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**Факультет інформатики та обчислювальної техніки**

**Кафедра ІІІ**

**Звіт**

з лабораторної роботи № 2 з дисципліни  
«Основи програмування 2. Модульне програмування»

**„ Файли даних. Бінарні файли”**

**Виконав**

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Київ 2022

## Завдання

19. Створити файл із списком творів автора: назва, дата написання, рік видання (якщо твір не видано, то - 0). Скопіюйте в окремий файл твори, написані протягом останніх чотирьох років. Вивести твори, що були надруковані більш ніж через 5 років після написання

Код c++

```
1  #include "Header.h"
2
3  struct writeDate {
4      char day[4];
5      char month[4];
6      int year;
7  };
8
9  struct Composition {
10     char nameOfText[21];
11     int rYear;
12     writeDate wDate;
13 };
14
15 void createFile(const string& name) {
16     ofstream file;
17     string ans;
18     cout << "Do you want to rewrite information (Y/N)? ";
19     cin >> ans;
20     while (ans != "Y" && ans != "y" && ans != "N" && ans != "n") {
21         cout << "Wrong, enter 'Y' or 'N': ";
22         cin >> ans;
23     }
24     if (ans == "Y" or ans == "y") file.open(name, ios::binary);
25     else file.open(name, ios::binary | ios::app);
26
27     int numb = getNumOfTexts();
28     for (int i = 0; i < numb; ++i)
29     {
30         Composition text = inputInfo();
31         file.write((char*)&text, sizeof(Composition));
32         cout << "Info are now in the file" << endl << endl;
33     }
34     file.close();
35 }
36
```

```

73
74 string getDay() {
75
76     string d;
77     cout << "Enter the day from 1 to 31: ";
78     cin >> d;
79     cin.ignore();
80     while (!isNumber(d) || stoi(d) < 1 || stoi(d) > 31) {
81         cout << "Enter correct day: ";
82         cin >> d;
83     }
84     if (stoi(d) < 10) { d = '0' + d; }
85     return d + '.';
86 }
87
88 string getMonth() {
89     string m;
90     cout << "Enter the month from 1 to 12: ";
91     cin >> m;
92     while (!isNumber(m) || stoi(m) < 1 || stoi(m) > 12) {
93         cout << "Enter correct month: ";
94         cin >> m;
95     }
96     if (stoi(m) < 10) { m = '0' + m; }
97     return m + '.';
98 }
99
100 int getYearWrite() {
101     string y;
102     cout << "Enter the year of writing, up to 2022: ";
103     cin >> y;
104     cin.ignore();
105     while (!isNumber(y) || stoi(y) < 1 || stoi(y) > 2022)
106     {
107         cout << "Enter correct year: ";
108         cin >> y;
109     }
110     return stoi(y);
111 }

```

```

37 int getNumOfTexts() {
38
39     string numb;
40     cout << "Enter the number of composicions: ";
41     cin >> numb;
42     cin.ignore();
43     while (stoi(numb) < 1 || !isNumber(numb)) {
44         cout << "Enter correct number(positive): ";
45         cin >> numb;
46         cin.ignore();
47     }
48     return stoi(numb);
49 }
50
51 Composition inputInfo() {
52     Composition txt{};
53
54     strcpy_s(txt.nameOfText, getTextName().c_str());
55     strcpy_s(txt.wDate.day, getDay().c_str());
56     strcpy_s(txt.wDate.month, getMonth().c_str());
57     txt.wDate.year = getYearWrite();
58     txt.rYear = getYearRelease(txt.wDate.year);
59     return txt;
60 }
61
62
63 string getTextName() {
64     string name;
65     cout << "Enter name of text, up to 20 symbols: ";
66     cin >> name;
67     while (name.length() > 20) {
68         cout << "The name is long, enter again: ";
69         cin >> name;
70     }
71     return name;
72 }

```

```

149
150 void changelist(const string& readFile, const string& writeFile) {
151     Composition txt{};
152     ofstream outFile(writeFile, ios::binary);
153     ifstream inFile(readFile, ios::binary);
154
155     while (inFile.read((char*)&txt, sizeof(Composition))) {
156         if (txt.wDate.year > 2018) { outFile.write((char*)&txt, sizeof(Composition)); }
157     }
158     inFile.close();
159     outFile.close();
160 }
161
162 void outOther(const string& inFile) {
163     Composition txt{};
164     ifstream file(inFile, ios::binary);
165
166     while (file.read((char*)&txt, sizeof(Composition))) {
167         if ((txt.rYear - txt.wDate.year) > 5)
168         {
169             string name(txt.nameOfText), day = (txt.wDate.day), month = txt.wDate.month;
170             string wYear = to_string(txt.wDate.year), rYear = to_string(txt.rYear);
171             cout << setw(15) << "Name: " << name << endl << setw(23) << " Written date: "
172                 << day << month << wYear << endl << setw(23) << " Release year: " << rYear << "\n\n";
173         }
174     }
175     cin.ignore();
176     file.close();
177 }
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212
213 int getYearRelease(int writeYear) {
214     string y;
215     cout << "Enter the year of release(if not released enter 0): ";
216     cin >> y;
217     cin.ignore();
218     if (y != "0") {
219         while (!isNumber(y) || stoi(y) < writeYear || stoi(y) > 2022 || stoi(y) < 0)
220         {
221             cout << "Enter correct year: ";
222             cin >> y;
223             if (y == "0") { return stoi(y); }
224         }
225     }
226     return stoi(y);
227 }
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```

```

1      #pragma once
2
3      #include <iostream>
4      #include <string>
5      #include <fstream>
6      #include <cmath>
7      #include <iomanip>
8      #include <cstdio>
9
10     using namespace std;
11
12     struct writeDate;
13     struct Composition;
14
15     void createFile(const string&);
16     void showList(const string&);
17     int getNumOfTexts();
18
19     Composition inputInfo();
20     string getTextName();
21     string getDay();
22     string getMonth();
23     bool isNumber(const string&);
24     int getYearWrite();
25     int getYearRelease(int writeYear);
26     void changeList(const string&, const string&);
27     void outOther(const string&);

```

```

1      #include "Header.h"
2
3      int main()
4      {
5          createFile("intoTheFile.txt");
6          cout << "Info:\n";
7          showList("intoTheFile.txt");
8          changeList("intoTheFile.txt", "OutTheFile.txt");
9          cout << "Texts written for last 4 years(2019-2022):\n\n";
10         showList("OutTheFile.txt");
11         cout << "Texts released after 5 years from being written:\n\n";
12         outOther("intoTheFile.txt");
13     }
14

```

## Консоль c++

```
Do you want to rewrite information (Y/N)? y
Enter the number of compositions: 3
Enter name of text, up to 20 symbols: 1
Enter the day from 1 to 31: 1
Enter the month from 1 to 12: 1
Enter the year of writing, up to 2022: 2020
Enter the year of release(if not released enter 0): 2021
Info are now in the file

Enter name of text, up to 20 symbols: 2
Enter the day from 1 to 31: 2
Enter the month from 1 to 12: 2
Enter the year of writing, up to 2022: 2000
Enter the year of release(if not released enter 0): 2006
Info are now in the file

Enter name of text, up to 20 symbols: 3
Enter the day from 1 to 31: 3
Enter the month from 1 to 12: 3
Enter the year of writing, up to 2022: 2000
Enter the year of release(if not released enter 0): 0
Info are now in the file
```

Info:

```
Name: 1
Written date: 01.01.2020
Release year: 2021

Name: 2
Written date: 02.02.2000
Release year: 2006

Name: 3
Written date: 03.03.2000
Release year: Not released
```

Texts written for last 4 years(2019-2022):

```
Name: 1
Written date: 01.01.2020
Release year: 2021
```

Texts released after 5 years from being written:

```
Name: 2
Written date: 02.02.2000
Release year: 2006
```

## Код python

```
from functions import *

def main():
    createFile("inToTheFile.txt")
    print("\nInfo:")
    showList("inToTheFile.txt")
    changeList("inToTheFile.txt", "outOfTheFile.txt")
    print("\nTexts written for last 4 years(2019-2022):")
    showList("outOfTheFile.txt")
    print("\nTexts released after 5 years from being written:")
    outOther("inToTheFile.txt")

if __name__ == '__main__':
    main()
```

```
import pickle
import os

def createFile(name):
    ans = input("Do you want to rewrite information (Y/N)? ")
    while ans != 'Y' and ans != 'y' and ans != 'N' and ans != 'n':
        ans = input("Wrong, enter 'Y' or 'N': ")

    if ans == 'Y' or 'y': file = open(name, 'wb')
    else: file = open(name, 'ab')

    numb = getNumOfTexts()
    composition = []
    for i in range (numb):
        text = {
            "name": getTextName(),
            "day": getDay(),
            "month": getMonth(),
            "wYear": "",
            "rYear": ""
        }
        wrYear = getYearWrite()
        text["wYear"] = wrYear
        text["rYear"] = getYearRelease(int(wrYear))
        composition.append(text)
        print("Info are now in the file\n")
    pickle.dump(composition, file)
    file.close()

def getNumOfTexts():
    numb = input("Enter the number of compositions: ")
    while not numb.isdigit() or not int(numb) > 0:
        numb = input("Enter correct number(positive): ")
    return int(numb)

def getTextName():
    name = input("Enter name of text: ")
    return name
```



```

def getDay():
    day = input("Enter the day from 1 to 31: ")
    while not day.isdigit or int(day) < 1 or int(day) > 31:
        day = input("Enter correct day: ")
    if len(day) != 2:
        day = '0' + day
    day = day + '.'
    return day

def getMonth():
    month = input("Enter the month from 1 to 12: ")
    while not month.isdigit or int(month) < 1 or int(month) > 12:
        month = input("Enter correct month: ")
    if len(month) != 2:
        month = '0' + month
    month = month + '.'
    return month

def getYearWrite():
    year = input("Enter the year of writing, up to 2022: ")
    while not year.isdigit or int(year) < 1 or int(year) > 2022:
        year = input("Enter correct year: ")
    return int(year)

def getYearRelease(writeYear):
    yearRel = input("Enter the year of release(if not released enter 0): ")
    if yearRel == '0':
        return int(yearRel)
    else:
        while not yearRel.isdigit or int(yearRel) < writeYear or int(yearRel) > 2022 or int(yearRel) < 1:
            yearRel = input("Enter correct year: ")
        return int(yearRel)

```

```

def showList(name):
    Rel = ''
    file = open(name, 'rb')
    composition = pickle.load(file)
    for text in composition:
        Rel = str(text["rYear"])
        if str(text["rYear"]) == '0':
            Rel = 'Not Released'
        print('\nName: ' + text["name"] + '\nWritten date: ' + text["day"] + text["month"] +
              str(text["wYear"]) + '\nRelease year: ' + Rel)
    file.close()

def changelist(inName, outName):
    inFile = open(inName, 'rb')
    outFile = open(outName, 'wb')
    composition = pickle.load(inFile)
    out = []
    for text in composition:
        if text["wYear"] > 2018:
            out.append(text)
    pickle.dump(out, outFile)
    inFile.close()
    outFile.close()

def outOther(name):
    file = open(name, 'rb')
    composition = pickle.load(file)
    for text in composition:
        if text["rYear"] - text["wYear"] > 5:
            print('\nName: ' + text["name"] + '\nWritten date: ' + text["day"] + text["month"] +
                  str(text["wYear"]) + '\nRelease year: ' + str(text["rYear"]))
    file.close()

```

## Консоль python

```
Do you want to rewrite information (Y/N)? y
Enter the number of compositions: 3
Enter name of text: 1
Enter the day from 1 to 31: 1
Enter the month from 1 to 12: 1
Enter the year of writing, up to 2022: 2020
Enter the year of release(if not released enter 0): 2021
Info are now in the file

Enter name of text: 2
Enter the day from 1 to 31: 2
Enter the month from 1 to 12: 2
Enter the year of writing, up to 2022: 2000
Enter the year of release(if not released enter 0): 2006
Info are now in the file

Enter name of text: 3
Enter the day from 1 to 31: 3
Enter the month from 1 to 12: 3
Enter the year of writing, up to 2022: 2000
Enter the year of release(if not released enter 0): 0
Info are now in the file
```

```
Info:

Name: 1
Written date: 01.01.2020
Release year: 2021

Name: 2
Written date: 02.02.2000
Release year: 2006

Name: 3
Written date: 03.03.2000
Release year: Not Released

Texts written for last 4 years(2019-2022):

Name: 1
Written date: 01.01.2020
Release year: 2021

Texts released after 5 years from being written:

Name: 2
Written date: 02.02.2000
Release year: 2006
```

## Висновки:

Під час виконання другої лабораторної роботи я навчився працювати та обробляти бінарні файли. Виконуючи поставлену задачу я створив бінарний файл програмним шляхом, реалізував можливість введення у бінарний файл, після чого програма виводить користувачу дані про тексти, що були написані у останні чотири роки та ті, які були випущені через 5 років після написання.