KAUNAS UNIVERSITY OF TECHNOLOGY

Faculty of Mathematics and Natural Sciences

Fundamentals of Object Programming (P175B013)

Project Report

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KAUNAS

CONTENT

1. Data Grouping

1.1. Problem

- Subscribers
- The text file contains information about the subscribers.
- The line of the file specifies subscriber surname, address, beginning of the period (integer 1 .. 12), the length of the period (integer 1 .. 12), newspaper code, number of newspapers. The rule is that the beginning of the period + period length <=13.
- To create a list of subscribers who ordered newspapers for more than 1 month. Print according to the address and surname.
- In the print, the subscribed months have to be labeled by '*' and unsubscribed – by points.
- Form a new list of subscribers who ordered the most newspapers.

1.2. Source Code

Subscriber.h

```
#pragma once
#include <string>

//subscriber class
class Subscriber{
    private:
        std::string surname, address, newsPCode;
        int begPeriod, lenPeriod, noNewsPr;

     public:
//constructor overload
       Subscriber():surname(""), address(""), newsPCode(""),
begPeriod(0),lenPeriod(0), noNewsPr(0)  { }
       void Set(std::string _surname, std::string _address,
std::string _newsPCode, int _noNewsPr, int _begPeriod, int
_lenPeriod);
//class methods
       std::string Print();
        std::string OrderedMoreThanOneMonth();
//operator overloading
        bool operator < (const Subscriber & next) {
             return (address < next.address ||
                  address == next.address && surname <
next.surname);
        }
```

```
//interface method
        int getnoNewsPr() { return noNewsPr; }
};
```

Subscriber.cpp

```
#include "subscriber.h"
#include <sstream>
#include <iomanip>
#include <string>

//implementation of class methods
void Subscriber::Set(std::string _surname, std::string _address,
std::string _newsPCode, int _noNewsPr, int _begPeriod, int
_lenPeriod){

     surname = _surname;
     address = _address;
     newsPCode = _newsPCode;
     begPeriod = _begPeriod;
     lenPeriod = _lenPeriod;
     noNewsPr = _noNewsPr;
}

std::string Subscriber::Print(){

     std::stringstream ret;
    ret << std::left<< std::setw(15)<< surname << std::setw(20) <<
address<< std::setw(15) << newsPCode
      << std::setw(15) << begPeriod  <<std::setw(15) << lenPeriod
<< std::setw(15) << noNewsPr << std::endl;
     return ret.str();
}


std::string Subscriber::OrderedMoreThanOneMonth() {
    std::stringstream ret("", std::ios::app | std::ios::out);
    if (lenPeriod > 1) {
      ret << std::left << std::setw(15) << surname << std::setw(20)
```

```
<< address << std::endl;
      for (int i = 1; i <= begPeriod - 1; i++) {
           ret << std::setw(35) << "" << std::setw(1) << ". Month "
<< i << std::endl;
      }
      for (int i = 0; i <= lenPeriod; i++) {
           ret << std::setw(35) << "" << std::setw(1) << "* Month "
<< begPeriod + i << std::endl;
      }
    }
    return ret.str();
}
```

Company.h

```
#pragma once
#include "subscriber.h"

//Company Class
class Company : Subscriber
{
    public:
        static const int CMax = 100;

    private:
        Subscriber Sb[CMax];
        int n;

    public:
        Company(): n(0) {}
        int Get() { return n;}
        Subscriber Get(int i) { return Sb[i]; }
        void Set(const Subscriber & ob) { Sb[n++] = ob; }
          int OrderedMost();
          void Sort();
};
```

Company.cpp

```
#include "company.h"
#include <string>
#include <limits>
#include <sstream>
#include <iomanip>



//class method implementations
int Company::OrderedMost() {

    int index = 0;
    int max = std::numeric_limits<int>::min();
    for (int i = 0; i < n - 1; i++) {
        if (Sb[i].getnoNewsPr() > max) {
            max = Sb[i].getnoNewsPr();
            index = i;
        }
    }

    return index;
}

//Bubble Sort--O(n^2) time
void Company::Sort()
{
    int i, j;
    for (i = 0; i < n - 1; i++){
        Subscriber min = Sb[i];
        // Last i elements are already
        // in place
        for (j = 0; j < n - i - 1; j++) {
            if (Sb[j] < Sb[j + 1])
                std::swap(Sb[j], Sb[j + 1]);
        }
    }
}
```

main.cpp

```
#include <iostream>
#include "company.h"
#include <string>
#include <fstream>
#include <iomanip>

//input and output files
const char dataFile[] = "Data.txt";
const char resFile[] = "Result.txt";

//prototypes of functions
void Read(Company & company);
void Print(Company & company, std::string tableHeader);
void PrintOrderedMoreThanOneMonth(Company & company, std::string
tableHeader);
void PrintOrderedMost(Company & company, std::string tableHeader);

//main functions
int main() {
    Company _company;
//flush file before rewriting
    std::ofstream("Result.txt", std::ofstream::trunc);

//read and print to and from file
    Read(_company);
    Print(_company, "Initial Data");

//sort class and print other after it
    _company.Sort();
    PrintOrderedMoreThanOneMonth(_company, "People who ordered more
than one month");
    PrintOrderedMost(_company, "Person who ordered most");
    return 0;
}

//function to read from file
void Read(Company & company) {
    std::ifstream fd(dataFile);
    Subscriber sb;
```

```
    std::string line, _surname, _address, _newsPCode;
    int _begPeriod, _lenPeriod, _noNewsPr;
    bool hasSpace = true;
    int noSub = 0;

    while (!fd.eof() && hasSpace) {


      getline(fd, _surname, ',');  fd >> std::ws;
      getline(fd, _address, ',');  fd >> std::ws;
      getline(fd, _newsPCode, ',');  fd >> std::ws;
      fd >> _begPeriod;
      fd >> _lenPeriod;
      fd >> _noNewsPr;
      noSub += 1;
//numerical data control
      if (0 < _begPeriod && _begPeriod <= 12 && 0 < _lenPeriod &&
_lenPeriod <= 12 && _begPeriod+_lenPeriod<=13) {

           sb.Set(_surname, _address, _newsPCode, _noNewsPr,
_begPeriod, _lenPeriod);

      }

      else {
           std::cout << "Your data has negatives or other invalid
data types. Please correct it." << std::endl;
           exit(1);
      }
      if (noSub - 1 < Company::CMax) {
           company.Set(sb);
      }

      else {
           hasSpace = false;
      }
    }

    fd.close();
}
```

```
//main print function
void Print(Company & company, std::string tableHeader) {
    std::string  dash(100, '-');
    std::ofstream fr(resFile, std::ios::app);
    fr.setf(std::ios::fixed); fr.setf(std::ios::left);
    fr << dash + "\n";
    fr << std::setw(30) << tableHeader << std::endl;
    fr << dash + "\n";
    fr << " Surname Address         NewsPaperCode  Period Begins
Period Length  Number of NewsPapers\n";
    fr << dash + "\n";
    for (int i = 0; i < company.Get(); i++) {
      fr << company.Get(i).Print();
      fr << dash + "\n";
    }

    fr << "\n\n\n\n";
    fr.close();
}

//print all those who ordered more than one month
void PrintOrderedMoreThanOneMonth(Company & company, std::string
tableHeader) {
    std::string  dash(100, '-');
    std::ofstream fr(resFile, std::ios::app);
    fr.setf(std::ios::fixed); fr.setf(std::ios::left);
    fr << dash + "\n";
    fr << std::setw(30) << tableHeader << std::endl;
    fr << dash + "\n";
    fr << " Surname Address         Months\n";
    fr << dash + "\n";
    for (int i = 0; i < company.Get(); i++) {
      fr << company.Get(i).OrderedMoreThanOneMonth();
      fr << dash + "\n";
    }
    fr << "\n\n\n\n";
    fr.close();
}

//print the person who ordered the most
```

```
void PrintOrderedMost(Company & company, std::string tableHeader) {
    std::string  dash(100, '-');
    int index = company.OrderedMost();
    std::ofstream fr(resFile, std::ios::app);
    fr.setf(std::ios::fixed); fr.setf(std::ios::left);
    fr << dash + "\n";
    fr << std::setw(30) << tableHeader << std::endl;
    fr << dash + "\n";
    fr << " Surname Address        NewsPaperCode  Period Begins
Period Length  Number of NewsPapers\n";
    fr << dash + "\n";
    fr << company.Get(index).Print();
    fr << dash + "\n";

    fr << "\n\n\n\n";
    fr.close();
}
```

1.3. Initial Data and Results

```
Stephen, Studentu gatve 48, A899, 11 1 34
Adesina, Griciupio gatve 9, Y2c5, 1 12 58
Nulis, Robies gatve 75, B567, 10 1 224
John, Tavas gatve 99, 3GHy, 9 4 58
Hewitt, Policija gatve 19, 009J, 4 7 242
Stone, Savanoriu gatve 47, jfJ8, 3 9 85
Druylte, Pasiles gatve 92, jf9H, 3 10 58
Schonberger, Saules gatve 3, f8J0, 9 2 50
Tampa, Alalade gatve 95, 3fJ9, 1 5 24
Lovwell, Baransauko gatve 7, hf95, 1 10 5
```

Result.txt

```
-----------------------------------------------
-----------------------------------------------
--------
Initial Data
-----------------------------------------------
-----------------------------------------------
--------
 Surname   Address           NewsPaperCode
Period Begins   Period Length  Number of
NewsPapers
-----------------------------------------------
-----------------------------------------------
--------
Stephen       Studentu gatve 48   A899
11            1             34
-----------------------------------------------
-----------------------------------------------
--------

Adesina    Griciupio gatve 9   Y2c5       1
    12            58
-----------------------------------------------
-----------------------------------------------
--------

Nulis      Robies gatve 75   B567          10
```

```
    1              224
-------------------------------------------------------------------------------

John        Tavas gatve 99    3GHy           9
    4              58
-------------------------------------------------------------------------------

Hewitt      Policija gatve 19   009J         4
    7              242
-------------------------------------------------------------------------------

Stone       Savanoriu gatve 47  jfJ8         3
    9              85
-------------------------------------------------------------------------------

Druylte     Pasiles gatve 92 jf9H            3
    10             58
-------------------------------------------------------------------------------
```

```
--------

Schonberger    Saules gatve 3    f8J0           9
    2              50
-------------------------------------------------
-------------------------------------------------
--------

Tampa      Alalade gatve 95  3fJ9           1
    5              24
-------------------------------------------------
-------------------------------------------------
--------

Lovwell    Baransauko gatve 7  hf95         1
    10             5
-------------------------------------------------
-------------------------------------------------
--------




-------------------------------------------------
-------------------------------------------------
--------
People who ordered more than one month
```

```
-----------------------------------------------
-----------------------------------------------
--------
 Surname   Address       Months
-----------------------------------------------
-----------------------------------------------
--------

John       Tavas gatve 99
                                 . Month 1
                                 . Month 2
                                 . Month 3
                                 . Month 4
                                 . Month 5
                                 . Month 6
                                 . Month 7
                                 . Month 8
                                 * Month 9
                                 * Month 10
                                 * Month 11
                                 * Month 12
                                 * Month 13
-----------------------------------------------
-----------------------------------------------
--------
-----------------------------------------------
-----------------------------------------------
```

```
--------

Stone      Savanoriu gatve 47
                                  . Month 1
                                  . Month 2
                                  * Month 3
                                  * Month 4
                                  * Month 5
                                  * Month 6
                                  * Month 7
                                  * Month 8
                                  * Month 9
                                  * Month 10
                                  * Month 11
                                  * Month 12
-----------------------------------------
-----------------------------------------
--------

Schonberger   Saules gatve 3
                                  . Month 1
                                  . Month 2
                                  . Month 3
                                  . Month 4
                                  . Month 5
                                  . Month 6
                                  . Month 7
```

```
                                    . Month 8
                                    * Month 9
                                    * Month 10
                                    * Month 11
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
--------
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
--------

Hewitt     Policija gatve 19
                                    . Month 1
                                    . Month 2
                                    . Month 3
                                    * Month 4
                                    * Month 5
                                    * Month 6
                                    * Month 7
                                    * Month 8
                                    * Month 9
                                    * Month 10
                                    * Month 11
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
--------
```

```
Druylte   Pasiles gatve 92
                                  . Month 1
                                  . Month 2
                                  * Month 3
                                  * Month 4
                                  * Month 5
                                  * Month 6
                                  * Month 7
                                  * Month 8
                                  * Month 9
                                  * Month 10
                                  * Month 11
                                  * Month 12
                                  * Month 13
-------------------------------------------
-------------------------------------------
--------

Adesina   Griciupio gatve 9
                                  * Month 1
                                  * Month 2
                                  * Month 3
                                  * Month 4
                                  * Month 5
                                  * Month 6
                                  * Month 7
                                  * Month 8
```

```
                                    * Month 9
                                    * Month 10
                                    * Month 11
                                    * Month 12
                                    * Month 13
-------------------------------------------------------------------------------

Lovwell    Baransauko gatve 7
                                    * Month 1
                                    * Month 2
                                    * Month 3
                                    * Month 4
                                    * Month 5
                                    * Month 6
                                    * Month 7
                                    * Month 8
                                    * Month 9
                                    * Month 10
                                    * Month 11
-------------------------------------------------------------------------------

Tampa      Alalade gatve 95
                                    * Month 1
```

```
                                    * Month 2
                                    * Month 3
                                    * Month 4
                                    * Month 5
                                    * Month 6
-------------------------------------------------
-------------------------------------------------
--------



-------------------------------------------------
-------------------------------------------------
--------
Person who ordered most
-------------------------------------------------
-------------------------------------------------
--------
 Surname   Address           NewsPaperCode
Period Begins   Period Length  Number of
NewsPapers
-------------------------------------------------
-------------------------------------------------
--------

Hewitt    Policija gatve 19   009J       4
```

```
    7                242
-------------------------------------------------------------
-------------------------------------------------------------
--------
```