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Course: CS3000
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Preserving Inter-gene Relations during Test Case Generation using Intelligent Evolutionary Operators

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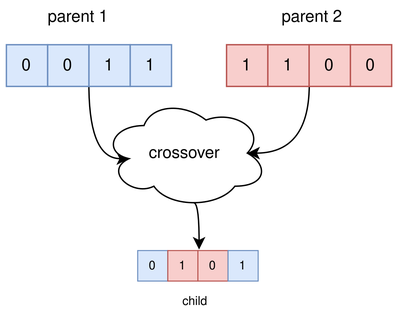
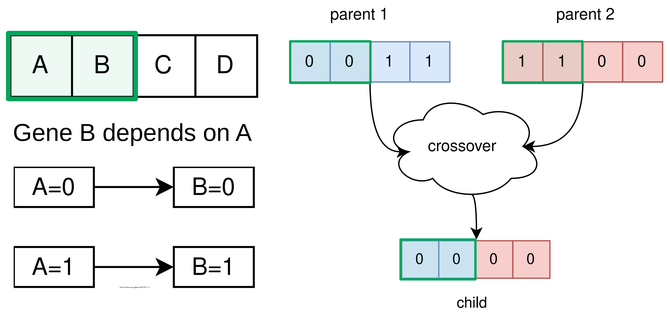
TU Delft

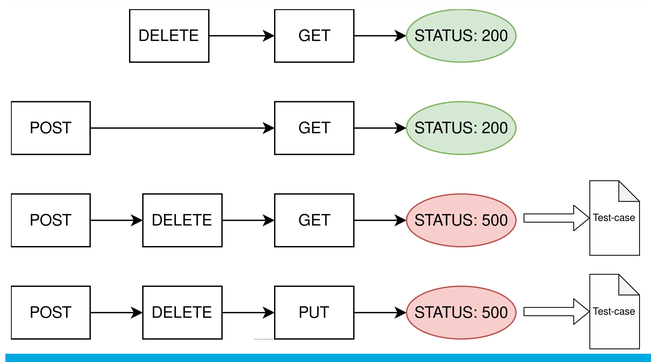
Disruptive Crossover Operators

Random



Building Blocks





RESTfull API Testing

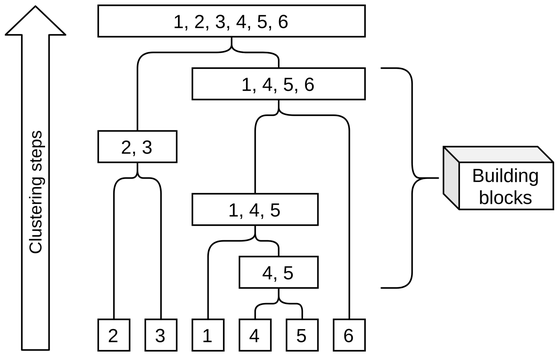
Looks like the POST and DELETE request depend on each-other.

Hence, the building block approach can be beneficial to the search process.

Machine Learning

ACMOSA

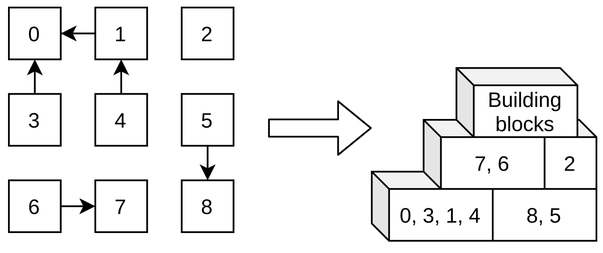
- Uses Agglomerative Hierarchical Clustering
- Finds the most similarly occurring parts of solutions



GOMOSA

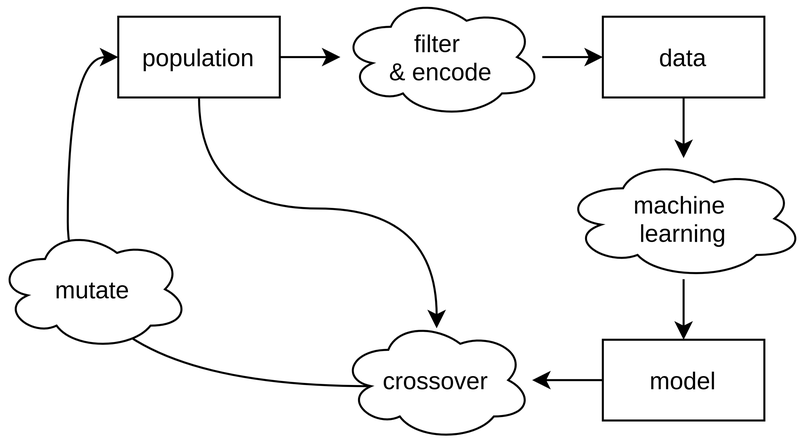
- Uses Gene-pool Optimal Mixing
- Finds a Bayesian Network that most accurately fits the distribution of partial solutions

Bayesian Network to Building Blocks



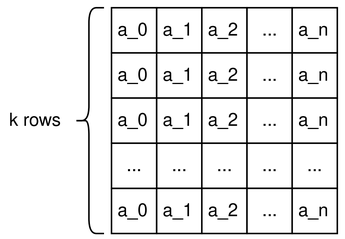
Process

Process Flow



Encoding

n possible actions
k solutions in population



What is the impact of using intelligent evolutionary operators on the performance of test-case generating evolutionary algorithms in terms of covering test targets?

Evaluation

Results

Out of the 5 benchmark APIs ACMOSA and GOMOSA performed:
- better for 2 benchmarks
- equal for 2 benchmarks
- worse for 1 benchmark

Conclusions

- ACMOSA and GOMOSA provide a significant benefit over MOSA for certain APIs
- Performance difference per API is most likely due to a combination of the API size and the level of dependence between API endpoints

Case: NCS benchmark