Міністерство освіти і науки України Національний університет "Львівська політехніка" Інститут комп'ютерних наук та інформаційних технологій Кафедра програмного забезпечення



Звіт

Про виконання лабораторної роботи №10 на тему:

«ДИНАМІЧНІ СТРУКТУРИ ДАНИХ»

з дисципліни «Основи програмування»

Лектор:

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Прийняв:

асист. каф. ПЗ Дивак І.В.

«___»____2021 p.

 $\sum =$ ______.

Тема: динамічні структури даних.

Мета: оволодіти практичними прийомами створення та опрацювання динамічних списків.

ЗАВДАННЯ

Варіант 17

Завдання: Виконати завдання з лабораторної роботи № 8, організувавши послідовність структур в однозв'язний список. Реалізувати операцію вставки нового елемента у відсортований список і операцію вилучення зі списку даних, які відповідають одній з наступних умов: про книги, видані раніше 1991 року;

ТЕКСТ ПРОГРАМИ

```
Файл main.c:
#include "functions.h"
int main(void) {
    Book* firstBook = NULL;
    readFromFile(&firstBook);//створення "бібліотеки"
    printf("\t\t\t\t Before burning books\n");
    seeOnShelf(firstBook);
    firstBook = burnBooks(firstBook);
    printf("\t\t\t\t After burning books\n");
    seeOnShelf(firstBook);
    sellBooks(firstBook);
    return 0;
}
Файл functions.c:
#include "functions.h"
Book *buyNewBook() {
    Book* newBook = calloc(1, sizeof(Book));
    newBook->next = NULL;
    return newBook;
}
void readFromFile(Book** firstBook) {
    char buffer[STANDARD_STRING_LENGHT];
    FILE* file;
    if (!(file = fopen("database.txt", "r")))
        printf("Input error");
```

```
return;
    }
    while (fgets(buffer, STANDARD_STRING_LENGHT, file))
        Book* newBook = buyNewBook();
        strcpy(newBook->author, strtok(buffer, "\t"));
        strcpy(newBook->name, strtok(NULL, "\t"));
        char* numberBuffer = strtok(NULL, "\t");
        newBook->year = strtol(numberBuffer, &numberBuffer, 10);
        numberBuffer = strtok(NULL, "\t");
        newBook->pages = strtol(numberBuffer, &numberBuffer, 10);
        numberBuffer = strtok(NULL, "\t");
        newBook->price = strtol(numberBuffer, &numberBuffer, 10);
        placeNewBook(firstBook, newBook);
    }
    fclose(file);
}
void placeNewBook(Book** firstBook, Book* newBook)
{
    if (!*firstBook || placeOnShelf(*firstBook, newBook) > 0)
        newBook->next = *firstBook;
        *firstBook = newBook;
        return;
    }
    Book* current = *firstBook;
    while (current->next && placeOnShelf(current->next, newBook) < 0)</pre>
    {
        current = current->next;
    }
    newBook->next = current->next;
    current->next = newBook;
}
int placeOnShelf(Book* one, Book* two) {
    return strcmp(two->name, one->name );
}
Book* burnBooks(Book* first) {
    Book* curr = first;
    Book* prev = NULL;
    while (curr) {
        if ((!prev) && (curr->year < 1991))
        {
            //problems with it
            first = curr->next;
            free(curr);
            curr = first;
            continue;
        }
        if (curr->year < 1991) {
            prev->next = curr->next;
```

```
free(curr);
         curr = prev->next;
         continue;
      }
      prev = curr;
      curr = curr->next;
   return first;
}
void seeOnShelf(Book** firstBook) {
printf("-----
----\n");
   printf("\t Author\t
                      |\t\t\t Name\t\t\t | Published| Pages |
printf("\n------
-----\n");
   Book* current = firstBook;
   do
      printf(" %-20s | %-44s| %4d | %3d | %4.2lf |\n", current->author,
current->name, current->year, current->pages, current->price);
     current = current->next;
   while (current);
printf("-----
-----\n\n");
}
void sellBooks(Book* curr) {
   if (!curr) {
      return;
   }
      sellBooks(curr->next);
      free(curr);
}
Файл functions.h:
#define _CRT_SECURE_NO_WARNINGS
#pragma once
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#define STANDARD_STRING_LENGHT 100
typedef struct BookNode
   char author[STANDARD_STRING_LENGHT];
   char name[STANDARD_STRING_LENGHT];
   int year;
   int pages;
   double price;
```

```
struct BookNode* next;
}Book;

#ifndef FUNCTIONS_H
#define FUNCTIONS_H

Book* buyNewBook();

void readFromFile(Book** first);

void placeNewBook(Book** firstBook, Book* newBook);

int placeOnShelf(Book* one, Book* two);

Book* burnBooks(Book* first);

void seeOnShelf(Book** firstBook);

void sellBooks(Book* firstBook);

#endif // FUNCTIONS_H
```

РЕЗУЛЬТАТИ

	Before burning books			
Author	Name	Published	Pages	Price
J. R. R. Tolkien	The Two Towers	1954	352	155.00
J. R. R. Tolkien	The Return of the King	1955	416	180.00
J. R. R. Tolkien	The Fellowship of the Ring	1954	423	165.00
Christopher Paolini	Inheritance	2011	860	270.00
J. K. Rowling	Harry Potter and the Prisoner of Azkaban	1999	317	175.00
J. K. Rowling	Harry Potter and the Philosopher's Stone	1997	223	150.00
J. K. Rowling	Harry Potter and the Order of the Phoenix	2003	766	195.00
J. K. Rowling	Harry Potter and the Half-Blood Prince	2005	607	205.00
J. K. Rowling	Harry Potter and the Goblet of Fire	2000	636	190.00
J. K. Rowling	Harry Potter and the Deathly Hallows	2007	607	240.00
J. K. Rowling	Harry Potter and the Chamber of Secrets	1998	251	160.00
Christopher Paolini	Eragon	2002	544	200.00
		2005	694	220.00
Thristopher Paolini				
Christopher Paolini Christopher Paolini 	Eldest Brisingr 	2003	831	250.00
	Brisingr	2008	831	
Christopher Paolini Author	Brisingr After burning books Name	2008	831	250.00
Christopher Paolini Author Christopher Paolini	Brisingr After burning books Name Inheritance	2008 Published 2011	831 Pages	250.00
Christopher Paolini Author Christopher Paolini J. K. Rowling	After burning books Name Inheritance Harry Potter and the Prisoner of Azkaban	2008 Published 2011 1999	831 Pages 860 317	250.00
Author Christopher Paolini Author Christopher Paolini J. K. Rowling J. K. Rowling	After burning books Name Inheritance Harry Potter and the Prisoner of Azkaban Harry Potter and the Philosopher's Stone	2008 Published 2011 1999 1997	831 Pages 860 317 223	250.00 Price 270.00 175.00 150.00
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Christopher Paolini Author	After burning books Name Inheritance Harry Potter and the Prisoner of Azkaban Harry Potter and the Philosopher's Stone Harry Potter and the Order of the Phoenix Harry Potter and the Half-Blood Prince Harry Potter and the Goblet of Fire Harry Potter and the Deathly Hallows Harry Potter and the Chamber of Secrets	2008 2008	Pages 860 317 223 766 607 636 607 251	250.00 Price 270.00 175.00 159.00 195.00 205.00 190.00 240.00 160.00

Рис 1. Результат виконання програми

висновки

Виконуючи лабораторну роботу №10, я оволодів практичними прийомами створення та опрацювання динамічних списків.