EXERCICE 1 :

```
#include <stdio.h>


struct book_s
      {
            char name[100];
            char authors[10][100];
            int nauthors;
            char publisher [100];
            int year;
            long isbn;
      };
      enum day_e
      {
                  monday, tuesday, wednesday, thursday, friday, saturday,
sunday
      };
      struct library_s
      {
            char name[100];
            enum day_e day_e[7];
            int ndays;
            struct book_s books[100];
            int nbooks;
      };

void book_print(struct book_s b)
{

int i;
      printf("(");
      printf("\"%s\", ", b.name);
      printf("(");
      for(i=0; i<b.nauthors-1;i++)
      {
            printf("\"%s\", ", b.authors[i]);
      }
      printf("\"%s\"", b.authors[i]);
      printf("), ");
      printf("\"%s\", ", b.publisher);
      printf("%d, ", b.year);
      printf("%ld", b.isbn);
}

void library_print(struct library_s l)
{

int i;
char *day_str[] = {"monday", "tuesday", "wednesday", "thursday",
"friday", "saturday", "sunday"};
      printf("(");
      printf("\"%s\", ", l.name);
      printf("(");
      for(i=0;i<l.ndays-1;i++)
      {
                  printf("\"%s\", ", day_str[l.day_e[i]]);
```

```
	}
	printf("\"%s\"", day_str[l.day_e[i]]);
	printf("), (");
	for(i=0; i<l.nbooks;i++)
	{
		book_print(l.books[i]);
		if (i != l.nbooks-1)
			printf("), ");
		else
			printf(")))\n");
	}
}

int main()
{

	struct library_s SciencesLibrary =
	{
		"Sciences Library",
		{monday, tuesday, wednesday, thursday},
		4,
		{
			{"The C Programming Language",
			{"Brian W. Kernighan", "Dennis M.Ritchie"},
			2,
			"Prentice Hall",
			1988,
			9780131103627},

			{"C: The Complete Reference",
			{"Herbert Schildt"},
			1,
			"McGraw-Hill Education",
			2000,
			9780072121247,
			}
		},
		2,
	};
	struct library_s NovelLibrary =
	{
		"Novel Library",
		{tuesday, wednesday, thursday, friday},
		4,
		{
			{"Harry Potter and the Philosopher's Stone",
			{"J. K. Rowling"},
			1,
			"Bloomsbury",
			1997,
			9780747532699},

			{"Harry Potter and the Chamber of Secrets",
			{"J. K. Rowling"},
			1,
			"Bloomsbury",
			1998,
			9780747538493,
```

```
                }
            },
            2,
      };
      library_print(SciencesLibrary);
      library_print(NovelLibrary);
      return 0;
}
```

EXERCICE 2 :

```
#include <stdio.h>

      typedef struct book_s book_t;
      struct book_s
      {
            char name[100];
            char authors[10][100];
            int nauthors;
            char publisher [100];
            int year;
            long isbn;
      };
      enum day_e
      {
                  monday, tuesday, wednesday, thursday, friday, saturday,
sunday
      };
      typedef enum day_e day_t;
      typedef struct library_s library_t;
      struct library_s
      {
            char name[100];
            day_t day_e[7];
            int ndays;
            book_t books[100];
            int nbooks;
      };

void book_print(book_t b)
{

int i;
      printf("(");
      printf("\"%s\", ", b.name);
      printf("(");
      for(i=0; i<b.nauthors-1;i++)
      {
            printf("\"%s\", ", b.authors[i]);
      }
      printf("\"%s\"", b.authors[i]);
      printf("), ");
      printf("\"%s\", ", b.publisher);
      printf("%d, ", b.year);
```

```
      printf("%ld", b.isbn);
}

void library_print(library_t l)
{

int i;
char *day_str[] = {"monday", "tuesday", "wednesday", "thursday",
"friday", "saturday", "sunday"};
      printf("(");
      printf("\"%s\", ", l.name);
      printf("(");
      for(i=0;i<l.ndays-1;i++)
      {
                printf("\"%s\", ", day_str[l.day_e[i]]);
      }
      printf("\"%s\"", day_str[l.day_e[i]]);
      printf("), (");
      for(i=0; i<l.nbooks;i++)
      {
            book_print(l.books[i]);
            if (i != l.nbooks-1)
                  printf("), ");
            else
                  printf(")))\n");
      }
}

int main()
{

      library_t SciencesLibrary =
      {
            "Sciences Library",
            {monday, tuesday, wednesday, thursday},
            4,
            {
                  {"The C Programming Language",
                  {"Brian W. Kernighan", "Dennis M.Ritchie"},
                  2,
                  "Prentice Hall",
                  1988,
                  9780131103627},

                  {"C: The Complete Reference",
                  {"Herbert Schildt"},
                  1,
                  "McGraw-Hill Education",
                  2000,
                  9780072121247,
                  }
            },
            2,
      };
      library_t NovelLibrary =
      {
            "Novel Library",
            {tuesday, wednesday, thursday, friday},
```

```
            4,
            {
                  {"Harry Potter and the Philosopher's Stone",
                  {"J. K. Rowling"},
                  1,
                  "Bloomsbury",
                  1997,
                  9780747532699},

                  {"Harry Potter and the Chamber of Secrets",
                  {"J. K. Rowling"},
                  1,
                  "Bloomsbury",
                  1998,
                  9780747538493,
                  }
            },
            2,
      };
      library_print(SciencesLibrary);
      library_print(NovelLibrary);
      return 0;
}
```

EXERCICE 3 :

```
#include <stdio.h>

      typedef struct
      {
            char name[100];
            char authors[10][100];
            int nauthors;
            char publisher [100];
            int year;
            long isbn;
      }book_t;

      typedef enum
      {
                  monday, tuesday, wednesday, thursday, friday, saturday,
sunday
      }day_t;


      typedef struct
      {
            char name[100];
            day_t day_e[7];
            int ndays;
            book_t books[100];
            int nbooks;
      }library_t;

void book_print(book_t b)
```

```
{

int i;
      printf("(");
      printf("\"%s\", ", b.name);
      printf("(");
      for(i=0; i<b.nauthors-1;i++)
      {
            printf("\"%s\", ", b.authors[i]);
      }
      printf("\"%s\"", b.authors[i]);
      printf("), ");
      printf("\"%s\", ", b.publisher);
      printf("%d, ", b.year);
      printf("%ld", b.isbn);
}

void library_print(library_t l)
{

int i;
char *day_str[] = {"monday", "tuesday", "wednesday", "thursday",
"friday", "saturday", "sunday"};
      printf("(");
      printf("\"%s\", ", l.name);
      printf("(");
      for(i=0;i<l.ndays-1;i++)
      {
                  printf("\"%s\", ", day_str[l.day_e[i]]);
      }
      printf("\"%s\"", day_str[l.day_e[i]]);
      printf("), (");
      for(i=0; i<l.nbooks;i++)
      {
            book_print(l.books[i]);
            if (i != l.nbooks-1)
                  printf("), ");
            else
                  printf(")))\n");
      }
}

int main()
{

      library_t SciencesLibrary =
      {
            "Sciences Library",
            {monday, tuesday, wednesday, thursday},
            4,
            {
                  {"The C Programming Language",
                  {"Brian W. Kernighan", "Dennis M.Ritchie"},
                  2,
                  "Prentice Hall",
                  1988,
                  9780131103627},
```

```
                {"C: The Complete Reference",
                {"Herbert Schildt"},
                1,
                "McGraw-Hill Education",
                2000,
                9780072121247,
                }
          },
          2,
     };
     library_t NovelLibrary =
     {
          "Novel Library",
          {tuesday, wednesday, thursday, friday},
          4,
          {
                {"Harry Potter and the Philosopher's Stone",
                {"J. K. Rowling"},
                1,
                "Bloomsbury",
                1997,
                9780747532699},

                {"Harry Potter and the Chamber of Secrets",
                {"J. K. Rowling"},
                1,
                "Bloomsbury",
                1998,
                9780747538493,
                }
          },
          2,
     };
     library_print(SciencesLibrary);
     library_print(NovelLibrary);
     return 0;
}
```

EXERCICE 4 ;

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


char
*day_str[]={"monday","tuesday","wednesday","thursday","friday","saturday"
,"sunday"};

enum day_e
{
  monday,tuesday,wednesday,thursday,friday,saturday,sunday
};
typedef enum day_e day_t;

struct book_s
```

```
{
 char *name;
 char **authors;
int nbauthors;
 char *publisher;
 int year;
 double isbn;
};
typedef struct book_s book_t;

struct library_s
{

  char *name;
  day_t *days;
  int ndays;
  book_t *books;
  int nbooks;

};
typedef struct library_s library_t;

book_t book_create()
{
      book_t *book;
      book = (book_t*)malloc(sizeof(book_t));

      book->name=NULL;
      book->authors=NULL;
      book->nbauthors=0;
      book->publisher=NULL;
      book->year=0;
      book->isbn=0;

      return book ;
}

library_t library_creat()
{
      library_t *L;
      L=(library_t*)malloc(sizeof(library_t));

      L->name=NULL;
      L->days=NULL;
      L->ndays=0;
      L->books=NULL;
      L->nbooks=0;

      return L;

}

void book_free (book_t *book)
{
      free(book);
}

void library_free(library_t *L)
```

```
{
      free(L);
}

int book_add_author(book_t *B,char author[])
{
      int i;
      if(B->nbauthors==0)
      {
      B->authors=(char**)malloc(B->nbauthors+1*sizeof(char));
      B->authors[B->nbauthors]=(char*)malloc(sizeof(char));
      for(i=0;i<strlen(author);i++)
      {
            B->authors[B->nbauthors]=(char*)realloc(B->authors[B-
>nbauthors],(i+1)*sizeof(char));
            B->authors[B->nbauthors][i]=author[i];

      }

      }
      else {
      B->authors=(char**)realloc(B->authors,B->nbauthors+1*sizeof(char));
      B->authors[B->nbauthors]=(char*)malloc(sizeof(char));
      for(i=0;i<strlen(author);i++)
      {
            B->authors[B->nbauthors]=(char*)realloc(B->authors[B-
>nbauthors],(i+1)*sizeof(char));
            B->authors[B->nbauthors][i]=author[i];
      }
      }


      if(strcmp(B->authors[B->nbauthors],author)==0)
      {
        B->nbauthors = B->nbauthors+1;
       return 0 ;
    }
    else
      return -1;
}

int library_add_day(library_t *L, day_t D)
{
      int i,n=L->ndays;
      if(L->ndays == 0)
      {
        L->days=(day_t*)malloc(sizeof(day_t));

        L->days[n] = D;

        L->ndays=L->ndays+1;
      }

      else
      {
            L->days=(day_t*)realloc(L->days,n+1*sizeof(day_t));
            L->days[n] = D;
            L->ndays=L->ndays+1;
```

```
      }

      if(n==L->ndays)
        return -1;
       else
       return 0;
}

int library_add_book(library_t *L , book_t *B)
{
      int i,n=L->nbooks;
      if(n==0)
      {
            L->books=(book_t*)malloc(sizeof(book_t));

            L->books[n]->name = B->name;
            L->books[n]->isbn = B->isbn;
            L->books[n]->nbauthors = B->nbauthors;
            L->books[n]->publisher = B->publisher;

            for(i=0;i<B->nbauthors;i++)
            {
                  book_add_author(L->books[n]->authors[i],B->authors[i]);
            }
            L->books[n]->year=B->year
            L->nbooks++;
      }
      else
       {
            L->books=(book_t*)realloc(L->books,n+1*sizeof(book_t));

            L->books[n]->name = B->name;
            L->books[n]->isbn = B->isbn;
            L->books[n]->nbauthors = B->nbauthors;
            L->books[n]->publisher = B->publisher;

            for(i=0;i<B->nbauthors;i++)
            {
                  book_add_author(L->books[n]->authors[i],B->authors[i]);
            }
            L->books[n]->year=B->year;
            L->nbooks++;
       }

       if(n==L->nbooks)
        return -1;
        else
        return 0;
}

void affichage_book(book_t books)
{
      int i;
      printf("), ((\" %s \", (",books.name);
      for(i=0;i<books.nbauthors;i++)
      printf("\" %s \", ",books.authors[i]);

      printf("), \" %s \", ",books.publisher);
```

```
          printf("%d" , books.year);
      printf("%ld",books.isbn);
}



void affichage_library(library_t library)
{
int i;
    printf("(");
     printf(" \" %s \", (",library.name);
     for(i=0;i<library.ndays;i++)
     printf(" \" %s \", ",day_str[library.days[i]]);
       for(i=0;i<library.nbooks;i++)
         affichage_book(library.books[i]);
}


int main()
{


library_t library1=
      {
            "Sciences Library",
            {monday,tuesday,wednesday,thursday},
            4,
            {
               {"The C Programming Language",
                 {"Brian W. Kernighan ","Dennis M. Ritchie"},
                 2,
                 "Prentice Hall",
                 1988,
                 780131103627
               },
               {
                 "C: The Complete Reference",
                 {"Herbert Schildt","McGraw-Hill Education"},
                 2,
                 2000,
                 780072121247
               }
            },
            2
      };

library_t library2=
{
      "Novel Library",
      {tuesday,wednesday,thursday,friday},
      4,
      {
            {"Harry Potter and the Philosopher's Stone",
{"J.K.Rowling"},1,"Bloomsbury",1997,9780747532699},
            {"Harry potter and the chamber of secret",{"J. K.
Rowling"},1,"Bloomsbury",1998,978074753849}
      },
```

```
      2
      };

affichage_library(library1);
affichage_library(library2);


}
```