

The Development of a Software Training Package to Aid the Computing Undergraduate in Learning the AVL Tree

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Abstract

The AVL Tree – named after Russian scientists Adelson-Velski and Landis – is a descendant of the more basic Binary Tree structure. The AVL Tree uses a self-balancing routine, consisting of a number of complex rotations, in order to minimize its branch depth. This means that operations of the AVL Tree – such as node insertion and deletion – are far more complex than corresponding operations performed on its binary ascendant. The problem facing any teacher, instructor or demonstrator therefore, is how best to communicate the operations of the tree in an easily understandable way.

This dissertation proposes a software training tool for teaching the AVL Tree. After an initial discussion on the role of computer aids in the learning process, a full evaluation of existing AVL demonstrations software is carried out. The remainder of the document is dedicated to the development, implementation and testing of a comprehensive AVL learning aid.

A primary objective of the dissertation is to gauge the effectiveness of the tool in assisting the Computing undergraduate to better learn the AVL Tree. A series of implementation, testing and feedback phases were carried out and system enhancements were carried out after each iteration. It was imperative that all system testing was carried out with the intended audience so that a thorough understanding could be gained of the effectiveness of the software. This dissertation concludes that the students learning was indeed enhanced through the use of the AVL Training software and it is recommended that such a system be utilized in conjunction with traditional lectures on the topic.
