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Автор:Горянський І.,1.КІТ101.8б

Лабораторна робота № 12

## Регулярні вирази. Обробка тексту

**1. ЗАВДАННЯ ДО РОБОТИ**

**Загальне завдання:**

1. Використовуючи програми рішень попередніх задач, продемонструвати ефективне (оптимальне) використання регулярних виразів при вирішенні [прикладної задачі](https://oop-khpi.github.io/" \l "task_12_app).
2. Передбачити можливість незначної зміни умов пошуку.
3. Продемонструвати розроблену функціональність в діалоговому та автоматичному режимах.

**1.1 Опис змінних:**

**private** T currElem; поточний елемент списку

**private** Node<T> prevElem; попередній елемент списку

**private** Node<T> nextElem; наступний елемент списку

**private** Node<T> fstNode;

**private** Node<T> lstNode;

**private** **int** size = 0; змінна розміру списку

**private** String Address; поле адресу прикладної галузі

**private** String Name; поле імені прикладної галузі

**private** String Special; поле спеціалізіції прикладної галузі

**private** String Phone; поле телефону прикладної галузі

**private** String StartTime; поле початку робочого дня прикладної галузі

**private** String EndTime; поле кінця робочого дня прикладної галузі

Текст програми

**package** ua.khpi.oop.gorianckiy09;

**import** java.util.Iterator;

**public** **interface** DescendingIterator<T> {

Iterator<T> descendingIterator();

}

**package** ua.khpi.oop.gorianckiy09;

**import** java.util.Scanner;

**import** java.util.regex.Matcher;

**import** java.util.regex.Pattern;

**import** java.text.ParseException;

**import** java.io.IOException;

**import** java.util.Comparator;

**import** java.util.Date;

**import** java.text.SimpleDateFormat;

**public** **class** Directory {

**private** String Address;

**private** String Name;

**private** String Special;

**private** String Phone;

**private** String StartTime;

**private** String EndTime;

**private** String FreeTime;

**private** String Consultation;

String str1;

String str2;

Directory(){

Address = **null**;

Name = **null**;

Special = **null**;

Phone = **null**;

StartTime = **null**;

EndTime = **null**;

FreeTime = **null**;

Consultation = **null**;

}

@Override

**public** String toString() {

**return** "\nAddress=" + Address + "\nName=" + Name + "\nSpecial=" + Special + "\nPhone=" + Phone

+ "\nStartTime=" + StartTime + "\nEndTime=" + EndTime + "\nFreeDay =" + FreeTime + "\nConsulation=" + Consultation;

}

Directory(**final** Directory obj){

Address = obj.Address;

Name = obj.Name;

Special = obj.Special;

Phone = obj.Phone;

StartTime = obj.StartTime;

EndTime = obj.EndTime;

FreeTime = obj.FreeTime;

Consultation = obj.Consultation;

}

**public** **void** setAddress(String Address) {

**this**.Address =Address;

}

**public** **void** setName(String Name) {

**this**.Name = Name;

}

**public** **void** setSpecial(String Special) {

**this**.Special = Special;

}

**public** **void** setPhone(String Phone) {

**this**.Phone = Phone;

}

**public** **void** setTime(String Time) {

**this**.StartTime = Time;

}

**public** **void** setTime1(String Time1) {

**this**.EndTime = Time1;

}

**public** **void** setFreeTime(String FreeTime) {

**this**.FreeTime = FreeTime;

}

**public** **void** setConsultation(String Consult) {

**this**.Consultation = Consult;

}

String getFreeTime() {

**return** FreeTime;

}

String getConsultation() {

**return** Consultation;

}

String getAddress() {

**return** Address;

}

String getName() {

**return** Name;

}

String getSpecial() {

**return** Special;

}

String getPhone() {

**return** Phone;

}

**public** String getTime() {

// SimpleDateFormat sdf = new SimpleDateFormat("HH:mm");

// return sdf.format(this.StartTime);

**return** StartTime;

}

**public** String getTime1() {

// SimpleDateFormat sdf = new SimpleDateFormat("HH:mm");

// return sdf.format(this.EndTime);

**return** EndTime;

}

**public** **void** generateStore() **throws** ParseException,IOException {

Scanner s = **new** Scanner(System.***in***);

Pattern pat = Pattern.*compile*("^[a-zA-Z]{3,10}[0-9]{0,2}|[a-zA-Z]{3,10}\\s[a-zA-Z]{3,10}[0-9]{0,2}");

String str3 = **null**;

Matcher mat3 = **null**;

**do** {

System.***out***.println("Enter name of outlet");

str3 = s.nextLine();

mat3 = pat.matcher(str3);

}**while**(!mat3.matches());

Name = str3;

Pattern patt = Pattern.*compile*("^[a-zA-Z]{3,10}[0-9]{0,2}|[a-zA-Z]{3,10}\\s[0-9]{0,2}|[a-zA-Z]{3,10}\\s[a-zA-Z]{3,10}[0-9]{0,2}");

String str4 = **null**;

Matcher mat4 = **null**;

**do** {

System.***out***.println("Enter Address");

str4 =s.nextLine();

mat4 = patt.matcher(str4);

}**while**(!mat4.matches());

Address = str4;

Pattern patter = Pattern.*compile*("^[a-zA-Z]{3,10}");

String str5 =**null**;

Matcher mat5 = **null**;

**do** {

System.***out***.println("Enter Specialization");

str5 = s.nextLine();

mat5 = patter.matcher(str5);

}**while**(!mat5.matches());

Special = str5;

Pattern pattern = Pattern.*compile*("\\d{10,12}");

String str = **null**;

Matcher m = **null**;

**do** {

System.***out***.println("Enter Phone number");

str = s.nextLine();

m = pattern.matcher(str);

}**while**(!m.matches());

Phone = str;

Pattern pattern1 = Pattern.*compile*("[0-9]{2}:[0-9]{2}");

String str1 = **null**;

Matcher mat1 = **null**;

**do** {

System.***out***.println("Enter StartTime:");

str1 =s.nextLine();

mat1 = pattern1.matcher(str1);

}**while**(!mat1.matches());

StartTime = str1;

Pattern pattern2 = Pattern.*compile*("[0-9]{2}:[0-9]{2}");

String str2 = **null**;

Matcher mat2 = **null**;

**do** {

System.***out***.println("Enter EndTime:");

str2 =s.nextLine();

mat2 = pattern2.matcher(str2);

}**while**(!mat2.matches());

EndTime = str2;

System.***out***.println("Enter availability of FreeTime: ");

FreeTime =s.nextLine();

System.***out***.println("Enter availability of Consultation: ");

Consultation = s.nextLine();

}

**public** **static** Comparator<Directory> *comparatorName* = **new** Comparator<Directory>() {

@Override

**public** **int** compare(Directory o1,Directory o2) {

**return** o1.getName().compareTo(o2.getName());

}

};

**public** **static** Comparator<Directory> *comparatorAddres* = **new** Comparator<Directory>() {

@Override

**public** **int** compare(Directory o1, Directory o2) {

**return** o1.getAddress().compareTo(o2.getAddress());

}

};

**public** **static** Comparator<Directory> *comparatorSpecailization* = **new** Comparator<Directory>() {

@Override

**public** **int** compare(Directory o1, Directory o2) {

**return** o1.getSpecial().compareTo(o2.getSpecial());

}

};

}

**package** ua.khpi.oop.gorianckiy09;

**import** java.io.IOException;

**import** java.text.ParseException;

**public** **class** Demo {

**public** **static** **void** main(String[]args) **throws** ParseException, IOException {

Main.*main*(args);

}

}

**package** ua.khpi.oop.gorianckiy09;

**import** java.util.Arrays;

**import** java.util.regex.Matcher;

**import** java.util.regex.Pattern;

**public** **class** FuncNine {

**public** **static** **void** ChooseMenu() {

System.***out***.println("\n\nChoose what you want to do:");

System.***out***.println("1. Delete all from Container");

System.***out***.println("2. Output to File ");

System.***out***.println("3. Output from File ");

System.***out***.println("4. Check for emptiness");

System.***out***.println("5. Output container to screen");

System.***out***.println("6. Add to our directory new data");

System.***out***.println("7. Sort directory by Name");

System.***out***.println("8. Sort directory by Addres");

System.***out***.println("9. Sort directory by Spicialization");

System.***out***.println("10. Word processing");

System.***out***.println("0. Exit");

System.***out***.print("Write:");

}

**public** **static**<T **extends** Directory> **void** sortByName(LinkedContainer<T> t) {

Directory [] array = **new** Directory[t.size()];

**for**(**int** i = 0;i<t.size();i++) {

array[i] = t.getElementByIndex(i);

}

Arrays.*sort*(array,Directory.*comparatorName*);

t.clear();

**for**(**int** i =0;i<array.length;i++) {

t.add((T)array[i]);

}

}

**public** **static**<T **extends** Directory> **void** sortByAddres(LinkedContainer<T>t) {

Directory []array = **new** Directory[t.size()];

**for**(**int** i =0;i<t.size();i++) {

array[i] = t.getElementByIndex(i);

}

Arrays.*sort*(array,Directory.*comparatorAddres*);

t.clear();

**for**(**int** i =0;i<array.length;i++) {

t.add((T)array[i]);

}

}

**public** **static**<T **extends** Directory> **void** sortBySpecial(LinkedContainer<T>t ) {

Directory [] array = **new** Directory[t.size()];

**for**(**int** i =0;i<t.size();i++) {

array[i] = t.getElementByIndex(i);

}

Arrays.*sort*(array,Directory.*comparatorSpecailization*);

t.clear();

**for**(**int** i =0;i<array.length;i++) {

t.add((T)array[i]);

}

}

**public** **static** <T **extends** Directory> **void** find(LinkedContainer<T>t ) {

**if**(t!=**null**) {

**for**(Directory s : t) {

Pattern p = Pattern.*compile*("No");

Matcher m = p.matcher(s.getFreeTime());

**if**(m.find()) {

Pattern pat = Pattern.*compile*("Yes");

Matcher mat = pat.matcher(s.getConsultation());

**if**(mat.find()) {

System.***out***.println(s);

}

}

}

}**else** {

System.***out***.println("No matches found");

}

}

**public** **static** <T **extends** Directory> **void** find1(LinkedContainer<T>t,String filter,String filter1 ) {

**if**(t!=**null**) {

**for**(Directory s : t) {

Pattern p = Pattern.*compile*("No");

Matcher m = p.matcher(s.getFreeTime());

**if**(m.find()) {

Pattern pat = Pattern.*compile*("Yes");

Matcher mat = pat.matcher(s.getConsultation());

**if**(mat.find()) {

System.***out***.println(s);

}

}

}

}**else** {

System.***out***.println("No matches found");

}

}

}

**package** ua.khpi.oop.gorianckiy09;

**import** java.io.Serializable;

**import** java.text.ParseException;

**import** java.util.Iterator;

**public** **interface** Linked<T> {

**void** addLast(T obj);

**void** addFirst(T obj);

**int** size();

T getElementByIndex(**int** index);

**void** add(T obj);

**void** clear();

**void** toFile();

**void** FromFile() **throws** ParseException;

**void** readAll();

**void** DelAll();

**void** toFileAll();

**void** checkEmptiness();

}

**package** ua.khpi.oop.gorianckiy09;

**import** java.io.BufferedReader;

**import** java.io.File;

**import** java.io.FileReader;

**import** java.io.IOException;

**import** java.io.PrintWriter;

**import** java.text.ParseException;

**import** java.util.Arrays;

**import** java.util.Iterator;

**import** java.util.NoSuchElementException;

**package** ua.khpi.oop.gorianckiy09;

**import** java.io.BufferedReader;

**import** java.io.File;

**import** java.io.FileReader;

**import** java.io.IOException;

**import** java.io.PrintWriter;

**import** java.text.ParseException;

**import** java.util.Arrays;

**import** java.util.Iterator;

**import** java.util.NoSuchElementException;

**import** java.util.regex.Matcher;

**import** java.util.regex.Pattern;

**public** **class** LinkedContainer<T **extends** Directory> **implements** Linked<T>, Iterable<T>,DescendingIterator<T> {

//конструктор инициализации

**private** **class** Node<T> {

**private** T currElem; //текущий

**private** Node<T> prevElem; //предыдущий

**private** Node<T> nextElem; //следущий

//конструктор копирования

Node( T currElem, Node<T> prevElem, Node<T> nextElem) {

**this**.currElem = currElem;

**this**.prevElem = prevElem;

**this**.nextElem = nextElem;

}

//геттеры и сеттеры

**public** T getCurrentElem() {

**return** currElem;

}

**public** **void** setCurrentElem( T currentElem) {

**this**.currElem = currentElem;

}

**public** Node<T> getPrevElem() {

**return** prevElem;

}

**public** **void** setPrevElem(Node<T> prevElem) {

**this**.prevElem = prevElem;

}

**public** Node<T> getNextElem() {

**return** nextElem;

}

**public** **void** setNextElem(Node<T> nextElem) {

**this**.nextElem = nextElem;

}

}

**private** Node<T> fstNode;

**private** Node<T> lstNode;

**private** **int** size = 0;

**public** LinkedContainer() {

fstNode = **new** Node<T>(**null**,**null**,lstNode);

lstNode = **new** Node<T>(**null**,fstNode,**null**);

fstNode = **new** Node<T>(**null**,**null**,lstNode);

}

@Override

**public** Iterator<T> iterator() {

**return** **new** Iterator<T>() {

**private** **int** position = 0;

@Override

**public** **boolean** hasNext() {

**return** position < size;

}

@Override

**public** T next() {

**if** (**this**.hasNext()) {

**return** getElementByIndex(position++);

} **else** {

**throw** **new** NoSuchElementException();

}

}

};

}

@Override

**public** Iterator<T> descendingIterator() {

**return** **new** Iterator<T>() {

**int** position = size - 1;

@Override

**public** **boolean** hasNext() {

**return** position >= 0;

}

@Override

**public** T next() {

**if** (**this**.hasNext()) {

position--;

**return** getElementByIndex(position--);

} **else** {

**throw** **new** NoSuchElementException();

}

}

};

}

@Override

**public** **void** clear() {

**for** (Node<T> x = fstNode; x != **null**; ) {

Node<T> next = x.nextElem;

x.currElem = **null**;

x.nextElem = **null**;

x.prevElem = **null**;

x = next;

}

fstNode = **null**;

lstNode = **null**;

lstNode = **new** Node<>(**null**, fstNode, **null**);

fstNode = **new** Node<>(**null**, **null**, lstNode);

size = 0;

}

@Override

**public** **void** add(**final** T t) {

addLast(t);

}

@Override

**public** **void** toFile() {

**try** {

File file = **new** File("File.txt");

**if**(!file.exists())

file.createNewFile();

PrintWriter pw = **new** PrintWriter(file);

Directory temp ;

System.***out***.println();

pw.println(size);

**for**(**int** i=0;i<size;i++) {

temp =(Directory)getElementByIndex(i);

pw.println(temp.getName());

pw.println(temp.getAddress());

pw.println(temp.getSpecial());

pw.println(temp.getPhone());

pw.println(temp.getTime() );

pw.println(temp.getTime1());

}

pw.close();

}

**catch**(IOException e){

System.***out***.print("Error: " + e);

}

}

@Override

**public** **void** readAll() {

**try** (BufferedReader br = **new** BufferedReader(**new** FileReader("File1.txt"))) {

Object temp;

String line;

line = br.readLine();

**int** count = Integer.*parseInt*(line);

**for** (**int** i = 0; i < count; i++) {

line = br.readLine();

temp = line;

add((T) temp);

}

} **catch** (IOException ex) {

ex.printStackTrace();

}

}

@Override

**public** **void** FromFile() **throws** ParseException {

BufferedReader br = **null**;

Directory temp = **new** Directory();

**try** {

br = **new** BufferedReader(**new** FileReader("C:\\Users\\User\\eclipse-workspace\\laba11\\File1.txt"));

String Line;

Line = br.readLine();

**int** count = Integer.*parseInt*(Line);

**for**(**int** i =0;i<count;i++){

Pattern pat = Pattern.*compile*("^[a-zA-Z]{3,10}[0-9]{0,2}|[a-zA-Z]{3,10}\\s[a-zA-Z]{3,10}[0-9]{0,2}");

Matcher mat3 = **null**;

**do** {

System.***out***.println("Enter name of outlet");

Line = br.readLine();

mat3 = pat.matcher(Line);

}**while**(!mat3.matches());

temp.setName(Line);

Pattern patt = Pattern.*compile*("^[a-zA-Z]{3,10}[0-9]{0,2}|[a-zA-Z]{3,10}\\s[0-9]{0,2}|[a-zA-Z]{3,10}\\s[a-zA-Z]{3,10}[0-9]{0,2}");

Matcher mat4 = **null**;

**do** {

System.***out***.println("Enter Address");

Line = br.readLine();

mat4 = patt.matcher(Line);

}**while**(!mat4.matches());

temp.setAddress(Line);

Pattern patter = Pattern.*compile*("^[a-zA-Z]{3,10}|[a-zA-Z]{3,10}\\s[a-zA-Z]{3,10}");

Matcher mat5 = **null**;

**do** {

System.***out***.println("Enter Specialization");

Line = br.readLine();

mat5 = patter.matcher(Line);

}**while**(!mat5.matches());

temp.setSpecial(Line);

Pattern pattern = Pattern.*compile*("\\d{10,12}");

Matcher m = **null**;

**do** {

System.***out***.println("Enter Phone number");

Line = br.readLine();

m = pattern.matcher(Line);

}**while**(!m.matches());

temp.setPhone(Line);

Pattern pattern1 = Pattern.*compile*("[0-9]{2}:[0-9]{2}");

Matcher mat1 = **null**;

**do** {

System.***out***.println("Enter StartTime:");

Line = br.readLine();

mat1 = pattern1.matcher(Line);

}**while**(!mat1.matches());

temp.setTime(Line);

Pattern pattern2 = Pattern.*compile*("[0-9]{2}:[0-9]{2}");

Matcher mat2 = **null**;

**do** {

System.***out***.println("Enter EndTime:");

Line = br.readLine();

mat2 = pattern2.matcher(Line);

}**while**(!mat2.matches());

temp.setTime1(Line);

add((T) **new** Directory(temp));

}

}**catch**(IOException e) {

System.***out***.print("Error: " + e);

}**finally** {

**try** {

br.close();

}**catch**(IOException e ) {

System.***out***.print("Error: " + e);

}

}

}

**public** Object[] toArray() {

Object[] result = **new** Object[size];

**int** i = 0;

**for** (Node<T> temp = fstNode; i < size; temp = temp.nextElem) {

result[i++] = temp.currElem;

}

**return** result;

}

@Override

**public** String toString() {

**return** Arrays.*toString*(toArray());

}

@Override

**public** **void** addLast(**final** T obj) {

Node<T> prev = lstNode; //сохранение данных хвоста

prev.setCurrentElem((T)**new** Directory(obj)); //установка значения

lstNode = **new** Node<>(**null**, prev, **null**); //изменение указателя хвоста

prev.setNextElem(lstNode); //установка указателя на хвост

size++; //увелечение размера списка

}

@Override

**public** **void** addFirst(**final** T obj) {

Node<T> next = fstNode;

next.setCurrentElem(obj);

fstNode = **new** Node<>(**null**, **null**, next);

next.setPrevElem(fstNode);

size++;

}

@Override

**public** **int** size() {

**return** size;

}

@Override

**public** T getElementByIndex(**final** **int** index) {

Node<T> target = fstNode.getNextElem(); //след элемент первого узла

**for** (**int** i = 0; i < index; i++) {

target = getNextElement(target);

}

**return** target.getCurrentElem();

}

**private** Node<T> getNextElement(**final** Node<T> index) {

**return** index.getNextElem();

}

@Override

**public** **void** DelAll() {

fstNode = **null**;

lstNode = **null**;

lstNode = **new** Node<>(**null**, fstNode, **null**);

fstNode = **new** Node<>(**null**, **null**, lstNode);

size = 0;

}

@Override

**public** **void** toFileAll() {

**try** {

File file = **new** File("File.txt");

**if**(!file.exists())

file.createNewFile();

PrintWriter pw = **new** PrintWriter(file);

System.***out***.println();

pw.println(size);

**for**(**int** i=0;i<size;i++) {

pw.println(getElementByIndex(i));

}

pw.close();

}

**catch**(IOException e){

System.***out***.print("Error: " + e);

}

}

@Override

**public** **void** checkEmptiness() {

**if**(size >0) {

System.***out***.println("Container is not empty");

}**else** {

System.***out***.println("Conteiner is empty");

}

}

}

**package** ua.khpi.oop.gorianckiy09;

**import** java.io.IOException;

**import** java.text.ParseException;

**public** **class** Main {

**public** **static** **void** main(String[] args) **throws** ParseException, IOException {

**if**(args.length!= 0) {

**if**(args[0].equals("-auto")) {

TypeOfWork.*auto*();

}

} **else** {

System.***out***.println("Could not find value: -auto\n"

+ "Transition to manual mode");

TypeOfWork.*menu*();

}

}

}

**package** ua.khpi.oop.gorianckiy09;

**import** java.io.IOException;

**import** java.text.ParseException;

**import** java.util.Scanner;

**public** **class** TypeOfWork {

**public** **static** **void** menu() **throws** ParseException, IOException {

LinkedContainer<Directory>stringLinked = **new** LinkedContainer<>();

Directory dir = **new** Directory();

System.***out***.println("Welocme to Manual Mode");

**int** loop = 1;

**while**(loop ==1) {

FuncNine.*ChooseMenu*();

Scanner sc = **new** Scanner(System.***in***);

**int** choose = sc.nextInt();

**switch**(choose) {

**case** 1:

stringLinked.clear();

**break**;

**case** 2:

stringLinked.toFileAll();

**break**;

**case** 3:

stringLinked.readAll();

**break**;

**case** 4:

stringLinked.checkEmptiness();

**break**;

**case** 5:

**for**(Directory s :stringLinked) {

System.***out***.println(s);

System.***out***.println();

}

**break**;

**case** 6:

dir.generateStore();

stringLinked.add(dir);

**break**;

**case** 7:

FuncNine.*sortByName*(stringLinked);

**break**;

**case** 8:

FuncNine.*sortByAddres*(stringLinked);

**break**;

**case** 9:

FuncNine.*sortBySpecial*(stringLinked);

**break**;

**case** 0:

loop = 0;

}

}

}

**public** **static** **void** auto() **throws** ParseException {

LinkedContainer<Directory>dir = **new** LinkedContainer<>();

System.***out***.println("Welcome to auto-mode");

System.***out***.println("Add to container new elements");

dir.FromFile();

System.***out***.println("Check if there is something in container");

dir.checkEmptiness();

System.***out***.println("Let's see what we added");

**for**(Directory s:dir) {

System.***out***.println(s);

}

System.***out***.println("Check size of container");

System.***out***.println(dir.size());

System.***out***.println("Output data to file");

dir.toFileAll();

}

}

**2. Діаграми**

3.Результат роботи:

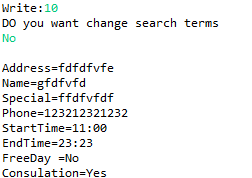


Рисунок 1 – Пошук елементів

Рисунок 2 – виведення даних

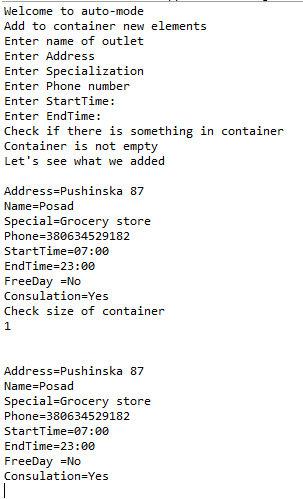


Рисунок 3 – Робота в автоматичному режимі

ВИСНОВОК

При виконанні цієї лабораторної роботи були набуті навички використовування регулярних виразів.