Data Structures HW3

Toygar Tanyel
18011094

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Introduction of the system:

I prefered to create a linked list to hold files in tree structure as follows:

```
struct l{
    struct l *next;
    char *filename;
};
typedef struct l list;

struct n{
    struct l *files;
    char *word;
    struct n *left;
    struct n *right;
};
typedef struct n node;
```

Functions:

```
node * insertWord2BST(char*, char*, node *); // Helper function that adds
    every single word to the Binary Search Tree when it is called in the
    readFile_createTree() function.
node * deleteFile(node *, char*); // Helper function that delete files by
    getting call from search() when deletion_mode activated.
node * deleteNode(node *, char*); // Helper function that helps to deleteFile
    when the last file is detected and node must be deleted.
void search(char*, node *, int, char*); // it can be used for both search
    words and deletion of files. I added deletion mode to it to increase
    effectiveness in the code.
node *readFile_createTree(node*); // it read the file and initialize/add new
    binary search tree.
```

```
node *readFile_toDelete(node*, char *); // main function for deleting given
    filename from everywhere.
void inOrder(node *); // print functions
void preOrder(node *);
void postOrder(node *);
char *find_max(node *); // helper to deletion
char *find_min(node *); // helper to deletion
```

Menu:

```
###   Welcome  ####
1) Initialize/Add New File to the tree. (Please use .txt file to add new file)
2) Search for a specific word and see the files that contains that word.
3) Delete a file.
4) Quit
Choice:
```

Figure 1 Menu of the program.

Task 1 Adding:

```
Enter file name:
test.txt
a.txt: the beach was crowded with snow leopards
b.txt: the sun with had set and so had his dream
The word 'the' is already exist.
The word 'with' is already exist.
The word 'had' is already exist.
c.txt: she sells sea shells on the beach
The word 'the' is already exist.
The word 'beach' is already exist.
d.txt: i love the beach in ankara  The word 'the' is already exist.
The word 'beach' is already exist.

** Your file is read and new tree is created. Check the words below in different orders. **

Inorder BST:
and ankara beach crowded dream had his i in leopards love on sea sells set she shells snow so sun the was with

Preorder BST:
the beach and ankara crowded snow leopards had dream his i in set sells sea on love she shells sun so was with

Postorder BST:
ankara and dream in i his had love on sea sells shells she set leopards so sun snow crowded beach with was the
```

Figure 2 Adding files/words into the tree.

Task 2 Deleting:

```
Enter the name of file that you want to delete: b.txt


###  3 words sample before deletion:  ###

'the' found! in following files:
a.txt
b.txt
c.txt
d.txt

'with' found! in following files:
a.txt
b.txt

'sea' found! in following files:
c.txt

###  Last files for 3 words after deletion:  ###

a.txt: the beach was crowded with snow leopards

b.txt: the sun with had set and so had his dream

### Deleted file from 'sun' and word removed from tree. ###
### Deleted file from 'had' and word removed from tree. ###
### Deleted file from 'set' and word removed from tree. ###
### Deleted file from 'and' and word removed from tree. ###
### Deleted file from 'so' and word removed from tree. ###
'had' is not in the tree.
```

Figure 3 Deleting Example 1 Part1.

```
### Deleted file from 'his' and word removed from tree. ###
### Deleted file from 'dream' and word removed from tree. ###
c.txt: she sells sea shells on the beach

d.txt: i love the beach in ankara

###  The tree after deletion of file:  ###

Inorder BST:
ankara beach crowded  i in leopards love on sea sells she shells snow  the was with

Preorder BST:
the beach ankara crowded snow leopards i  in she sells sea on love shells  was with

Postorder BST:
ankara  in i love on sea sells shells she leopards  snow crowded beach with was the

###  Last files for 3 words after deletion:  ###

'the' found! in following files:
a.txt
c.txt
d.txt

'with' found! in following files:
a.txt

'sea' found! in following files:
c.txt
```

Figure 4 Deleting Example 1 Part2.

```
Enter the name of file that you want to delete: d.txt


###  3 words sample before deletion:  ###

'the' found! in following files:
a.txt
b.txt
c.txt
d.txt

'with' found! in following files:
a.txt
b.txt

'sea' found! in following files:
c.txt

###  Last files for 3 words after deletion:  ###

a.txt: the beach was crowded with snow leopards

b.txt: the sun with had set and so had his dream

c.txt: she sells sea shells on the beach

d.txt: i love the beach in ankara
### Deleted file from 'i' and word removed from tree. ###
### Deleted file from 'love' and word removed from tree. ###
### Deleted file from 'in' and word removed from tree. ###
### Deleted file from 'ankara' and word removed from tree. ###
```

Figure 5 Deleting Example 2 Part1.

```
###  The tree after deletion of file:  ###

Inorder BST:
and  beach crowded dream had his ` leopards  on sea sells set she shells snow so sun the was with

Preorder BST:
the beach and  crowded snow leopards had dream his ` set sells sea on  she shells sun so was with

Postorder BST:
 and dream ` his had  on sea sells shells she set leopards so sun snow crowded beach with was the

###  Last files for 3 words after deletion:  ###

'the' found! in following files:
a.txt
b.txt
c.txt

'with' found! in following files:
a.txt
b.txt

'sea' found! in following files:
c.txt
```

Figure 6 Deleting Example 2 Part2.

Task 3 Searching:

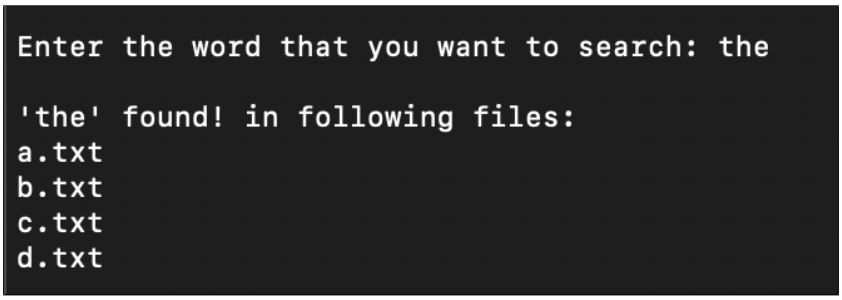

Figure 7 Searching Example 1

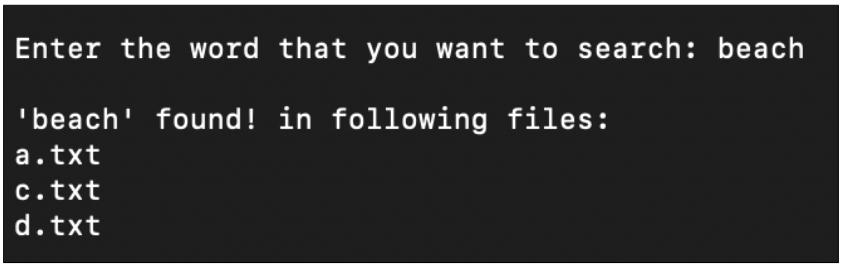

Figure 8 Searching Example 2

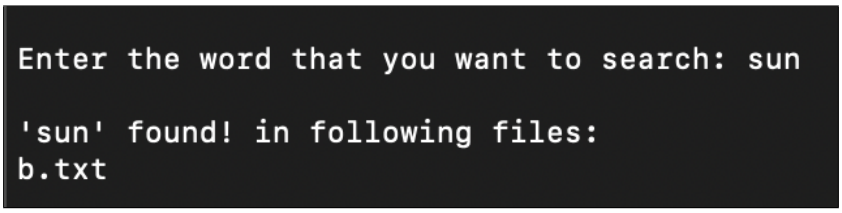

Figure 9 Searching Example 3