

2CS301

Data Structure and Algorithms

Comprehensive Assignment

Roll No : 19BCE189

Name : Patel Parthiv Rakeshbhai

Definition: "Design a Library management system. It should allow you to enter book details like Title, Author, Publisher, Price, Quantity etc. Book Title, Author and Quantity are mandatory fields. When any book issued then quantity should be reduced and should be displayed against the book."

File: Library management.c

File purpose : "Library management.c" file contain all the functions with main method, which are responsible to perform operations like add new book in library , remove book or some quantity of book from the library , buy book from library and view book information which is available in library.

C code :

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

```
struct node{
char title[20];
char author[20];
char publisher[20];
```

```

int price;
int quantity;
struct node *left;
struct node *right;
};

struct node* root=NULL;

int user_payment=0;

struct node* get_node(char title[],char author[],char publisher[],int price,int quantity)
//Create new node and return its reference
{
    struct node* temp = (struct node*)malloc(sizeof(struct node));
    strcpy(temp->author,author);
    strcpy(temp->publisher,publisher);
    strcpy(temp->title,title);

    temp->price=price;
    temp->quantity=quantity;
    temp->left = NULL;
    temp->right = NULL;

    return temp;
}

struct node* add_first_book(char title[],char author[],char publisher[],int price,int quantity)
//Add first book in library
{
    if(root==NULL)
        root=get_node(title,author,publisher,price,quantity);

    return root;
}

```

```
}
```

```
struct node* add_book(struct node* root,struct node* temp)           //Add book
```

```
{
```

```
    if(root==NULL)
```

```
        return temp;
```

```
    if(strcmp(temp->title,root->title)>0)
```

```
        root->right=add_book(root->right,temp);
```

```
    else if (strcmp(temp->title,root->title)<=0)
```

```
        root->left=add_book(root->left,temp);
```

```
    return root;
```

```
}
```

```
void find_book(struct node* root,char title[20],int purchase_quantity) //Find any  
book from library
```

```
{
```

```
    while(root!=NULL)
```

```
    {
```

```
        if(strcmp(title,root->title)==0)
```

```
        {
```

```
            if(purchase_quantity==-1 && root->quantity!=0)           //If user want  
to check book availability
```

```
            {
```

```
                printf("-----\n");
```

```
                printf("\tTitle : ");
```

```
                puts(root->title);
```

```
                printf("\tAuthor name : ");
```

```
                puts(root->author);
```

```

printf("\tPublisher name : ");
puts(root->publisher);
printf("\tPrice : %d\tQuantity : %d",root->price,root->quantity);
printf("\n-----\n");
return;
}
else if(purchase_quantity>root->quantity || root->quantity==0)
{
    if(root->quantity!=0)
        printf("\nNo sufficient book !! \n");
    else
        printf("\nNo book available\n");
    return;
}
else //If user
want to buy book
{
    user_payment=user_payment+(purchase_quantity*root->price);
    printf("\nBook purchased successfully \n-----\n");
    printf("\tTitle : ");
    puts(root->title);
    printf("\tAuthor name : ");
    puts(root->author);
    printf("\tPublisher name : ");
    puts(root->publisher);
    printf("\tPrice : %d\tQuantity : %d",root->price,purchase_quantity);

    printf("\n\n\tYou    have    to    pay    %d\n-----\n",user_payment);
    root->quantity=root->quantity-purchase_quantity;

```

```

        printf("-----\n");
        return;
    }

}

else if(strcmp(title,root->title)<0)
    root=root->left;
else
    root=root->right;
}

printf("\nNo book with the title ' %s ' exist\nCheck after some time\n",title);

}

void all_book(struct node* root)                                //Print all book which is available
in library
{
    if(root==NULL)
        return;
    all_book(root->left);
    if(root->quantity!=0)
    {
        printf("-----\n");
        printf("\tTitle : ");
        puts(root->title);
        printf("\tAuthor name : ");
        puts(root->author);
        printf("\tPublisher name : ");
        puts(root->publisher);
        printf("\tPrice : %d\tQuantity : %d",root->price,root->quantity);
    }
}

```

```

        printf("\n-----\n");

    }
    all_book(root->right);
}

void book_delete(struct node* root, char title[])           //Delete book
{
    int quantity, choice;
    while(root!=NULL)
    {
        if(strcmp(title, root->title)==0)
        {
            if(root->quantity==0)
            {
                printf("Book not exist\n");
                return;
            }
            printf("1.Delete book\n2.Delete some quantity\n"); fflush(stdin);
            scanf("%d", &choice);
            if(choice==1)                                     //Delete book from library
            {
                printf("-----\n");
                printf("\tTitle : ");
                puts(root->title);
                printf("\tAuthor name : ");
                puts(root->author);
                printf("\tPublisher name : ");
                puts(root->publisher);
            }
        }
    }
}

```

```

printf("\tPrice : %d\tQuantity : %d",root->price,root->quantity);
printf("\n-----\n");
root->quantity=0;
printf("Delete successfully\n");
}
else if(choice==2)                                //Delete some quantity of book from
library
{
printf("-----\n");
printf("\tTitle : ");
puts(root->title);
printf("\tAuthor name : ");
puts(root->author);
printf("\tPublisher name : ");
puts(root->publisher);
printf("\tPrice : %d\tQuantity : %d",root->price,root->quantity);
printf("\n-----\n");
printf("Enter quantity you want to remove --- ");
scanf("%d",&quantity);
while(quantity>root->quantity || quantity<0)        //Iterate until user enter suitable
quantity
{
printf("Error----- !!\n");
if(quantity<0)
{
printf("Enter positive number\n");
}
else if(quantity>root->quantity)
{
printf("Not sufficient book \n");
}
}

```

```

        printf("Again enter quantity you want to remove --- ");
        scanf("%d",&quantity);
    }
    root->quantity=root->quantity-quantity;
    printf("Quantity remove successfully\n");
    printf("-----\n");
    printf("\tTitle : ");
    puts(root->title);
    printf("\tAuthor name : ");
    puts(root->author);
    printf("\tPublisher name : ");
    puts(root->publisher);
    printf("\tPrice : %d\tQuantity : %d",root->price,root->quantity);
    printf("\n-----\n");
}
return;
}
else if(strcmp(title,root->title)<0)
    root=root->left;
else
    root=root->right;
}
printf("\nNo book with the title ' %s ' exist\n",title);

}

```

```

void main()
{
    struct node *ptr;

```



```

int choice,price,quantity,purchase_quantity,x,y,n=1,i=0,ask_user;

char title[20],author[20],publisher[20],username[20],password[20],ch;

printf("\t#####\n");

printf("\n\t#####");

printf("\n\t#####\t\tLibrary management System\t\t#####");

printf("\n\t#####");

printf("\n\t#####\n");

printf("\n\t#####\n");

printf("\n-----\n");

printf("\t\tUSER : nirma_uni\n");

printf("\t\tPASSWORD : password\n");

do{ //Log in System run loop until user name
and password match

printf("\n\t\tUSER name : ");fflush(stdin);

gets(username);

printf("\t\tPassword : ");fflush(stdin);

while(ch!=13)

{

ch=getch();

if(ch!=13&&ch!=8)

{

putch('*');

password[i]=ch;

i++;

}

}

ch='\0';

```

```

password[i]='\0';
x=strcmp(username,"nirma_uni");
y=strcmp(password,"password");
if(x==0 && y==0)
{
    printf("\n\t\t\tSuccessfully logged in\n");
    break;
}
else
{
    printf("\n\t\t\tWrong password ,try again\n");
    n++;
    i=0;
}
}while(1);

//Menu driven function

while(1){
    printf("\n-----\n1.Add book\n2.Book you want to buy or check
book availability\n3.Remove book quantity\n4.All available book detail\n5.Exit\n\n>> ");
    scanf("%d",&choice);
    printf("\n");
    switch(choice)
    {
    case 1:
        printf("Enter title of book -- ");
        fflush(stdin);
        gets(title);
        fflush(stdin);
        printf("Enter author name -- ");

```

```

gets(author);
fflush(stdin);
printf("Enter publisher name -- ");
gets(publisher);
fflush(stdin);
printf("Enter price of the book -- ");
scanf("%d",&price);
fflush(stdin);
printf("Enter quantity of book -- ");
scanf("%d",&quantity);
if(root==NULL)
    root=add_first_book(title,author,publisher,price,quantity);
else
{
    ptr=get_node(title,author,publisher,price,quantity);
    root=add_book(root,ptr);
}
break;

```

case 2:

```

printf("1.Purchase book\n2.Check book\n---> ");
scanf("%d",&ask_user);
if(ask_user==1){
    printf("Enter name of book (title) --- ");
    fflush(stdin);
    gets(title);
    fflush(stdin);
    printf("Enter quantity of book you want to purchase --- ");
    scanf("%d",&purchase_quantity);

```

```

    find_book(root,title,purchase_quantity);
}
else if(ask_user==2){
    printf("Enter name of book (title) --- ");
    fflush(stdin);
    gets(title);
    fflush(stdin);
    find_book(root,title,-1);}
else
    printf("Enter valid input\n");
    break;

case 3:
    printf("Enter name of book (title) --- ");
    fflush(stdin);
    gets(title);
    fflush(stdin);
    book_delete(root,title);
    break;

case 4:
    all_book(root);
    break;
case 5:
    exit(0);
default:
    printf("Enter valid input\n");

}

printf("\n"); } }

```

Output :

```
"E:\B.tech sem-3\DSA\Assignment\Dsa_comprehensive\19bce189_Comprehensive.exe"

#####
#####                               #####
#####           Library management System           #####
#####                               #####
#####
-----
USER : nirma_uni
PASSWORD : password

USER name : nirma_uni
Password : *****
Successfully logged in

-----
1.Add book
2.Book you want to buy or check book availability
3.Remove book quantity
4.All available book detail
5.Exit

>> 1

Enter title of book -- DSA
Enter author name -- Amit garg
Enter publisher name -- DSA publication
Enter price of the book -- 500
Enter quantity of book -- 5

-----
1.Add book
2.Book you want to buy or check book availability
3.Remove book quantity
4.All available book detail
5.Exit

>> 1

Enter title of book -- OOP
Enter author name -- Ketul kumar
Enter publisher name -- OOP publication
Enter price of the book -- 600
Enter quantity of book -- 6
```

```
-----  
1.Add book  
2.Book you want to buy or check book availability  
3.Remove book quantity  
4.All available book detail  
5.Exit
```

```
>> 1
```

```
Enter title of book -- DM  
Enter author name -- Lalit kumar  
Enter publisher name -- DM publication  
Enter price of the book -- 250  
Enter quantity of book -- 3
```

```
-----  
1.Add book  
2.Book you want to buy or check book availability  
3.Remove book quantity  
4.All available book detail  
5.Exit
```

```
>> 1
```

```
Enter title of book -- DC  
Enter author name -- Vinay sharma  
Enter publisher name -- DC publication  
Enter price of the book -- 420  
Enter quantity of book -- 4
```

```
-----  
1.Add book  
2.Book you want to buy or check book availability  
3.Remove book quantity  
4.All available book detail  
5.Exit
```

```
>> 1
```

```
Enter title of book -- POE  
Enter author name -- Gunjan patil  
Enter publisher name -- POE production  
Enter price of the book -- 130  
Enter quantity of book -- 6
```

```
-----
1.Add book
2.Book you want to buy or check book availability
3.Remove book quantity
4.All available book detail
5.Exit
```

```
>> 4
```

```
-----
Title : DC
Author name : Vinay sharma
Publisher name : DC publication
Price : 420      Quantity : 4
-----
```

```
-----
Title : DM
Author name : Lalit kumar
Publisher name : DM publication
Price : 250      Quantity : 3
-----
```

```
-----
Title : DSA
Author name : Amit garg
Publisher name : DSA publication
Price : 500      Quantity : 5
-----
```

```
-----
Title : OOP
Author name : Ketul kumar
Publisher name : OOP publication
Price : 600      Quantity : 6
-----
```

```
-----
Title : POE
Author name : Gunjan patil
Publisher name : POE production
Price : 130      Quantity : 6
-----
-----
```

```
-----
1.Add book
2.Book you want to buy or check book availability
3.Remove book quantity
4.All available book detail
5.Exit

>> 2

1.Purchase book
2.Check book
---> 2
Enter name of book (title) --- DSA
-----
      Title : DSA
      Author name : Amit garg
      Publisher name : DSA publication
      Price : 500      Quantity : 5
-----

-----
1.Add book
2.Book you want to buy or check book availability
3.Remove book quantity
4.All available book detail
5.Exit

>> 2

1.Purchase book
2.Check book
---> 1
Enter name of book (title) --- OOP
Enter quantity of book you want to purchase --- 4

Book purchased successfully
-----
      Title : OOP
      Author name : Ketul kumar
      Publisher name : OOP publication
      Price : 600      Quantity : 4

      You have to pay 2400
-----
-----
```



```
-----
1.Add book
2.Book you want to buy or check book availability
3.Remove book quantity
4.All available book detail
5.Exit
```

```
>> 3
```

```
Enter name of book (title) --- POE
```

```
1.Delete book
2.Delete some quantity
1
```

```
-----
Title : POE
Author name : Gunjan patil
Publisher name : POE production
Price : 130      Quantity : 6
-----
```

```
Delete successfully
```

```
-----
1.Add book
2.Book you want to buy or check book availability
3.Remove book quantity
4.All available book detail
5.Exit
```

```
>> 4
```

```
-----
Title : DC
Author name : Vinay sharma
Publisher name : DC publication
Price : 420      Quantity : 4
-----
```

```
-----
Title : DM
Author name : Lalit kumar
Publisher name : DM publication
Price : 250      Quantity : 3
-----
```

```
-----
Title : DSA
Author name : Amit garg
Publisher name : DSA publication
Price : 500      Quantity : 5
-----
```

```
-----
Title : OOP
Author name : Ketul kumar
Publisher name : OOP publication
Price : 600      Quantity : 2
-----
```

```
-----
1.Add book
2.Book you want to buy or check book availability
3.Remove book quantity
4.All available book detail
5.Exit
```

```
>> 3
```

```
Enter name of book (title) --- DSA
1.Delete book
2.Delete some quantity
2
-----
Title : DSA
Author name : Amit garg
Publisher name : DSA publication
Price : 500      Quantity : 5
-----
Enter quantity you want to remove --- 4
Quantity remove successfully
-----
Title : DSA
Author name : Amit garg
Publisher name : DSA publication
Price : 500      Quantity : 1
-----
```

```
-----
1.Add book
2.Book you want to buy or check book availability
3.Remove book quantity
4.All available book detail
5.Exit
```

```
>> 4
```

```
-----
Title : DC
Author name : Vinay sharma
Publisher name : DC publication
Price : 420      Quantity : 4
-----
```

```
-----
Title : DM
Author name : Lalit kumar
Publisher name : DM publication
Price : 250      Quantity : 3
-----
```

```
-----
Title : DSA
Author name : Amit garg
Publisher name : DSA publication
Price : 500      Quantity : 1
-----
```

```
-----
Title : OOP
Author name : Ketul kumar
Publisher name : OOP publication
Price : 600      Quantity : 2
-----
-----
```

```
1.Add book
2.Book you want to buy or check book availability
3.Remove book quantity
4.All available book detail
5.Exit

>> 2

1.Purchase book
2.Check book
---> 1
Enter name of book (title) --- DC
Enter quantity of book you want to purchase --- 5

No sufficient book ! !
```

```
1.Add book
2.Book you want to buy or check book availability
3.Remove book quantity
4.All available book detail
5.Exit

>> 3

Enter name of book (title) --- OOP
1.Delete book
2.Delete some quantity
2
-----
      Title : OOP
      Author name : Ketul kumar
      Publisher name : OOP publication
      Price : 600      Quantity : 2
-----
Enter quantity you want to remove --- 10
Error----- ! !
Not sufficient book
Again enter quantity you want to remove --- -1
Error----- ! !
Enter positive number
```

```
-----
1.Add book
2.Book you want to buy or check book availability
3.Remove book quantity
4.All available book detail
5.Exit

>> 2

1.Purchase book
2.Check book
---> 1
Enter name of book (title) --- CS
Enter quantity of book you want to purchase --- 5

No book with the title ' CS ' exist
Check after some time

-----
1.Add book
2.Book you want to buy or check book availability
3.Remove book quantity
4.All available book detail
5.Exit

>> 2

1.Purchase book
2.Check book
---> 2
Enter name of book (title) --- Netwoking

No book with the title ' Netwoking ' exist
Check after some time

-----
1.Add book
2.Book you want to buy or check book availability
3.Remove book quantity
4.All available book detail
5.Exit

>> 5

Process returned 0 (0x0)   execution time : 799.305 s
Press any key to continue.
```