

# CSE 373: Extra Assignment - Written

## Splay Tree

Due: Friday, June 2nd, 11:59 PM to Canvas

### Introduction

For this assignment, you will investigate and report on the splay tree, a unique data structure not covered in the course. You may use any resources to help you understand the data structure, but all analysis and discussion should be your own. Additionally, you should reference any resources you used in compiling your report. Wikipedia is an acceptable entry, but it will not be sufficient.

Your final result should be between 3-5 pages and you may use figures to illustrate your point when necessary. The final result will be graded out of 25 and will replace your lowest homework part score, provided that you score better on this assignment. **Your total homework score cannot go down from completing this extra assignment.**

In your discussion of splay trees, there should be an answer to at least the following questions. Many of the questions overlap and a thorough and logical discussion of the data structure will likely not answer these prompts in order. Support any claims you make and be as thorough as possible.

- What is splaying? How long does this process take? What are the acceptable manners in which the splay can occur? What sort of properties does the tree have after a splay?
- How does this tree maintain balance? How are find, insert and delete affected? What are the best and worst-case runtimes for these functions?
- What are the advantages and disadvantages of this data structure over other self-balancing trees, namely AVL? Discuss runtime, memory or other relevant aspects of this course in your answer.
- What is amortized analysis? How does it apply to splay trees? To illustrate amortized analysis technique, discuss amortized analysis around array resizing.
- Which parts of the implementation of this data structure would you expect to be more difficult? Do you find this implementation simpler or more complex than an AVL Tree?

- Describe client constraints that may make splay trees a desirable design choice. What design choices exist within the splay tree itself?

## Deliverables

To canvas, submit a `.pdf` of your write up. It should thoroughly and completely cover all of the expected topics discussed above. Complete **EITHER** this assignment or the AVL assignment.