

1. Implementation Code

(Main function)

```
#include <stdio.h>
#include <stdlib.h>
#include <conio.h>
int count=0;
struct{
    int id;
    int quantity;
    char name[30];
}book[15],sort[15];
// function prototype
void Menu ();
void insert_book();
void delete_a_book_by_id();
void search_a_book_by_id(int c,int id);
void search_a_book_by_name_binarysearch(char nob[],int high,int low);
void Display_all_books_sorted_by_name();
void Display_all_books_unsorted();

int main()
{
// read information from the file
    int i=0,j;
    FILE *fptr;
    fptr=fopen("E:\\library.txt","r");
    if(fptr==NULL)
        printf("File could not be open");
    else
    {
        while(!feof(fptr))
        {
            fscanf(fptr,"%d",&book[i].id);
            fgets(book[i].name,30,fptr);
            fscanf(fptr,"%d",&book[i].quantity);
            i++;
        }
    }
}
```

```

    }
}
count=i-1;
//repeat function gets
for(i=0;i<count;i++)
{
    for(j=0;book[i].name[j]!='\n';)
        j++;
    book[i].name[j]='\0'; }
fclose(fptr);
Menu();
//put information in file
FILE *pt;
pt=fopen("E:\\library.txt","w");
if(pt==NULL)
    printf("file could not be open");
else
{
    for(j=0;j<count;j++)

fprintf(pt,"%d%s\n%d\n",book[j].id,book[j].name,book[j].quantity);
    }
    fclose(pt);
// End
return 0;
}

// menu
void Menu (){
    int x=1,ID,i;
    char choice[3],NAME[30];
    int num;
    while(x)
    {
        printf("Welcome to the library\n\n1-Insert a book.\n2-Delete a book
by id.\n3-Search a book by id.\n4-Search a book by name.\n5-Display all
books sorted by name.\n6-Display all books unsorted.\n");
        printf("=====\n");
        printf("Enter your choice[1..6]: \n");
    }
}

```

```

scanf("%d",&num);
if(num>6||num<=0) break;
switch(num)
{
case 1:
    insert_book();
    break;
case 2:
    delete_a_book_by_id();
    break;
case 3:
    printf("Enter the id of the book : \n");
    scanf("%d",&ID);
    search_a_book_by_id(count,ID);
    break;
case 4:
    Display_all_books_sorted_by_name();
    printf("Enter the name of the book :\n");
    fflush(stdin);
    gets(NAME);
    search_a_book_by_name_binarysearch(NAME,count-1,0);
    break;
case 5:
    Display_all_books_sorted_by_name();
    for(i=0;i<count;i++)
        printf("%-10d%-
25s%d\n",sort[i].id,sort[i].name,sort[i].quantity);
    break;
case 6:
    Display_all_books_unsorted();
    break;
}
printf("You want to choice again ?! \n");
scanf("%s",choice);

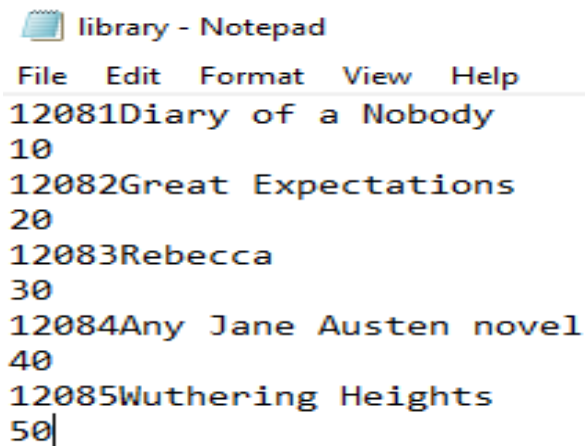
if((choice[0]=='N'||choice[0]=='n')&&(choice[1]=='O'||choice[1]=='o'))
    x--;
else
    system("cls"); } }

```

2. Function Codes and their corresponding Screenshots of Output Screen

a. Create a text file

Screenshot of the text file including some books with their ids, name, and quantity)



The screenshot shows a Notepad window with the title 'library - Notepad'. The menu bar includes 'File', 'Edit', 'Format', 'View', and 'Help'. The text content is as follows:

```
12081Diary of a Nobody
10
12082Great Expectations
20
12083Rebecca
30
12084Any Jane Austen novel
40
12085Wuthering Heights
50|
```

b. Insert a book

The function and the screenshot of output screen (Insert your id, complete name, any grade as a book), text file after insertion.

```
void insert_book()
{
    printf("Please enter the id , name , quantity of the book :\n");
    scanf("%d",&book[count].id);
    gets(book[count].name);
    scanf("%d",&book[count].quantity);
    count++;
}
```

```
"C:\Users\mac\Desktop\project of library\bin\Debug\project of library.exe"
Welcome to the library
1-Insert a book.
2-Delete a book by id.
3-Search a book by id.
4-Search a book by name.
5-Display all books sorted by name.
6-Display all books unsorted.
=====
Enter your choice[1..6]:
1
Please enter the id , name , quantity of the book :
201900894Nada Sabry Mohamed Muosa
90
You want to choice again ?!
NO

Process returned 0 (0x0)    execution time : 138.006 s
Press any key to continue.
```

```
library - Notepad
File Edit Format View Help
12081Diary of a Nobody
15
12082Great Expectations
10
12083Rebecca
34
12084Any Jane Austen novel
40
12085Anna Karenina
56
201900894Nada Sabry Mohamed Muosa
90
```

c. Delete a book by id

The function and the screenshot of output screen (choose an id to delete, but not your id), text file after deletion.

```
void delete_a_book_by_id()
{
    int id,x,i,j,z;
    printf("Enter the id of the book you want to delete : ");
    scanf("%d",&id);
    z=count;
    for(i=0;i<count;i++)
    {
```

```

    if(id==book[i].id){
        for(j=i;j<count-1;j++)
        {
            book[j].id=book[j+1].id;
            book[j].quantity=book[j+1].quantity;
            for(x=0;book[j].name[x]!='\0';x++)
                book[j].name[x]=book[j+1].name[x];
            strcpy(book[j].name,book[j+1].name);
        }
        count--;
        break;
    }
}
if(count==z)
    printf("Not Found\n");
else
    printf("successfully deleted.\n");
}

```

```

Welcome to the library
1-Insert a book.
2-Delete a book by id.
3-Search a book by id.
4-Search a book by name.
5-Display all books sorted by name.
6-Display all books unsorted.
=====
Enter your choice[1..6]:
2
Enter the id of the book you want to delete : 12082
successfully deleted.
You want to choice again ?!
no

Process returned 0 (0x0)   execution time : 41.463 s
Press any key to continue.

```

```

library - Notepad
File Edit Format View Help
12081Diary of a Nobody
15
12083Rebecca
34
12084Any Jane Austen novel
40
12085Anna Karenina
56
201900894Nada Sabry Mohamed Muosa
90

```

d. Search a book by id and display its name and quantity using linear search recursively. If not exist, display “Not found”.

The function and the screenshot of output screen

- Choose *your id* to display.
- Choose an *id that doesn't exist* in your file.

```

void search_a_book_by_id(int c,int id)
{ static y=0;
  if(y==c){
    printf("Not Found.\n");
    return;}
  else if(book[y].id==id)
  {
    printf("%d %s
%d\n",book[y].id,book[y].name,book[y].quantity);
    return;
  }
  else{
    y++;
    search_a_book_by_id(c,id);
  }
}

```

```

"C:\Users\mac\Desktop\project of library\bin\Debug\project of library.exe"
Welcome to the library
1-Insert a book.
2-Delete a book by id.
3-Search a book by id.
4-Search a book by name.
5-Display all books sorted by name.
6-Display all books unsorted.
=====
Enter your choice[1..6]:
3
Enter the id of the book :
12084
12084 Any Jane Austen novel 40
You want to choice again ?!
no

Process returned 0 (0x0)   execution time : 18.460 s
Press any key to continue.

```

```

"C:\Users\mac\Desktop\project of library\bin\Debug\project of library.exe"
Welcome to the library
1-Insert a book.
2-Delete a book by id.
3-Search a book by id.
4-Search a book by name.
5-Display all books sorted by name.
6-Display all books unsorted.
=====
Enter your choice[1..6]:
3
Enter the id of the book :
20150
Not Found.
You want to choice again ?!
no

Process returned 0 (0x0)   execution time : 13.794 s
Press any key to continue.

```

e. **Search a book by name and display its id and quantity using binary search. If not exist, display “Not found”.**

The function and the screenshot of output screen

- Choose an *id that exist* to display.
- Choose an *id that doesn't exist* in your file.

```

void search_a_book_by_name_binarysearch(char nob[],int high,int
low)
{
    int result;
    int middle=(low+high)/2;
    result=strcmp(nob,sort[middle].name);
    if(low>high)
        {printf("Not Found\n");return;}
    if(result==0)
        {printf("%d %s
%d\n",sort[middle].id,sort[middle].name,sort[middle].quantity);retur
n;}
    else if(strcmp(nob,sort[middle].name)>0)
        return search_a_book_by_name_binarysearch(nob,high,middle+1);
    else
        return search_a_book_by_name_binarysearch(nob,middle-1,low);
}

```

```

"C:\Users\mac\Desktop\project of library\bin\Debug\project of library.exe"
Welcome to the library
1-Insert a book.
2-Delete a book by id.
3-Search a book by id.
4-Search a book by name.
5-Display all books sorted by name.
6-Display all books unsorted.
=====
Enter your choice[1..6]:
4
Enter the name of the book :
Anna Karenina
12085 Anna Karenina 56
You want to choice again ?!
no
Process returned 0 (0x0)   execution time : 8.740 s
Press any key to continue.

```

```

"C:\Users\mac\Desktop\project of library\bin\Debug\project of library.exe"
Welcome to the library
1-Insert a book.
2-Delete a book by id.
3-Search a book by id.
4-Search a book by name.
5-Display all books sorted by name.
6-Display all books unsorted.
=====
Enter your choice[1..6]:
4
Enter the name of the book :
java script
Not Found
You want to choice again ?!
no
Process returned 0 (0x0)   execution time : 40.693 s
Press any key to continue.

```

- f. **Display all books sorted by name, and their corresponding ids and quantity.**

The function and the screenshot of output screen of all sorted books including your name.

```
void Display_all_books_sorted_by_name()
{ int i,j,t;
  char tmp[30];
  for(i=0;i<count;i++)
  {
    sort[i].id=book[i].id;
    sort[i].quantity= book[i].quantity;
    strcpy( sort[i].name,book[i].name); }
  for(i=0;i<count;i++)
  {
    for(j=i+1;j<count;j++)
    {
      if(strcmp(sort[i].name,sort[j].name)>0)
      {
        strcpy(tmp,sort[i].name);
        strcpy(sort[i].name,sort[j].name);
        strcpy(sort[j].name,tmp);
        t=sort[i].id;
        sort[i].id=sort[j].id;
        sort[j].id=t;
        t=sort[i].quantity;
        sort[i].quantity=sort[j].quantity;
        sort[j].quantity=t;
      }
    }
  }
}
```

```
"C:\Users\mac\Desktop\project of library\bin\Debug\project of library.exe"
Welcome to the library

1-Insert a book.
2-Delete a book by id.
3-Search a book by id.
4-Search a book by name.
5-Display all books sorted by name.
6-Display all books unsorted.
=====
Enter your choice[1..6]:
5
12085      Anna Karenina      56
12084      Any Jane Austen novel  40
12081      Diary of a Nobody   15
201900894  Nada Sabry Mohamed Muosa 90
12083      Rebecca           34
You want to choice again ?!
no

Process returned 0 (0x0)   execution time : 9.210 s
Press any key to continue.
```

- g. **Display all books unsorted, their ids, names and quantity (as entered)**
The function and the screenshot of output screen of all unsorted books including your name.

```
void Display_all_books_unsorted()
{
    int i;
    for(i=0;i<count;i++)
        printf("%-10d%-
25s%d\n",book[i].id,book[i].name,book[i].quantity);
}
```

```
"C:\Users\mac\Desktop\project of library\bin\Debug\project of library.exe"
Welcome to the library
1-Insert a book.
2-Delete a book by id.
3-Search a book by id.
4-Search a book by name.
5-Display all books sorted by name.
6-Display all books unsorted.
=====
Enter your choice[1..6]:
6
12081      Diary of a Nobody      15
12083      Rebecca                34
12084      Any Jane Austen novel  40
12085      Anna Karenina          56
201900894  Nada Sabry Mohamed Muosa 90
You want to choice again ?!
no
Process returned 0 (0x0)   execution time : 8.990 s
Press any key to continue.
```

h. Ask if you want another operation

The screenshot of output screen when you ask the user if he wants another operation, reply one time by 'yes' and another time by 'no'.

```
You want to choice again ?!
no
Process returned 0 (0x0)   execution time : 8.990 s
Press any key to continue.
```

```
You want to choice again ?!
yes
```

```
"C:\Users\mac\Desktop\project of library\bin\Debug\project of library.exe"
Welcome to the library
1-Insert a book.
2-Delete a book by id.
3-Search a book by id.
4-Search a book by name.
5-Display all books sorted by name.
6-Display all books unsorted.
=====
Enter your choice[1..6]:
```