University of Southern Denmark

DM803

Avancerede datastrukture forår 2020

Assignment 1

Author:
Sebastian Eklund Larsen
<selar16>
cpr: 300597

March 23, 2020

1 Introduction

In this assignment the objective is to implement both scapegoat trees and skip lists, and make and investigate their properties.

2 Implementation

The structures have been implemented following the descriptions from the articles from the course. They have been implemented in python. Both structures support the operations insert, delete and search. When running the main python file it waits for an input, writing "a" chooses scapegoat tree and "p" chooses skip list. Then one can write I, D or S followed by a number to insert delete or search for the number respectively.

3 Testing

Both structures have been manually tested to test if they can support the different inputs in a small capacity.
The scapegoat tree has been tested where it gets inserted many random numbers from a limited range, where it ends with a size beyond that of the range. This might be a problem with the way the rebuild function has been implemented. In order to try and fix it, the program tries to recalculate the parent reference for each node in the rebuild tree. This however creates the problem where the program reaches maximum recursion depth in python. Through further testing i found that some of the nodes in the rebuilt tree has created a cycle of parent child links. I used my time trying to fix this use since i did not feel it was possible to get a sufficiently big sample size for the other parts of the project with what the program was capable of, but i was unable to.

4 conclusion

Both structures are able to support insert, delete and search requests, but there are cases which have not been properly tested and debugged, which might crash the program. Since the program did not properly work, i did not manage to inspect the properties of the structures. I also a mistake where i forget to flush the output when everything is done.