# Data Structures

Lab Project (Semester-2)

## *DICTIONARY SEARCHING AND SORTING*

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# Contents

## Title of Project

Dictionary searching and sorting

## Description of Project

o A Dictionary stores keywords & their meanings. Create a notepad file which stores 100 keywords and their meanings.

o Provide facility for adding new keywords, deleting keywords, updating values of any entry.

o Provide facility to display whole data sorted in ascending/descending order.

o Also find how many maximum comparisons may require for finding any keyword. Use Binary Search Tree for implementation.

## Code

```
#include <stdio.h>

#include <stdlib.h>

#include<string.h>


struct dict {

  struct dict *left,*right;

  char word[20],meaning[20];

}*Root=NULL;


typedef struct dict dictionary;

int check(char[],char[]);

void insert(dictionary *);

// void Search();

// void view(dictionary *);


















/*******************************************************************
*****************************/

int check(char a[],char b[]){

     int i,j,c;
     for(i=0,j=0 ; a[i]!='\0'&&b[j]!='\0' ; i++,j++){
       if(a[i]>b[j]){
         c=1;
         break;
       }
        else if(b[j]>a[i]){
          c=-1;
          break;
        }
      else
         c=0;
     }
     if(c==1)
       return 1;
      else if(c==-1)
        return -1;
      else
        return 0;
}
```

```
/*******************************************************************
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```

```
// ADD A WORD
void insert(dictionary *temp){
  int flag=0;
  dictionary *ptr,*par;
  ptr=Root;

  if(Root==NULL)
     Root=temp;
  else{
     while(ptr!=NULL ){
       if(check(temp->word,ptr->word)>0){
         par=ptr;
         ptr=ptr->right;
       }

       else if(check(temp->word,ptr->word)<0)
     {
       par=ptr;
       ptr=ptr->left;
     }
       else if(check(temp->word,ptr->word)==0){
          flag=1;
            // printf("\nWord already exists!\n");
          break;
       }

   }
       if(flag==0 && ptr==NULL){
         if(check(par->word,temp->word)==1)
            par->left=temp;
         else if(check(par->word,temp->word)==-1)
            par->right=temp;
       }

     }

}
```

```
/*******************************************************************
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// DISPLAY THE WORDS
void viewTree(dictionary *ptr) {  // INORDER TRAVERSAL
  if(Root==NULL)
    printf("\nEmpty tree\n");

  else if(ptr !=NULL) {
   viewTree(ptr->left);
   printf("\n%s - %s", ptr->word, ptr->meaning);
   viewTree(ptr->right);
  }
}
// 3.VIEW FROM FILE
void view(){

  FILE *fp;
    char str[20]={'\0'};

    fp = fopen("dictionary.txt", "r");

    while(fgets(str, 60, fp) != NULL) {

      if(str == '\0')
        printf("\nEmpty dictionary\n");
      else {
        printf("%s", str);

        // CODE TO SEPARATE WORD AND MEANING FROM A SINGLE STRING
        char w[60]={'\0'}, m[60]={'\0'}; int i=0;

        while (str[i] != ' ') {
          ++i;
        }
        for (size_t j = 0; j < i; j++) {
          w[j] = str[j];
        }
        // printf("\n");
        for (size_t j = i+3; j < strlen(str)-1; j++) {
          m[j-i-3] = str[j];
        }
        // CODE TO SEPARATE WORD AND MEANING FROM A SINGLE STRING

        // CODE TO RECREATE BINARY SEARCH TREE
        dictionary *temp = (dictionary*)malloc(sizeof(dictionary));
        temp->left=NULL;
        temp->right=NULL;
        strcpy(temp->word, w);
        strcpy(temp->meaning, m);

        // printf("%s ---> %s", temp->word, temp->meaning);
        insert(temp);
        // CODE TO RECREATE BINARY SEARCH TREE
      }
    }

    fclose(fp);
    fp = NULL;
}
// VIEW FILE IN REVERSE ORDER
void viewReverse() {
  FILE *fp;
  fp=fopen("dictionary.txt","r");

  char arr[60][60]={'\0'};
  int count=0;
  if(fp==NULL) {
    printf("File does not exist..");
  }
  else {
    int i=0;
    char str[60];
    while (fgets(str, 60, fp) != NULL) {
      // printf("%s", strrev(str));
      strcpy(arr[i], str);
      // printf("%s", arr[i]);
      ++i; ++count;
    }
  }
  // printf("\n%d", count);
  for (size_t j = count; j > 0; j--) {
    printf("%s", arr[j]);
  }
  printf("%s", arr[0]);
}
```

```
/*******************************************************************
*****************************/
// UPDATE A WORD
void update() {
```

```
// CODE GOES HERE
int flag=0;
dictionary *ptr;
ptr=Root;

char w[20]; // ENTER WORD TO SEARCH
printf("\nEnter word: ");
scanf("%s",w);

while(ptr!=NULL && flag==0){
  if(check(w,ptr->word)>0)
     ptr=ptr->right;

  else if(check(w,ptr->word)<0)
        ptr=ptr->left;

  else if(check(w,ptr->word)==0){
     flag=1;
     // printf("\n%s",ptr->meaning);
     char newMeaning[60];
     printf("Enter new meaning: ");
     scanf("%s", newMeaning);
     strcpy(ptr->meaning, newMeaning);
     printf("\nWord updated successfully!");
  }

  }
  if(flag==0)
    printf("\nWord not found");
```

```
}









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// CODE TO SYNC FILE AND BST

void updateFile(dictionary *ptr) {

    if(Root==NULL)

        printf("\nEmpty dictionary\n");


    else if(ptr !=NULL) {

        updateFile(ptr->left);


        FILE *fp;

        fp = fopen("dictionary.txt", "a");


        if(fp == NULL) {

            printf("file cannot be opened!");

            // return (-1);

        }


        if(fp != NULL) {
            char str[60], str2[60];
            int isThere=0;

            strcpy(str, ptr->word);
            strcat(str, " - ");
            strcat(str, ptr->meaning);

            while(fgets(str2, 60, fp) != NULL) {
              if(strcmp(str, str2) == 0) {
                isThere = -1; // ALREADY THERE
              }
            }

            if(isThere == 0) {
              fputs(str, fp);
            }
            fputs("\n", fp);
        }
        fclose(fp);
        fp = NULL;

        updateFile(ptr->right);
    }
}
```

```
  }







/*******************************************************************
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// DELETE A WORD

dictionary *minValue(dictionary *ptr) {

  dictionary *current = ptr;


  while (current && current->left != NULL) {

    current = current->left;

  }


  return current;

}


dictionary *deleteNode(dictionary *root, char key[]) {

  // printf("Word found! - %s\n", key);


  if(root == NULL) {

    return root;

  }


  if(root->left == NULL && root->right == NULL) {

    Root = NULL;

    return root;

  }
  if(check(key, root->word) < 0) {
    root->left = deleteNode(root->left, key);
  } else if(check(key, root->word) > 0) {
    root->right = deleteNode(root->right, key);
  }

  // FOUND WORD TO DELETE
  else {
    if(root->left == NULL) {
      dictionary *temp = root->right;
      free(root);
      return temp;
    } else if(root->right == NULL) {
      dictionary *temp = root->left;
      free(root);
      return temp;
    }

    dictionary *temp = minValue(root->right);
    strcpy(root->word, temp->word);
    root->right = deleteNode(root->right, temp->word);
  }

  return root;
}

void deleteWord() {
  FILE *fp;
  fp = fopen("dictionary.txt", "r");
```
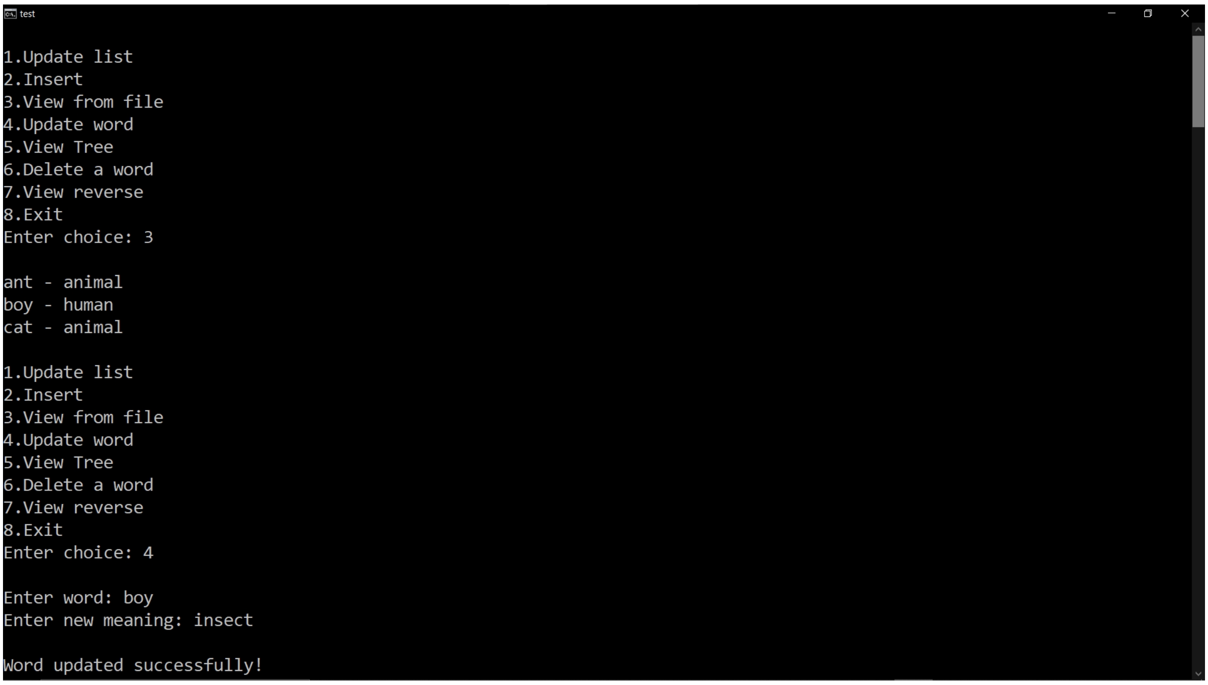

```
if(fp == NULL) {
    printf("file cannot be opened!");
    return;
}

char str[60], w[60], helpstr[60];

printf("\nEnter word to delete: ");
scanf("%s", w);

while (fgets(str, 60, fp) != NULL) {
  // printf("%s", str);
  // CODE TO SEPARATE WORD
  for (size_t i = 0; i < strlen(str)-1; i++) {
    if(str[i] == ' ') {
      break;
    }
    helpstr[i] = str[i];
  }
  // CODE TO CHECK IN FILE IF PRESENT
  if(check(helpstr, w) == 0) {
    // printf("Word found! - %s", w);
    deleteNode(Root, w);
    // updateFile(Root);
    break;
  }
}
```

```
  fclose(fp);

  fp = NULL;

}
```

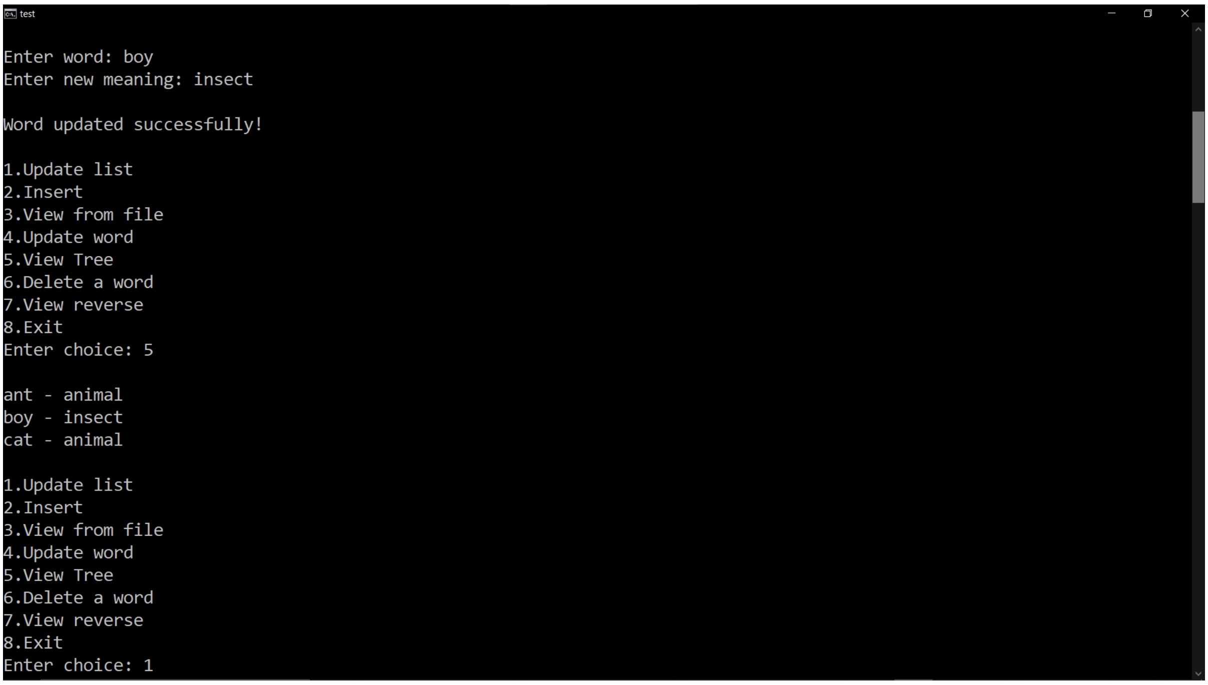
```
/*******************************************************************
*****************************/

int main(int argc, char const *argv[]) {

  int ch;

  dictionary *temp;


  while(ch!=8){

    printf("\n1.Update list\n2.Insert\n3.View from file\n4.Update
word\n5.View Tree\n6.Delete a word\n7.View reverse\n8.Exit\nEnter
choice: ");

    scanf("%d",&ch);


    switch (ch) {

      case 1: {

        FILE *fp;

        fp = fopen("dictionary.txt", "w");


        if(fp != NULL) {

          fputs("", fp);
        }

        fclose(fp);
        fp = NULL;

        updateFile(Root);
        printf("\nFile updated successfully!\n"); break;
      }
      case 2:
        temp=(dictionary*)malloc(sizeof(dictionary));
        temp->left=NULL;
        temp->right=NULL;

        printf("\nInsert word: ");
        scanf("%s",temp->word);
        printf("Insert meaning: ");
        scanf("%s",temp->meaning);

        insert(temp);
        break;
      case 3: {
          printf("\n");
          view(); break;
        }
      case 4: update(); printf("\n"); break;
      case 5: viewTree(Root); printf("\n"); break;
      case 6: printf("\n"); deleteWord(); break;
      case 7: {
        printf("\n");
```

```
        viewReverse();
        printf("\n"); break;
      }
      case 8: exit(0);
      // default: printf("\nWrong choice!\n");
    }
  }
  return 0;
}
```

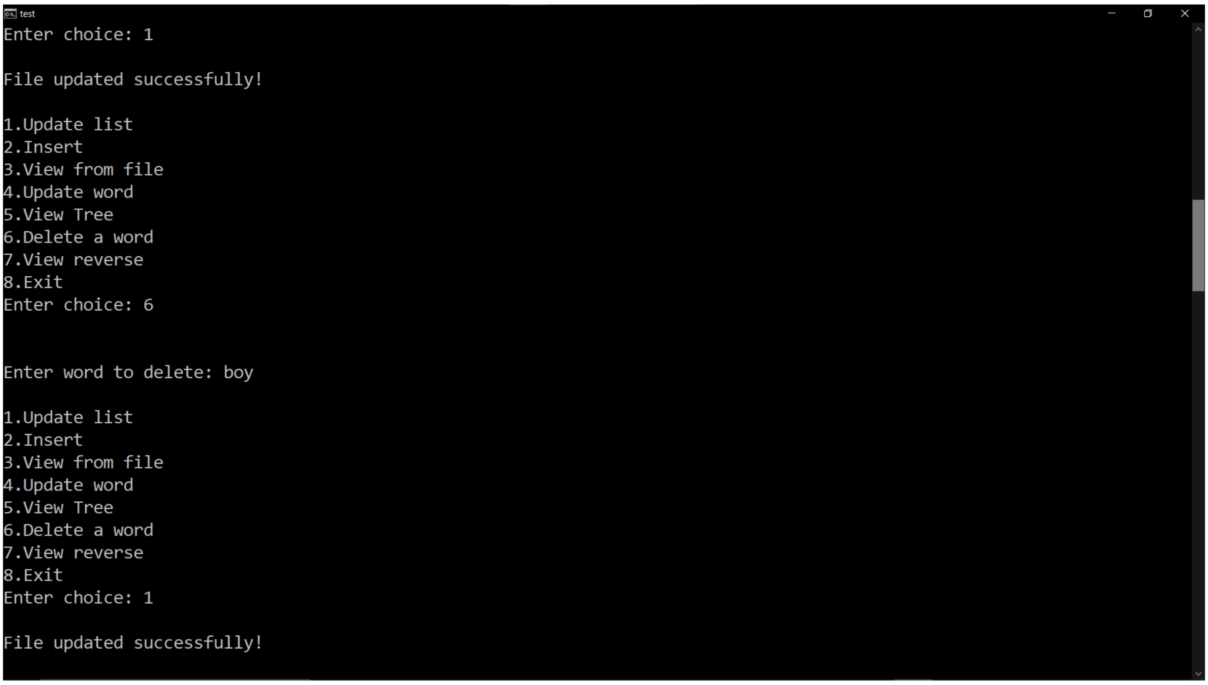
## Sample Outputs



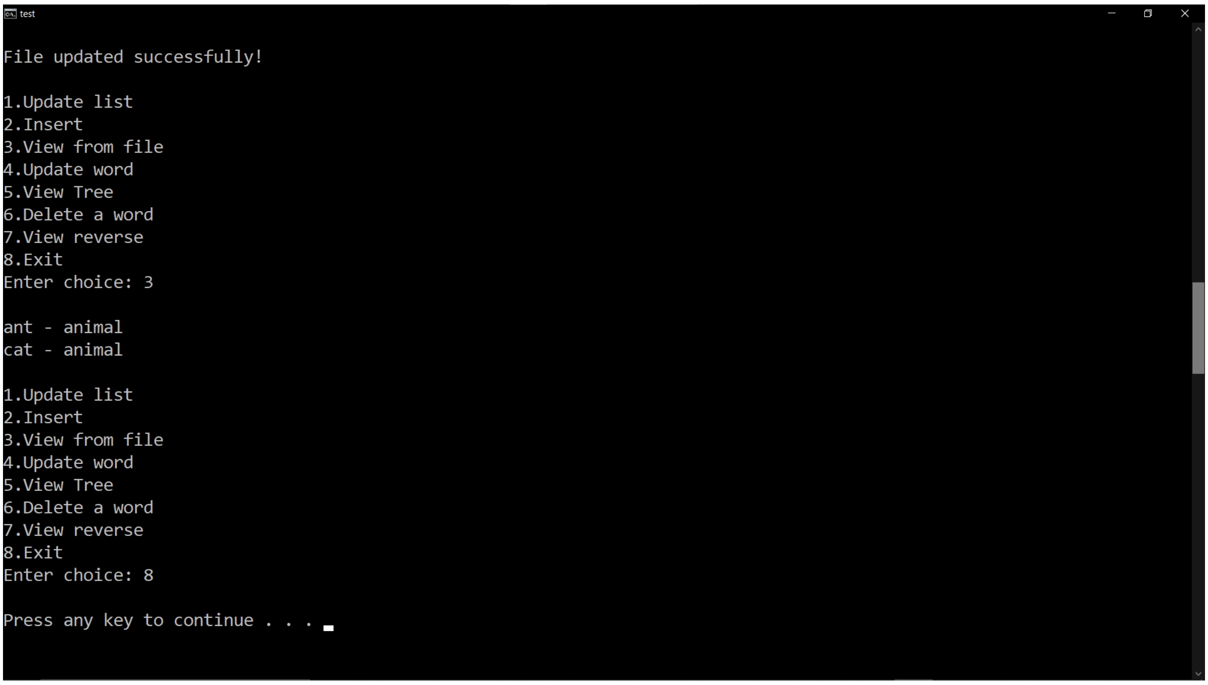
```

1.Update list
2.Insert
3.View from file
4.Update word
5.View Tree
6.Delete a word
7.View reverse
8.Exit
Enter choice: 3

ant - animal
boy - human
cat - animal

1.Update list
2.Insert
3.View from file
4.Update word
5.View Tree
6.Delete a word
7.View reverse
8.Exit
Enter choice: 4

Enter word: boy
Enter new meaning: insect

Word updated successfully!
```



```
Enter word: boy
Enter new meaning: insect

Word updated successfully!

1.Update list
2.Insert
3.View from file
4.Update word
5.View Tree
6.Delete a word
7.View reverse
8.Exit
Enter choice: 5

ant - animal
boy - insect
cat - animal

1.Update list
2.Insert
3.View from file
4.Update word
5.View Tree
6.Delete a word
7.View reverse
8.Exit
Enter choice: 1
```



```
Enter choice: 1

File updated successfully!

1.Update list
2.Insert
3.View from file
4.Update word
5.View Tree
6.Delete a word
7.View reverse
8.Exit
Enter choice: 6


Enter word to delete: boy

1.Update list
2.Insert
3.View from file
4.Update word
5.View Tree
6.Delete a word
7.View reverse
8.Exit
Enter choice: 1

File updated successfully!
```



```
File updated successfully!

1.Update list
2.Insert
3.View from file
4.Update word
5.View Tree
6.Delete a word
7.View reverse
8.Exit
Enter choice: 3

ant - animal
cat - animal

1.Update list
2.Insert
3.View from file
4.Update word
5.View Tree
6.Delete a word
7.View reverse
8.Exit
Enter choice: 8

Press any key to continue . . .
```

# Contribution by group members

<B120047>: In writing the code to make BST from words of text file.

<B120048>: For writing the different operations in the dictionary.

# References

YouTube

Geeksforgeeks

Github