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

typedef struct date{
    int day;
    int month;
    int year;
}date;

typedef struct book{
    char code[10];
    char b_name[30];
    char s_name[30];
    struct date issue_date;
}book;

void display();
void add();
void search();
int countLeapYears(date d);
int getDifference(date dt1, date dt2);
void fine();

void display()
{
    FILE *fp;
    fp = fopen("libr.bin", "rb");
    book disbook = {0};

    if(fp == NULL)
    {
        printf("File is not opened\n");
        exit(1);
    }

    int count = 0, flag = 0;
    while(fread(&disbook, sizeof(disbook), 1, fp))
    {
        printf("\nSr no.: %d\n", count + 1);
        printf("Book ID: %s\n", disbook.code);
        printf("Name of the Book: %s\n", disbook.b_name);
        printf("Name of the issuer: %s\n", disbook.s_name);
        printf("Date of Issue: %d/%d/%d\n", disbook.issue_date.day,
disbook.issue_date.month, disbook.issue_date.year);
        count++;
        flag = 1;
    }

    if(flag == 0)
        printf("No Record Found!!!\n");

    fclose(fp);
}

void add()
{
    FILE *fp;
    fp = fopen("libr.bin", "ab+");
    book addbook = {0};

    if(fp == NULL)
    {
        printf("File is not opened\n");
        exit(1);
    }

    printf("Enter the Book ID: ");
    scanf("%s", addbook.code);
    fflush(stdin);

    printf("Enter the name of the book: ");
    scanf("%s", addbook.b_name);
    fflush(stdin);

    printf("Enter the name of the issuer: ");
    scanf("%s", addbook.s_name);
    fflush(stdin);

    printf("Enter the date of issue: ");
    scanf("%d %d %d", &addbook.issue_date.day, &addbook.issue_date.month,
&addbook.issue_date.year);
    fflush(stdin);

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```c
    fwrite(&addbook, sizeof(addbook), 1, fp);
    fclose(fp);
}

void search()
{
    FILE *fp;
    fp = fopen("libr.bin", "rb");
    book findbook = {0};

    if(fp == NULL)
    {
        printf("File is not opened\n");
        exit(1);
    }

    int option = 0;
    printf("\nSearching Menu:\n");
    printf("1. Search by ID\n");
    printf("2. Search by name of book\n");
    printf("3. Search by name of issuer\n");
    printf("Choose an option from 1 to 3: ");
    scanf("%d", &option);

    switch(option)
    {
        case 1:
        {
            int found = 0;
            char b_id[30];
            fflush(stdin);
            printf("Enter the book ID: ");
            scanf("%s", b_id);

            while(fread(&findbook, sizeof(findbook), 1, fp))
            {
                if(!strcmp(findbook.code, b_id))
                {
                    printf("\nBook ID: %s\n", findbook.code);
                    printf("Name of the Book: %s\n", findbook.b_name);
                    printf("Name of the issuer: %s\n", findbook.s_name);
                    printf("Date of Issue: %d/%d/%d\n", findbook.issue_date.day,
findbook.issue_date.month, findbook.issue_date.year);
                    found = 1;
                }
            }

            if(!found)
                printf("No such record found in the Library database\n");
            break;
        }

        case 2:
        {
            int found = 0;
            char book_name[30];
            fflush(stdin);

            printf("\nEnter the name of the book: ");
            scanf("%s", book_name);

            while(fread(&findbook, sizeof(findbook), 1, fp))
            {
                if(!strcmp(findbook.b_name, book_name))
                {
                    printf("\nBook ID: %s\n", findbook.code);
                    printf("Name of the Book: %s\n", findbook.b_name);
                    printf("Name of the issuer: %s\n", findbook.s_name);
                    printf("Date of Issue: %d/%d/%d\n", findbook.issue_date.day,
findbook.issue_date.month, findbook.issue_date.year);
                    found = 1;
                }
            }

            if(!found)
                printf("No such record found in the Library database\n");
            break;
        }

        case 3:
        {
            int found = 0;
            char issuer_name[30];
            fflush(stdin);
```

```
165
166             printf("Enter the name of the issuer: ");
167             scanf("%s", issuer_name);
168
169             while(fread(&findbook, sizeof(findbook), 1, fp))
170             {
171                 if(!strcmp(findbook.s_name, issuer_name))
172                 {
173                     printf("\nBook ID: %s\n", findbook.code);
174                     printf("Name of the Book: %s\n", findbook.b_name);
175                     printf("Name of the issuer: %s\n", findbook.s_name);
176                     printf("Date of Issue: %d/%d/%d\n", findbook.issue_date.day,
    findbook.issue_date.month, findbook.issue_date.year);
177                     found = 1;
178                 }
179             }
180
181             if(!found)
182                 printf("No such record found in the Library database\n");
183             break;
184
185         }
186
187         fclose(fp);
188     }
189 }
190
191 int countLeapYears(date d)
192 {
193     int years = d.year;
194
195     if (d.day <= 2)
196         years--;
197
198     return (years / 4 - years / 100 + years / 400);
199 }
200
201 const int monthDays[12]
202     = { 31, 28, 31, 30, 31, 30,
203        31, 31, 30, 31, 30, 31 };
204
205 int getDifference(date dt1, date dt2)
206 {
207     long int n1 = dt1.year * 365 + dt1.day;
208
209     for (int i = 0; i < dt1.month - 1; i++)
210         n1 += monthDays[i];
211
212     n1 += countLeapYears(dt1);
213
214     long int n2 = dt2.year * 365 + dt2.day;
215     for (int i = 0; i < dt2.month - 1; i++)
216         n2 += monthDays[i];
217     n2 += countLeapYears(dt2);
218
219     return (n2 - n1);
220 }
221
222 void fine()
223 {
224     printf("\nFine Calculation\n");
225     printf("Rate of fine is Rs.1 per day after 15 days\n");
226
227     FILE *fp;
228     fp = fopen("libr.bin", "rb");
229
230     if(fp == NULL)
231     {
232         printf("File is not opened\n");
233         exit(1);
234     }
235
236     book findbook = {0};
237     date d_user;
238
239     int found = 0;
240     char b_id[30];
241     fflush(stdin);
242
243     printf("\nEnter the book ID: ");
244     scanf("%s", b_id);
245
246     while(fread(&findbook, sizeof(findbook), 1, fp))
247     {
```

```
248             if(!strcmp(findbook.code, b_id))
249             {
250                 d_user = findbook.issue_date;
251                 found = 1;
252             }
253         }
254 
255         if(!found)
256         {
257             printf("No such record found in the Library database\n");
258             exit(1);
259         }
260 
261         date d;
262         printf("Enter today's date: ");
263         scanf("%d %d %d", &d.day, &d.month, &d.year);
264 
265         int diff = getDifference(d_user, d);
266         if(diff > 15)
267             printf("Fine: Rs. %d\n", diff - 15);
268         else
269             printf("No Fine\n");
270 
271         fclose(fp);
272     }
273 
274     void drop()
275     {
276         FILE *fp;
277         FILE *tmp;
278 
279         fp = fopen("libr.bin", "rb");
280         tmp = fopen("newlibr.bin", "wb");
281 
282         if(fp == NULL)
283         {
284             printf("File is not opened\n");
285             exit(1);
286         }
287 
288         if(tmp == NULL)
289         {
290             printf("File is not opened\n");
291             exit(1);
292         }
293 
294         int found = 0;
295         char b_id[30];
296         fflush(stdin);
297         book findbook = {0};
298 
299         printf("\nEnter the book ID of the book to be deleted: ");
300         scanf("%s", b_id);
301 
302         while(fread(&findbook, sizeof(findbook), 1, fp))
303         {
304             if(strcmp(findbook.code, b_id) != 0)
305                 fwrite(&findbook, sizeof(findbook), 1, tmp);
306             else
307                 found = 1;
308         }
309 
310         if(found == 1)
311             printf("Required record deleted\n");
312         else
313             printf("No such record found in the Library database\n");
314 
315         fclose(fp);
316         fclose(tmp);
317         remove("libr.bin");
318         rename("newlibr.bin", "libr.bin");
319     }
320 
321     int main()
322     {
323         printf("Welcome to Ahan's Library Database Management Systems!!!\n");
324         int option = 0;
325         do{
326             printf("\nMenu:\n");
327             printf("1. Display record\n");
328             printf("2. Add a record\n");
329             printf("3. Drop a record\n");
330             printf("4. Search any book\n");
331             printf("5. Calculate fine\n");
```

```
332           printf("6. Exit\n");
333
334           printf("\nChoose an option: ");
335           scanf("%d", &option);
336
337           switch(option)
338           {
339               case 1:
340                   display();
341                   break;
342
343               case 2:
344                   add();
345                   break;
346
347               case 3:
348                   drop();
349                   break;
350
351               case 4:
352                   search();
353                   break;
354
355               case 5:
356                   fine();
357                   break;
358
359               case 6:
360                   printf("Exiting library database!!!\n");
361                   break;
362
363               default:
364                   printf("Wrong option. Please enter again!!!\n");
365           }
366       }while(option != 6);
367
368       return 0;
369   }
370
```