

Міністерство освіти і науки України
Національний технічний університет України «Київський політехнічний інститут імені
Ігоря Сікорського»
Факультет інформатики та обчислювальної техніки

Кафедра інформатики та програмної інженерії

Звіт
з лабораторної роботи № 1.2 з дисципліни
«Основи програмування - 2»

«Бінарні файли»

Варіант 4

Виконав: Бондаренко М.В. ПП-13

Перевірила: Вечерковська А.С.

Київ 2022

Лабораторна робота 1.2

Тема: робота з бінарними файлами.

Постановка задачі

4. Створити файл з інформацією про абітурієнтів: його ПІБ, дата народження (ДД.ММ.РРРР), стать (чоловік / жінка). Видалити зі списку абітурієнтів старше 35 років. Створити новий файл, до якого занести інформацію про юнаків призовного віку (від 18 до 27 років).

Код Python:

main.py:

```
1  from library import *
2
3
4  input_file = "input.bin"
5  output_file = "output.bin"
6
7  createFile(input_file)
8  Input(input_file)
9  print("\nThe list of applicants: ")
10 applicant_list = readFile(input_file)
11 removeOldApplicants(applicant_list)
12
13 writeNewFile(output_file, applicant_list)
14 print("\nThe list of applicants ready to army: ")
15 readFile(output_file)
```

library.py:

```
1  from applicants import Applicants
2  from datetime import datetime
3  import pickle
4
5
6  def Input(filename):
7      size = int(input("Enter the amount of applicants you want to input: "))
8      for i in range(size):
9          full_name = input("Enter the full name: ")
10         birth = input("Enter the birth date [DD.MM.YYYY]: ")
11         sex = input("Enter the sex [Male/Female]: ")
12         while (sex != "Male" and sex != "Female"):
13             sex = input("Wrong data, enter using this format [Male/Female]: ")
14         enterToFile(filename, full_name, birth, sex)
```

```

17 def createFile(filename):
18     mode = input("If you want to append your input enter a. Otherwise enter w: ")
19     while (mode != 'a' and mode != 'w'):
20         mode = input("Enter correct letter: ")
21     if mode == 'a':
22         file = open(filename, 'ab')
23         file.close()
24     if mode == 'w':
25         file = open(filename, 'wb')
26         file.close()
27
28
29 def enterToFile(filename, full_name, birth, sex):
30     with open(filename, 'ab') as file:
31         pickle.dump(full_name, file)
32         pickle.dump(birth, file)
33         pickle.dump(sex, file)
34
35
36 def readFile(filename):
37     applicant_list = []
38     with open(filename, "rb") as file:
39         while 1:
40             try:
41                 full_name = pickle.load(file)
42                 birth = pickle.load(file)
43                 sex = pickle.load(file)
44                 applicant = Applicants(full_name, birth, sex)
45                 applicant_list.append(applicant)
46                 applicant.Output()
47             except EOFError:
48                 break
49     return applicant_list

```

```

52 def removeOldApplicants(list):
53     temp_list = list.copy()
54     print("\nRemoved applicants (>35 yo): ")
55     for applicant in temp_list:
56         if calculateAge(applicant.birth) > 35:
57             list.remove(applicant)
58             applicant.Output()
59
60
61 def writeNewFile(filename, list):
62     with open(filename, 'w') as file:
63         for applicant in list:
64             if 18 <= calculateAge(applicant.birth) < 27 and applicant.sex == "Male":
65                 enterToFile(filename, applicant.full_name, applicant.birth, applicant.sex)

```

```

68 def calculateAge(birth):
69     today = datetime.now()
70     birth_date = datetime.strptime(birth, "%d.%m.%Y")
71     age = (today - birth_date).days/365.25
72     return age

```

Applicants.py:

```

1 class Applicants:
2     def __init__(self, full_name, birth, sex):
3         self.full_name = full_name
4         self.birth = birth
5         self.sex = sex
6
7     def Output(self):
8         print(f"Full name: {self.full_name}, birth: {self.birth}, sex: {self.sex}")

```

Console:

```

If you want to append your input enter a. Otherwise enter w: w
Enter the amount of applicants you want to input: 8
Enter the full name: Erling Haaland
Enter the birth date [DD.MM.YYYY]: 01.01.1986
Enter the sex [Male/Female]: Male
Enter the full name: Kevin De Bruyne
Enter the birth date [DD.MM.YYYY]: 01.01.1986
Enter the sex [Male/Female]: Female
Enter the full name: Lionel Messi
Enter the birth date [DD.MM.YYYY]: 01.01.1992
Enter the sex [Male/Female]: Male
Enter the full name: Cristiano Ronaldo
Enter the birth date [DD.MM.YYYY]: 01.01.1992
Enter the sex [Male/Female]: Female
Enter the full name: Luka Modric
Enter the birth date [DD.MM.YYYY]: 01.01.2002
Enter the sex [Male/Female]: Male
Enter the full name: Luka Jovic
Enter the birth date [DD.MM.YYYY]: 01.01.2002
Enter the sex [Male/Female]: Female
Enter the full name: Andriy Shevchenko
Enter the birth date [DD.MM.YYYY]: 01.01.2005
Enter the sex [Male/Female]: Male
Enter the full name: Phil Foden
Enter the birth date [DD.MM.YYYY]: 01.01.2005
Enter the sex [Male/Female]: Female

```

The list of applicants:

Full name: Erling Haaland, birth: 01.01.1986, sex: Male

Full name: Kevin De Bruyne, birth: 01.01.1986, sex: Female

Full name: Lionel Messi, birth: 01.01.1992, sex: Male

Full name: Cristiano Ronaldo, birth: 01.01.1992, sex: Female

Full name: Luka Modric, birth: 01.01.2002, sex: Male

Full name: Luka Jovic, birth: 01.01.2002, sex: Female

Full name: Andriy Shevchenko, birth: 01.01.2005, sex: Male

Full name: Phil Foden, birth: 01.01.2005, sex: Female

Removed applicants (>35 yo):

Full name: Erling Haaland, birth: 01.01.1986, sex: Male

Full name: Kevin De Bruyne, birth: 01.01.1986, sex: Female

The list of applicants ready to army:

Full name: Luka Modric, birth: 01.01.2002, sex: Male

Input.bin:

```
1  EOT DC2 NUL NUL NUL NUL NUL NUL NUL S Erling Haaland . EOT SONUL NUL NUL NUL NUL NUL NUL NUL
2  01.01.1986 . EOT BSNUL NUL NUL NUL NUL NUL NUL NUL EOT Male . EOT DC3 NUL NUL NUL NUL NUL NUL NUL S Kevin De Bruyne . EOT SONUL NUL NUL NUL NUL NUL NUL NUL
3  01.01.1986 . EOT
4  NUL NUL NUL NUL NUL NUL NUL NUL ACK Female . EOT DL NUL NUL NUL NUL NUL NUL NUL NUL FF Lionel Messi . EOT SONUL NUL NUL NUL NUL NUL NUL NUL
5  01.01.1992 . EOT BSNUL NUL NUL NUL NUL NUL NUL NUL EOT Male . EOT NAK NUL NUL NUL NUL NUL NUL NUL NUL DC1 Cristiano Ronaldo . EOT SONUL NUL NUL NUL NUL NUL NUL NUL
6  01.01.1992 . EOT
7  NUL NUL NUL NUL NUL NUL NUL NUL ACK Female . EOT SINUL NUL NUL NUL NUL NUL NUL NUL NUL VT Luka Modric . EOT SONUL NUL NUL NUL NUL NUL NUL NUL
8  01.01.2002 . EOT BSNUL NUL NUL NUL NUL NUL NUL NUL EOT Male . EOT SONUL NUL NUL NUL NUL NUL NUL NUL
9  Luka Jovic . EOT SONUL NUL NUL NUL NUL NUL NUL NUL
10 01.01.2002 . EOT
11 NUL NUL NUL NUL NUL NUL NUL NUL ACK Female . EOT NAK NUL NUL NUL NUL NUL NUL NUL NUL DC1 Andriy Shevchenko . EOT SONUL NUL NUL NUL NUL NUL NUL NUL
12 01.01.2005 . EOT BSNUL NUL NUL NUL NUL NUL NUL NUL EOT Male . EOT SONUL NUL NUL NUL NUL NUL NUL NUL
13 Phil Foden . EOT SONUL NUL NUL NUL NUL NUL NUL NUL
14 01.01.2005 . EOT
15 NUL NUL NUL NUL NUL NUL NUL NUL ACK Female .
```

Output.bin:

```
1  EOT SINUL NUL NUL NUL NUL NUL NUL NUL NUL VT Luka Modric . EOT SONUL NUL NUL NUL NUL NUL NUL NUL
2  01.01.2002 . EOT BSNUL NUL NUL NUL NUL NUL NUL NUL EOT Male .
```

Код C#:

Program.cs:

```
1  using System;
2  using System.Collections.Generic;
3
4  namespace lab1._2
5  {
6      internal class Program
7      {
8          public static void Main(string[] args)
9          {
10             string input_file = "input.bin";
11             string output_file = "output.bin";
12
13             Library.createFile(input_file);
14             Library.Input(input_file);
15
16             Console.WriteLine("\nThe list of applicants: ");
17             List<Applicants> applicant_list = Library.readFile(input_file);
18
19             Library.removeOldApplicants(applicant_list);
20
21             Library.writeNewFile(output_file, applicant_list);
22             Console.WriteLine("\nThe list of applicants ready to army: ");
23             Library.readFile(output_file);
24         }
25     }
26 }
```

Library.cs:

```
1  using System;
2  using System.Collections.Generic;
3  using System.IO;
4
5  namespace lab1._2
6  {
7      public class Library
8      {
9          public static void Input(string filename)
10         {
11             Console.Write("Enter the amount of applicants you want to input: ");
12             int size = Convert.ToInt32(Console.ReadLine());
13             for (int i = 0; i < size; i++)
14             {
15                 Console.Write("Enter the full name: ");
16                 string full_name = Console.ReadLine();
17                 Console.Write("Enter the birth date [DD.MM.YYYY]: ");
18                 string birth = Console.ReadLine();
19                 Console.Write("Enter the sex [Male/Female]: ");
20                 string sex = Console.ReadLine();
21                 while (sex != "Male" && sex != "Female")
22                 {
23                     Console.Write("Wrong data, enter using this format [Male/Female]: ");
24                     sex = Console.ReadLine();
25                 }
26                 enterToFile(filename, full_name, birth, sex);
27             }
28         }
29     }
30 }
```

```

31      1 usage
32      public static void createFile(string filename)
33      {
34          Console.WriteLine("If you want to append your input enter a. Otherwise enter w: ");
35          char mode = Convert.ToChar(Console.ReadLine());
36          while (mode != 'a' && mode != 'w')
37          {
38              Console.WriteLine("Enter correct letter: ");
39              mode = Convert.ToChar(Console.ReadLine());
40          }
41          if (mode == 'a')
42          {
43              BinaryWriter file = new BinaryWriter(output: File.Open(filename, FileMode.Append));
44              file.Close();
45          }
46          if (mode == 'w')
47          {
48              BinaryWriter file = new BinaryWriter(output: File.Open(filename, FileMode.Create));
49              file.Close();
50          }
51      }
52
53
54
55      2 usages
56      public static void enterToFile(string filename, string full_name, string birth, string sex)
57      {
58          using (BinaryWriter file = new BinaryWriter(output: File.Open(filename, FileMode.Append)))
59          {
60              file.Write(full_name);
61              file.Write(birth);
62              file.Write(sex);
63          }
64      }

```

```

66      2 usages
67      public static List<Applicants> readFile(string filename)
68      {
69          List<Applicants> applicant_list = new List<Applicants>();
70          using (BinaryReader file = new BinaryReader(input: File.Open(filename, FileMode.Open)))
71          {
72              while (true)
73              {
74                  try
75                  {
76                      string full_name = file.ReadString();
77                      string birth = file.ReadString();
78                      string sex = file.ReadString();
79                      Applicants applicant = new Applicants(full_name, birth, sex);
80                      applicant_list.Add(applicant);
81                      applicant.Output();
82                  }
83                  catch (Exception e)
84                  {
85                      break;
86                  }
87              }
88          }
89          return applicant_list;
90      }

```

```

103 1 usage
104
105 public static void removeOldApplicants(List<Applicants> list)
106 {
107     List<Applicants> temp = list.GetRange(index: 0, list.Count);
108     Console.WriteLine("\nRemoved applicants (>35 yo): ");
109     foreach (var applicant:Applicants in temp)
110     {
111         if (calculateAge(applicant.birth) > 35)
112         {
113             list.Remove(applicant);
114             applicant.Output();
115         }
116     }
117 }
118
119 1 usage
120
121 public static void writeNewFile(string filename, List<Applicants> list)
122 {
123     using (BinaryWriter file = new BinaryWriter( output: File.Open(filename, FileMode.Create)));
124     {
125         foreach (var applicant:Applicants in list)
126         {
127             int age = calculateAge(applicant.birth);
128             if (age >= 18 && age < 27 && applicant.sex == "Male")
129             {
130                 enterToFile(filename, applicant.full_name, applicant.birth, applicant.sex);
131             }
132         }
133     }
134 }

```

```

135 2 usages
136
137 public static int calculateAge(string birth)
138 {
139     DateTime today = DateTime.Now;
140     DateTime birth_date = Convert.ToDateTime(birth);
141     int age = (int) ((today - birth_date).Days / 365.25);
142     return age;
143 }
144
145 }
146
147 }

```


Console:

```
If you want to append your input enter a. Otherwise enter w: w
Enter the amount of applicants you want to input: 8
Enter the full name: Erling Haaland
Enter the birth date [DD.MM.YYYY]: 01.01.1986
Enter the sex [Male/Female]: Male
Enter the full name: Kevin De Bruyne
Enter the birth date [DD.MM.YYYY]: 01.01.1986
Enter the sex [Male/Female]: Female
Enter the full name: Lionel Messi
Enter the birth date [DD.MM.YYYY]: 01.01.1992
Enter the sex [Male/Female]: Male
Enter the full name: Cristiano Ronaldo
Enter the birth date [DD.MM.YYYY]: 01.01.1992
Enter the sex [Male/Female]: Female
Enter the full name: Luka Modric
Enter the birth date [DD.MM.YYYY]: 01.01.2002
Enter the sex [Male/Female]: Male
Enter the full name: Luka Jovic
Enter the birth date [DD.MM.YYYY]: 01.01.2002
Enter the sex [Male/Female]: Female
Enter the full name: Andriy Shevchenko
Enter the birth date [DD.MM.YYYY]: 01.01.2005
Enter the sex [Male/Female]: Male
Enter the full name: Phil Foden
Enter the birth date [DD.MM.YYYY]: 01.01.2005
Enter the sex [Male/Female]: Female
```

The list of applicants:

```
Full name: Erling Haaland, birth: 01.01.1986, sex: Male
Full name: Kevin De Bruyne, birth: 01.01.1986, sex: Female
Full name: Lionel Messi, birth: 01.01.1992, sex: Male
Full name: Cristiano Ronaldo, birth: 01.01.1992, sex: Female
Full name: Luka Modric, birth: 01.01.2002, sex: Male
Full name: Luka Jovic, birth: 01.01.2002, sex: Female
Full name: Andriy Shevchenko, birth: 01.01.2005, sex: Male
Full name: Phil Foden, birth: 01.01.2005, sex: Female
```

Removed applicants (>35 yo):

```
Full name: Erling Haaland, birth: 01.01.1986, sex: Male
Full name: Kevin De Bruyne, birth: 01.01.1986, sex: Female
```

The list of applicants ready to army:

```
Full name: Luka Modric, birth: 01.01.2002, sex: Male
```

Input.bin:

1	EOTDC2NULNULNULNULNULNULS0Erling HaalandEOTS0NULNULNULNULNULNUL
2	01.01.1986EOTBSNULNULNULNULNULNULEOTMaleEOTDC3NULNULNULNULNULNULS1Kevin De BruyneEOTS0NULNULNULNULNULNUL
3	01.01.1986EOT
4	NULNULNULNULNULNULACKFemaleEOTDLENULNULNULNULNULNULFFLionel MessiEOTS0NULNULNULNULNULNUL
5	01.01.1992EOTBSNULNULNULNULNULNULEOTMaleEOTNAKNULNULNULNULNULNULDC1Cristiano RonaldoEOTS0NULNULNULNULNULNUL
6	01.01.1992EOT
7	NULNULNULNULNULNULACKFemaleEOTSINULNULNULNULNULNULVTLuka ModricEOTS0NULNULNULNULNULNUL
8	01.01.2002EOTBSNULNULNULNULNULNULEOTMaleEOTS0NULNULNULNULNULNUL
9	Luka JovicEOTS0NULNULNULNULNULNUL
10	01.01.2002EOT
11	NULNULNULNULNULNULACKFemaleEOTNAKNULNULNULNULNULNULDC1Andriy ShevchenkoEOTS0NULNULNULNULNULNUL
12	01.01.2005EOTBSNULNULNULNULNULNULEOTMaleEOTS0NULNULNULNULNULNUL
13	Phil FodenEOTS0NULNULNULNULNULNUL
14	01.01.2005EOT
15	NULNULNULNULNULNULACKFemale.

Output.bin:

```
1 | EOT SINULNULNULNULNULNUL VTLuka Modric. EOT SONULNULNULNULNULNUL
2 | 01.01.2002. EOT BSNULNULNULNULNULNUL EOTMale.
```