

Collin Gros  
02/07/2020

### **CS-370 LAB 2.1**

I created a symtable.h file, and indented/commented a lot of the code. I also tested the functionality of the program.

The main data structure in this code is SymbTab. It has two 'strings': label, and symbol. Label is the variable's name, and symbol is the variable's value. It also has an integer called addr, which represents the address of a declared variable, and a pointer to another SymbTab (next), allowing us to traverse the Symbol Table.

Malloc allocates memory on the heap. We use this to store variables in places we don't want to be overwritten (unlike the Stack).

#### **MAKEFILE**

```
# collin gros
# 02/07/2020
#
# compiles symtable.c along with its header file
#

# create our executable
all: symtable.o
    gcc -o run symtable.o

# compile symtable.c
symtable.o: symtable.c symtable.h
    gcc -c symtable.c

# get rid of generated crap
clean:
    rm run
```

#### **SYMTABLE.C**

```
/*!
collin gros
02/07/2020
lab 3
```

code is from: <https://forgetcode.com/C/101-Symbol-table>

indent, comment, and understand the code. create a .h file w/description

i created the .h file, and indented/commented a lot of the code  
\*/

```
#include<stdio.h>
#include<malloc.h>
#include<string.h>
#include<stdlib.h>
```

```
#include "symtable.h"
```

```
void main()
{
    int option;
    char label[10];

    /* our menu */
    do {
        printf("\n\tSYMBOL TABLE IMPLEMENTATION\n");
        printf("\n\t1.INSERT\n\t2.DISPLAY\n"
               "\t3.DELETE\n\t4.SEARCH\n\t5.MODIFY\n\t6.END\n");
        printf("\n\tEnter your choice: ");
        scanf("%d",&option);

        switch(option) {
            case 1:
                Insert();
                break;
            case 2:
                Display();
                break;
            case 3:
                Delete();
                break;
            case 4:
                printf("\n\tEnter the label to be searched : ");
                scanf("%s",label);

                /* search for the label they specified */
                int isPresent = Search(label);
                printf("\n\tSearch Result:");
                if(isPresent) {
```

```

                printf("\n\tThe label is present in "
                        "the symbol table\n");
            }
            else {
                printf("\n\tThe label is not present "
                        "in the symbol table\n");
            }

            break;
        case 5:
            Modify();
            break;
        case 6:
            exit(0);
    }
} while(1);
}

```

```

void Insert()
{
    int n;
    char l[10];

    printf("\n\tEnter the label : ");
    scanf("%s",l);

    /* can't insert a label if it already exists! */
    n=Search(l);
    if(n==1) {
        printf("\n\tThe label exists already in the symbol "
                "table\n\tDuplicate can.t be inserted");
    }
    else {
        struct SymbTab *p;
        p=malloc(sizeof(struct SymbTab));
        strcpy(p->label,l);

        /* set our values in the symbol table */
        printf("\n\tEnter the symbol : ");
        scanf("%s",p->symbol);
        printf("\n\tEnter the address : ");
        scanf("%d",&p->addr);
    }
}

```

```

        /* if there were no other nodes before... */
        p->next=NULL;
        if(size==0) {
            first=p;
            last=p;
        }
        /* insert it into existing list */
        else {
            last->next=p;
            last=p;
        }

        size++;
    }
    printf("\n\tLabel inserted\n");
}

```

```

void Display()
{
    int i;
    struct SymbTab *p;

    p=first;
    printf("\n\tLABEL\t\tSYMBOL\t\tADDRESS\n");

    /* increment the entire list and print all information */
    for(i=0;i<size;i++) {
        printf("\t%s\t\t%s\t\t%d\n",p->label,p->symbol,p->addr);
        p=p->next;
    }
}

```

```

int Search(char lab[])
{
    int i,flag=0;
    struct SymbTab *p;

    /* iterate the entire table and search for our label */
    p=first;
    for(i=0;i<size;i++) {

```

```

        if(strcmp(p->label,lab)==0) {
            flag=1;
        }

        p=p->next;
    }
    return flag;
}

```

```

void Modify()
{
    char l[10],nl[10];
    int add,choice,i,s;
    struct SymbTab *p;

    p=first;
    printf("\n\tWhat do you want to modify?\n");
    printf("\n\t1.Only the label\n\t2.Only the address\n"
           "\t3.Both the label and address\n");
    printf("\tEnter your choice : ");

    scanf("%d",&choice);
    switch(choice) {
        case 1:
            printf("\n\tEnter the old label : ");
            scanf("%s",l);

            /* if our label doesn't exist */
            s=Search(l);
            if(s==0) {
                printf("\n\tLabel not found\n");
            }
            else {
                printf("\n\tEnter the new label : ");
                scanf("%s",nl);
                /* search our symbol table for the label and change its
                   data */
                for(i=0;i<size;i++) {
                    if(strcmp(p->label,l)==0) {
                        strcpy(p->label,nl);
                    }
                }
            }
        }
    }
}

```

```

        p=p->next;
    }

    printf("\n\tAfter Modification:\n");
    Display();
}
break;
case 2:
    printf("\n\tEnter the label where the "
           "address is to be modified : ");
    scanf("%s",l);

    /* if our label doesn't exist */
    s=Search(l);
    if(s==0) {
        printf("\n\tLabel not found\n");
    }
    else {
        printf("\n\tEnter the new address : ");
        scanf("%d",&add);
        /* search our symbol table for the label and change its
           data */
        for(i=0;i<size;i++) {
            if(strcmp(p->label,l)==0) {
                p->addr=add;
            }

            p=p->next;
        }

        printf("\n\tAfter Modification:\n");
        Display();
    }
    break;
case 3:
    printf("\n\tEnter the old label : ");
    scanf("%s",l);

    /* if our label doesn't exist */
    s=Search(l);
    if(s==0) {
        printf("\n\tLabel not found\n");
    }

```

```

        else {
            printf("\n\tEnter the new label : ");
            scanf("%s",nl);
            printf("\n\tEnter the new address : ");
            scanf("%d",&add);

            /* search our symbol table for the label and change its
               data */
            for(i=0;i<size;i++) {
                if(strcmp(p->label,l)==0) {
                    strcpy(p->label,nl);
                    p->addr=add;
                }

                p=p->next;
            }

            printf("\n\tAfter Modification:\n");
            Display();
        }
        break;
    }
}

```

```

void Delete()
{
    int a;
    char l[10];
    struct SymbTab *p,*q;

    p=first;
    printf("\n\tEnter the label to be deleted : ");
    scanf("%s",l);

    /* if our label doesn't exist */
    a=Search(l);
    if(a==0) {
        printf("\n\tLabel not found\n");
    }
    else {
        /* if we found our label in the first node */
        if(strcmp(first->label,l)==0) {

```

```

        /* 'delete' our node, and modify where first points to */
        first=first->next;
    }

    /* if we found our label in the last node */
    else if(strcmp(last->label,l)==0) {
        q=p->next;
        /* 'delete' node, and modify where last points to */
        while(strcmp(q->label,l)!=0) {
            p=p->next;
            q=q->next;
        }

        p->next=NULL;
        last=p;
    }
    else {
        q=p->next;
        /* search for our label */
        while(strcmp(q->label,l)!=0) {
            p=p->next;
            q=q->next;
        }

        /* 'delete' our node */
        p->next=q->next;
    }

    size--;
    printf("\n\tAfter Deletion:\n");
    Display();
}
}

```

## **SYMTABLE.H**

/\*!

collin gros  
02/07/2020  
lab 3

code is from: <https://forgetcode.com/C/101-Symbol-table>

indent, comment, and understand the code. create a .h file w/description



i created the .h file, and indented/commented a lot of the code  
\*/

```
#ifndef __SYMTABLE__  
#define __SYMTABLE__
```

```
/* stores node information */  
struct SymbTab {  
    char label[10],symbol[10];  
    int addr;  
    struct SymbTab *next;  
};
```

```
/* insert a new entry into our symboltable */  
void Insert();
```

```
/* print all of our table */  
void Display();
```

```
/* search for and delete a node */  
void Delete();
```

```
/* search through the entire table, looking for a particular symbol */  
/* returns 1 if lab is found, otherwise the label wasn't found*/  
int Search(char lab[]);
```

```
/* change a particular node's data */  
void Modify();
```

```
/* our first and last nodes in the symtable */  
struct SymbTab *first,*last;  
int size = 0;
```

```
#endif
```

## **OUTPUT**

Activities Fri Feb 7, 11:48:30

cgros@lappy28:~/Downloads/school/cp/lab3

File Edit View Search Terminal Help

cgros@lappy28:~/Downloads/school/cp/lab3> ./run

SYMBOL TABLE IMPLEMENTATION

1.INSERT  
2.DISPLAY  
3.DELETE  
4.SEARCH  
5.MODIFY  
6.END

Enter your choice: 1

Enter the label : x

Enter the symbol : 5

Enter the address : 20

Label inserted

SYMBOL TABLE IMPLEMENTATION

1.INSERT

LAB 3 -- Symbol Table Tools - Mo... cgros@lappy28:~/Downloads/sch...

LAB 3 -- Symbol Table Tools

Spring 2020

Home

Announcements

Assignments

Discussions

Grades

People

Pages

Files

Syllabus

Quizzes

Collaborations

Chat

Purchase Course Materials

Getting Started with Research

Finding Books & Articles

Citing Your Sources

Student Help

Office 365

Adobe Connect

Due Wednesday by 11:59pm Points 20 Submitting a file upload File Types pdf

This assignment deals with working with a symbol table. The code [HERE](http://forgetcode.com/C/101-Symbol-Table) is for <http://forgetcode.com/C/101-Symbol-Table>. -- Make sure you get this run understand it. You will be using this on your next assignment.

Your task is the following:

0) Your name, the date, a one line description of this assignment

1) Properly indent, and comment the code. The header of your code should be the code, where it was pulled from and changes you made.

2) Demonstrate that you understand the code by testing the functionality of the screen shot of at least 4 actions is required

3) Describe the main data structure in this code. What is it's name? What are is the structure built

4) What does "malloc()" do? Why do we use malloc()?

Some Rubric (2)

Criteria	Rating
Your name, the date, a one line description	1.0 pts Full Marks
Properly indent, and comment the code	5.0 pts

1 / 4

Activities Fri Feb 7, 11:48:49

cgros@lappy28:~/Downloads/school/cp/lab3

File Edit View Search Terminal Help

cgros@lappy28:~/Downloads/school/cp/lab3> ./run

SYMBOL TABLE IMPLEMENTATION

1.INSERT  
2.DISPLAY  
3.DELETE  
4.SEARCH  
5.MODIFY  
6.END

Enter your choice: 2

LABEL SYMBOL ADDRESS  
x 5 20

SYMBOL TABLE IMPLEMENTATION

1.INSERT  
2.DISPLAY  
3.DELETE  
4.SEARCH  
5.MODIFY  
6.END

Enter your choice:

LAB 3 -- Symbol Table Tools - Mo... cgros@lappy28:~/Downloads/sch...

LAB 3 -- Symbol Table Tools

Spring 2020

Home

Announcements

Assignments

Discussions

Grades

People

Pages

Files

Syllabus

Quizzes

Collaborations

Chat

Purchase Course Materials

Getting Started with Research

Finding Books & Articles

Citing Your Sources

Student Help

Office 365

Adobe Connect

Due Wednesday by 11:59pm Points 20 Submitting a file upload File Types pdf

This assignment deals with working with a symbol table. The code [HERE](http://forgetcode.com/C/101-Symbol-Table) is for <http://forgetcode.com/C/101-Symbol-Table>. -- Make sure you get this run understand it. You will be using this on your next assignment.

Your task is the following:

0) Your name, the date, a one line description of this assignment

1) Properly indent, and comment the code. The header of your code should be the code, where it was pulled from and changes you made.

2) Demonstrate that you understand the code by testing the functionality of the screen shot of at least 4 actions is required

3) Describe the main data structure in this code. What is it's name? What are is the structure built

4) What does "malloc()" do? Why do we use malloc()?

Some Rubric (2)

Criteria	Rating
Your name, the date, a one line description	1.0 pts Full Marks
Properly indent, and comment the code	5.0 pts

1 / 4

Activities Fri Feb 7, 11:48:58

cgros@lappy28:~/Downloads/school/cp/lab3

```
File Edit View Search Terminal Help
1.INSERT
2.DISPLAY
3.DELETE
4.SEARCH
5.MODIFY
6.END

Enter your choice: 4

Enter the label to be searched : x

Search Result:
The label is present in the symbol table

SYMBOL TABLE IMPLEMENTATION

1.INSERT
2.DISPLAY
3.DELETE
4.SEARCH
5.MODIFY
6.END

Enter your choice: 
```

LAB 3 -- Symbol Table Tools

Due Wednesday by 11:59pm Points 20 Submitting a file upload File Types pdf

This assignment deals with working with a symbol table. The code [HERE](http://forgetcode.com/C/101-Symbol-Table) is for <http://forgetcode.com/C/101-Symbol-Table> . -- Make sure you get this run understand it. You will be using this on your next assignment.

Your task is the following:

- 0) Your name, the date, a one line description of this assignment
- 1) Properly indent, and comment the code. The header of your code should be the code, where it was pulled from and changes you made.
- 2) Demonstrate that you understand the code by testing the functionality of screen shot of at least 4 actions is required
- 3) Describe the main data structure in this code. What is it's name? What are is the structure built
- 4) What does "malloc()" do? Why do we use malloc()?

Some Rubric (2)	
Criteria	Rating
Your name, the date, a one line description	1.0 pts Full Marks
Properly indent, and comment the code	5.0 pts

LAB 3 -- Symbol Table Tools - Mo... cgros@lappy28:~/Downloads/sch... 1/4

Activities Fri Feb 7, 11:49:05

cgros@lappy28:~/Downloads/school/cp/lab3

```
File Edit View Search Terminal Help
2.DISPLAY
3.DELETE
4.SEARCH
5.MODIFY
6.END

Enter your choice: 3

Enter the label to be deleted : x

After Deletion:

LABEL          SYMBOL          ADDRESS

SYMBOL TABLE IMPLEMENTATION

1.INSERT
2.DISPLAY
3.DELETE
4.SEARCH
5.MODIFY
6.END

Enter your choice: 
```

LAB 3 -- Symbol Table Tools

Due Wednesday by 11:59pm Points 20 Submitting a file upload File Types pdf

This assignment deals with working with a symbol table. The code [HERE](http://forgetcode.com/C/101-Symbol-Table) is for <http://forgetcode.com/C/101-Symbol-Table> . -- Make sure you get this run understand it. You will be using this on your next assignment.

Your task is the following:

- 0) Your name, the date, a one line description of this assignment
- 1) Properly indent, and comment the code. The header of your code should be the code, where it was pulled from and changes you made.
- 2) Demonstrate that you understand the code by testing the functionality of screen shot of at least 4 actions is required
- 3) Describe the main data structure in this code. What is it's name? What are is the structure built
- 4) What does "malloc()" do? Why do we use malloc()?

Some Rubric (2)	
Criteria	Rating
Your name, the date, a one line description	1.0 pts Full Marks
Properly indent, and comment the code	5.0 pts

LAB 3 -- Symbol Table Tools - Mo... cgros@lappy28:~/Downloads/sch... 1/4