Topics

Dynamic Memory Allocation and Structure

General Instructions:

- o First create a directory with your full ID e.g. 2010A7PS111.
- o Create a sub-directory (within the above directory) named Lab_No.
- o Create all your files within the subdirectory.

Write a C program to maintain list of text book information for each class. The structure definition of text book and class/standard is as given below:

```
struct class                          struct text_book
{                                     {
int no_books;                         char name[10];
struct text_book *booklist;           int bid;
};                                    float price;
typedef struct class std;             int numaut;
                                      char autlist[5][10];
                                      };
```

Where, *"no_books"* refers the number of text books for the respective class and *"booklist"* stores the set of text books information of the respective class. The variable *name, bid, price, numaut and autlist* in the structure *text_book* refers name, identification number, price, number of author and list of authors of the text book respectively.

Write functions to perform the following:

1. void read_classInfobyRef(std *s,int cl_no,int nb)

     This function takes a structure variable of type class by reference(***s***), class number(***cl_no)*** and number of text books***(nb)*** for the class ***cl_no*** as arguments. This function reads the value of each variable in the structure class from the user.

Note1: Allocate memory dynamically for the variable ***booklist.***

Note2: To access member of the structure using pointer variable *ptr*, either of following operators is used:

- • ptr -> member
- • (*ptr).member

2. void **print_classInfo**(std s,int cl_no)

     This function takes a structure variable of type class by value(***s***) and class number(***cl_no)*** as arguments. This function prints the value of each variable in the structure class.

3. std read_classInfobyVal(std s,int cl_no,int nb)

This function takes a structure variable of type standard by value(***s***), class number(***cl_no)*** and number of text books***(nb)*** for the class ***cl_no*** as

arguments. This function reads the value of each variable in the structure standard from the user and returns the class s.

4. void **print_allInfo**(std *s, int nc)

This function takes array of structure of type class and number of classes in the school **(nc)** as arguments. This function prints the text book information of all classes in the school.

Template of Driver/Main function for calling the above mentioned functions is given below:

```
void main()
{
int nc,ns,i,j;
std *s;
printf("enter number of classes\n");
scanf("%d",&nc);

  // Allocate memory dynamically for the variable s using malloc()


for(i=1;i<=nc;i++)
{
 printf("enter number of text_books for %d standard\n",i);
 scanf("%d",&ns);
  // Call the function read_classInfobyRef() or read_classInfobyVal()


}
for(i=1;i<=nc;i++)
{

  // Call the function print_classInfo() appropriately


}
 // Call the function print_allInfo()
}
```

Exercises:

1. Modify the variable *autlist[5][10]* in the structure text_book into ****autlist** and rewrite the function **read_classInfobyRef() and read_classInfobyVal**()by dynamically allocating memory for two dimensional array autlist[5][10].

2. Write a function to sort books *in non-increasing order of* book id "*bid".*