Transistor

BCS 1600, Project 1-2

Group 11

Full Name	Student ID
Dani Angelov	I6343770
Ethan Goetsch	I6293227
Vojtěch Kosatík	I6351976
Huy Pham	I6358696
Julian Nijhuis Nijhuis	I6367247
Nikita Souslau	I6366381
Michał Urbanowicz	I6354317

Examiners: Dr. Ashish Sai, Dr. David Mestel

Maastricht, June 10, 2024

Contents

1 | Abstract

Abstract goes here.

2 | Introduction

Introduction goes here.

3 | Methodology

Methodology goes here.

3.1 | Subsection 1

3.2 | Subsection 2

4 | Implementation

The following section describes the general outline of how the algorithms are implemented.

4.1 | Routing algorithm

The algorithm is implemented as follows:

Algorithm 1 Placeholder for Algorithm

Initialise population list p of size n_p with randomly generated solutions
Initialise empty list c of size n_c
Initialise best solution $a = 0$
Initialise iterator $i = 0$
Initialise maximum number of repetitions r
Initialise minimum subset size t
for parent in list p **do**
    Create subset q of population of random size $s \in [t, n_p]$
    for element in subset q **do**
        Evaluate value of element
    end for
    Select two best elements e_1, e_2 with most weight
    Create child k using **cross-over** of e_1 and e_2
    Mutate child k ▷ The mutation adds or removes a pentomino
    Add child k to list c
    if n_c equals n_p **then**
        List p is set to list c
        List c is emptied
        Increase value of iterator i by 1
        if evaluation of $k > a$ **then**
            Solution a is set to evaluation of k;
        end if
        if $i = r$ **then** ▷ The number m is arbitrarily selected
            break for loop;
        end if
    end if
end for
Ensure: k

Algorithm description goes here.

5 | Experiments

Experiment goes here.

6 | Results

Result goes here.

7 | Discussion

Discussion goes here.

8 | Conclusion

Conclusion goes here.

9 | References

[1] Xinwei Cui. *Using genetic algorithms to solve combinatorial optimization problems*. PhD thesis, Florida International University, Apr 1991.

[2] Soukaina Laabadi, Mohamed Naimi, Hassan El Amri, and Boujemâa Achchab. The 0/1 multidimensional knapsack problem and its variants: A survey of practical models and heuristic approaches. *American Journal of Operations Research*, 08(05):395–439, 2018.

[3] Yang Song, Chi Zhang, and Yuguang Fang. Multiple multidimensional knapsack problem and its applications in cognitive radio networks. In *MILCOM 2008 - 2008 IEEE Military Communications Conference*. IEEE, Nov 2008.

A | Appendix: pseudocode and flowcharts