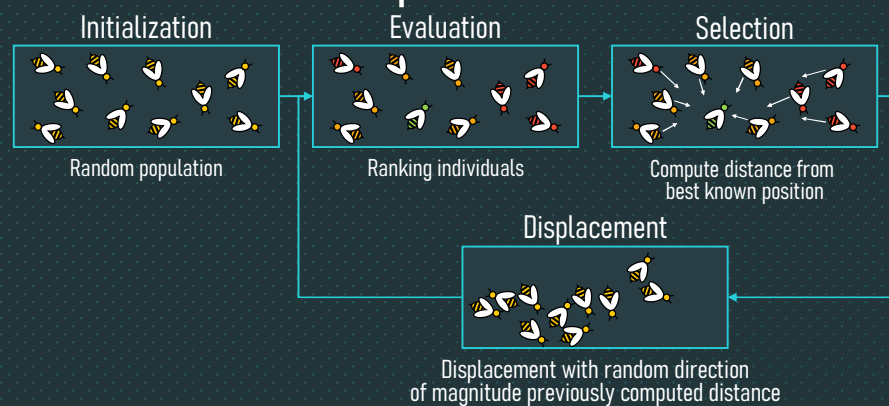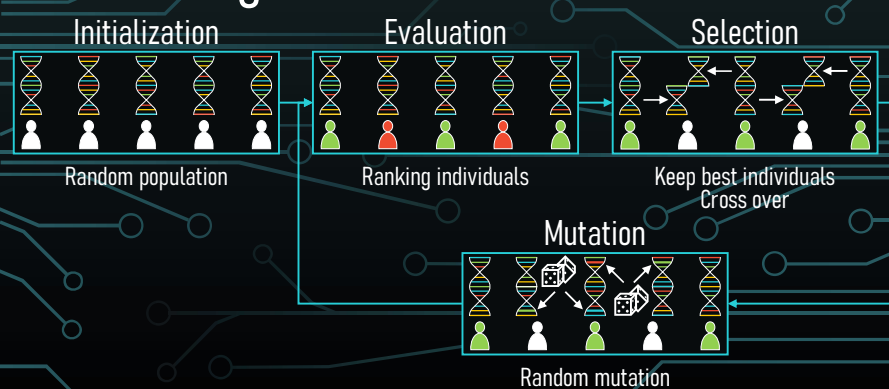
Family tree

- Combinatorial optimization
- Metaheuristics
  Random based
- Population based
  Candidate selection
- Single candidate
  Trajectory adaptation

GA
Genetic Algorithm

PSO
Particle Swarm Optimization

VNS
Variable Neighborhood Search

SA
Simulated Annealing

General principle

Random initialization

Random modification

Evaluation

Selection

Simulated Annealing

Initialization

Random organization

Evaluation

How well does it fulfill the task ?

Reorganization

Random modification of particle organization with magnitude ε

Selection

Keep best organization, reduce ε

Particle organization represents combination to optimize

Particle Swarm Optimization

Initialization

Random population

Evaluation

Ranking individuals

Selection

Compute distance from best known position

Displacement

Displacement with random direction of magnitude previously computed distance

Bee spatial position represents combination to optimize

Genetic algorithm

Initialization

Random population

Evaluation

Ranking individuals

Selection

Keep best individuals
Cross over

Mutation

Random mutation

DNA represents combination to optimize