Introduction to Programming

Assignment 2

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***Abstract* - In this paper, we have discussed about a menu driven and user-friendly program which helps the user to check for different inputs. We have used C language for this program.**

Keywords – Library, While loop, Structures.

I. INTRODUCTION

Here we will be discussing how to print upper and lower triangular Matrices. So, first let us know what is a matrix. A matrix is a 2-Dimensional (2-D) array of number arranged in rows and columns. The C programs in this section are based on input and output method. Basic addition and subtraction are involved. An upper triangular matrix is a matrix in which all elements are below the main diagonal is zero. Similarly, in a lower triangular matrix, the elements above the main diagonal are zero.

II. DESCRIPTION

The logic used in the code is fairly simple. We have used WHILE Loop in our code. Here, statement(s) may be a single statement or a block of statements. The condition may be any expression, and true is any nonzero value. The loop iterates while the condition is true. When the condition becomes false, the program control passes to the line immediately following the loop.

III. ALGORITHM :

• INCLUDE HEADER FILE I.E**,<STDIO.H>, <STDLIB.H>, <STRINGH.H>**.

• Declare a **structure** named **library** for holding composite data of **string, integer** and **float** type.
• Then define **strut library arr[limit]** for accessing data members.
• Start a **while loop** with condition (**x=1**).
• Make switch case consisting of **7 cases:**

Position of pointer	0th pos	2RD TO 999TH POS
Blueprint of datatypes in structure type array ,arr[ ]	String book_nam String author Float price Int f Int acc_no	String book_nam String author Float price Int f Int acc_no

• Case 1: to input data for book.

• Case 2: for displaying the book data
• Case 3: for displaying the books of the author given from the console.
• Case 4:to list the title of the specified book.
• Case 5:to know count of books in library.
• Case 6:to list the book in accession number.
• Case 7: to exit from the process.

• For case 1 for taking input of the string part use **fflush(stdin)** and **fgets ()** And for entering the price and flag use **scanf()** with appropriate **access specifier.**
• Further in case 1 use **arr[j]. acc no.= j** for storing there accession no of the book. And then increment j by 1**(J++**).
• In the case 2 of the switch case use **puts ()** to print the string part and **printf () function** for printing price of book.
• Further in case 2, **if(arr[I]. f==0) then print book is issued else print not issued.**
• In case 3 take input from the console for the author's name by **fflush(stdin) & fgets ()** and check that **if(strcmp(arr[I]. author,aut)==0**) then print **arr[I].nam else print "no book available".**
• In case 4 ask for the accession number from the console and then print the book added to the library to that particular accession number by **if(arr[I]. acc_no. ==accession)** then print **arr[i]. nam.**
• In case 5 simply print value of **"j"** for knowing the count of books in the library.
• In case 6 start a loop from **i=0** to **i<j and print arr[i]. nam .**
• In case 7 make value of **x=2** for terminating the while loop matrix.

A. ***PROCEDURE :***

1. A composite data type i.e, structure namely library is declared consisting of integer ,float and two character array each of size 1000 for storing the name of book and name of author

2. Array of structure data type of length 1000 is declared for storing details of book of library.

3. Now the compiles moves inside while loop as the condition is true(x=1).

4. Value of k is first initialised to 0 before each iteration and then it asks every time for giving the choice .

5. Let us say the user has entered 1 as choice now the cursor goes inside the switch case and goes to choice number 1 there it first takes the name of book from console and stores it inside arr[j].nam the then it asks for the name of the author of he book and stores it in arr[j].author then it takes the value of book from user and also asks for the status of book i.e issued or not.Then it assigns the accession no to the book i.e the value of which was initially initialised to “0” and then j++ for counting number of books in library

6. Still the compiler is inside the while loop thus it again asks for entering choice from the user and it goes on until the user give choice as 7 .

7. Now let us say console has given choice as 5 then the cursor again goes inside the switch case and directs itself to case no 5 and prints the number of book present in the library i.e, the value of “j” using the printf() function.

8. If choice no 7 is given then then the value of x is assigned to 0 thus condition of while loop(x=1) becomes false and it comes out of loop.

9. Thus the program of working of library is terminated.

B. ***CODE :***

lib.c > ...

```c
#include<stdio.h>
#include<stdlib.h>
#include<string.h>
int main()
{  const int MAX = 1000;
  struct libary
  {
      int acc_no;
      int f;
      float price;
      char nam[1000];
      char author[1000];
  }arr[1000];
  int j=0,p;
   int x=1,f=1,c=0;
   int ch,i;
   char aut[100];
   int accession;
   char pt[100];
    while(x==1)
    {
     int k=0;
     printf("\n enter the choice \n ");
     printf("enter 1 for entering book information \n ");
     printf("enter 2 for displaying book information \n ");
     printf("enter 3 to know list of all books of the given author \n ");
     printf("enter 4 to list the title of the specified book \n ");
     printf("enter 5 to know count of books in libary book \n ");
     printf("enter 6 to list the book in accession number \n ");
     printf("enter 7 to exit from the process \n ");
     scanf("%d",&ch);
     switch(ch){
        case 1:
          printf("enter the name of the book \n");
          fflush(stdin);
          fgets(arr[j].nam,MAX,stdin);
          printf("enter the name of the author \n ");
          fflush(stdin);
          fgets(arr[j].author,MAX,stdin);
          printf("enter the price of book \n ");
          scanf("%f",&arr[j].price);
          printf("enter 0 if the book is issued \n ");
          scanf("%d",&arr[j].f);
          arr[j].acc_no=j;
          j++;
          break;
     case 2:
         for(i=0;i<j;i++){
          puts(arr[i].nam);
          puts(arr[i].author);
          printf("\n%f",arr[i].price);
          if(arr[i].f==0){
              printf("  ");
              printf("\n the book is issued ");
              printf("\n");
          } else {
              //printf("  ");
              printf("\nthe book is not issued ");
              printf("\n");
          }

      } break;
      case 3:
         printf("enter the name of the author:");
           fflush(stdin);
          fgets(aut,MAX,stdin);
         for(i=0;i<j;i++){
             //puts(arr[i].author);
         if(strcmp(arr[i].author,aut)==0 ){
             puts(arr[i].nam);
             k++;
             }
             }
             if(k==0){
             printf("\n no book aviable");
              }
             break;
      case 4:
         printf("enter the acession no:");
         scanf("%d",&accession);
         for(i=0;i<j;i++){
          if(arr[i].acc_no==accession)
          puts(arr[i].nam);
          printf("\n");
      } break;
      case 5:
       printf("the number of books in libary is %d",j);
        break;
        case 6:
         for(i=0;i<j;i++){
            puts(arr[i].nam);
        } break;
        case 7:
         x=0;
        break;
        default:
        printf("please enter the correct choice,invalid choice entered");
     }

   }
}
```

IV. ***TIME COMPLEXITY***

The time complexity of the code is defined in the worst case for the .As the max value of structure type array can take is 1000 and we know 10^8 in nearly 1 second thus, O(1000)=10^3/10^8=0.00001 sec.

CONCLUSION

It is a very user friendly and menu driven program a gives freedom to the user to check for different inputs.

REFERENCES

[1] Let us C – Yashavant Kanetkar for basic C language theory