Hacettepe University Computer Science and Engineering Department BBM203 ASSIGNMENT 4

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1 Introduction

In this experiment we are responsible learn basic tree operations.This tree structure is very useful at file system,storing strings and search operations in huge data files.There are some kind of trees such as B tree,B+ tree, Binary Tree vs.But this experiment our tree is not one of them.We are creating this tree using unique numbers.

2 Software Using Documentation

2.1 Software Usage

This software based on C programming language.I compiled on dev machine using this command "gcc hw4.c -o simon". Software takes two input file.First input file contains the unique numbers which will be added to tree.This file contains two columns.First column is unique number and second column is how many times will line read.Second input file contains commands of this software.There are two specific commands.First one is "-d" command and number.That means element of tree will be deleted which was decided by second input.Second command is "-l" and number.It writes the tree's current state by selecting root input number.

Software runs this functions ;

reading:Reads first input file and stores the inserted nodes to number array.

readingCommands:Reads the command file and operates to tree

insert:It inserts the number array to available child nodes and returns head of available child nodes.

DFS:Finds the node using Depth First Search algorithm and returns address of the node.

list:Writes the result of the "-l" command to "output.txt"

3 Software Design Notes

3.1 Desctiption of the program

3.1.1 Problem

My point of view,problem was creation of the tree using mixed input file.Other problem was deleting the root node and child-parent nodes.

3.1.2 Solution

My solutions for creation is using two file pointers for reading the file and I stored all inserted numbers to array.For insertion I created new linked list for available child nodes.Then insert function takes two parameters and inserts the all nodes to tree.
For deleting root,I used the pass by reference technique and I could change the root easily.
For deleting-child parent nodes,I used extra pointer which is called "parent".I reconnected the deleted nodes children using this pointer.

3.1.3 Algorithm

1.Read first input file.
1.1.Read first line and create root node using first column.
1.2.Find the correct inserted numbers and store them to number array.
1.3.Allocate each nodes and connect it's links to tree.
1.4.Free number array after reading first file.
2.Read second input file.
2.1.Find the address of the node using by DFS.
2.2.For all commands in second file.
2.3.Check the node's position.
2.4.Select necessary operation for command.
3.Print list command the screen and output file

4 Software Testing Notes

4.1 Bugs and Software Reliability

Bugs of this software are;
1.If you delete the last child of the node,This software gives Segmentation Fault error.
2.User can insert same numbers to tree.Because, there is no handling.
3.It writes results from end to begging.Because of the recursion DFS algorithm.

REFERENCES

www.programiz.com/c-programming/c-dynamic-memory-allocation
www.cprogramming.com/tutorial/cfileio.html
www.programiz.com/c-programming/c-strings stackoverflow.com/questions/24753342/c-how-to-free-a-struct-array-cell-completely
www.network-theory.co.uk/docs/gccintro/gccintro_16.html
www.fresh2refresh.com/c-programming/c-passing-struct-to-function/