МИНИСТЕРСТВО ОБРАЗОВАНИЯ РЕСПУБЛИКИ БЕЛАРУСЬ
УЧРЕЖДЕНИЕ ОБРАЗОВАНИЯ
«БРЕСТСКИЙ ГОСУДАРСТВЕННЫЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ»
Кафедра интеллектуальных информационных технологий

Отчет по лабораторной работе №4

По дисциплине «Современные платформы программирования»
Специальность ПО-8

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Цель работы: приобрести навыки в области объектно-ориентированного проектирования

Вариант 15

Задание 1. Создать класс Catalog (каталог) с внутренним классом, с помощью объектов которого можно хранить информацию об истории выдач книги читателям.

Код программы

Catalog.java

```
import java.util.ArrayList;

public class Catalog {
    private ArrayList<Book> bookList;
    Catalog(){
        bookList = new ArrayList<>();
    }
    public static class Book{
        private String bookName;
        private String readerName;
        private String dateOfIssue;
        Book(String _bookName, String _readerName, String _dateOfIssue){
            bookName=_bookName;
            readerName=_readerName;
            dateOfIssue=_dateOfIssue;
        }
        @Override
        public String toString(){
            return new String("-------------\nbook name: "+bookName+"\nreader
name: "+readerName+"\ndate of issue: "+dateOfIssue+"\n");
        }

        public String getBookName() {
            return bookName;
        }

        public String getDateOfIssue() {
            return dateOfIssue;
        }

        public String getReaderName() {
            return readerName;
        }

        public void setBookName(String bookName) {
            this.bookName = bookName;
        }

        public void setDateOfIssue(String dateOfIssue) {
            this.dateOfIssue = dateOfIssue;
        }

        public void setReaderName(String readerName) {
            this.readerName = readerName;
        }
    }
    @Override
    public String toString(){
        String result = "";
        for(Book book: bookList){
            result+=book.toString();
        }
```

```
        return result;
    }
    public void addBook(String _bookName, String _readerName, String
_dateOfIssue){
        Book book = new Book(_bookName, _readerName, _dateOfIssue);
        bookList.add(book);
    }
    public void addBook(Book book){
        bookList.add(book);
    }

    public void setBookList(ArrayList<Book> bookList) {
        this.bookList = bookList;
    }
}
```

task1.java

```
public class task1 {
    public static void main(String[] args) {
        Catalog catalog=new Catalog();
        catalog.addBook(new Catalog.Book("a","a reader","24.12.2024"));
        catalog.addBook(new Catalog.Book("b","b reader","24.11.2024"));
        catalog.addBook(new Catalog.Book("c","c reader","24.10.2024"));
        catalog.addBook("e","e reader","24.09.2024");
        catalog.addBook("f","f reader","24.08.2024");
        System.out.println(catalog);
    }
}
```

Пример

```
D:\СПП\lab4\out\production\lab4>java task1
-------------
book name: a
reader name: a reader
date of issue: 24.12.2024
-------------
book name: b
reader name: b reader
date of issue: 24.11.2024
-------------
book name: c
reader name: c reader
date of issue: 24.10.2024
-------------
book name: e
reader name: e reader
date of issue: 24.09.2024
-------------
book name: f
reader name: f reader
date of issue: 24.08.2024
```

Задание 2. Создать класс Страница, используя класс Абзац.

Код программы

Paragraph.java

```
public class Paragraph {
    private String paragraphText;
    Paragraph(String _text){
        paragraphText =_text;
```

```
    }
    @Override
    public String toString(){
        return paragraphText;
    }
    public String getParagraphText() {
        return paragraphText;
    }
    public void setParagraphText(String paragraphText) {
        this.paragraphText = paragraphText;
    }
}
```

Page.java

```
import java.util.Vector;

public class Page {
    private Vector<Paragraph> pageContent;
    Page(){
        pageContent = new Vector<>();
    }
    public void addParagraph(String paragraphText){
        pageContent.add(new Paragraph(paragraphText));
    }
    public void addParagraph(Paragraph paragraph){
        pageContent.add(paragraph);
    }
    @Override
    public String toString(){
        String result ="";
        for(Paragraph paragraph: pageContent){
            result+=paragraph+"\n";
        }
        return result;
    }
    public void setPageContent(Vector<Paragraph> pageContent) {
        this.pageContent = pageContent;
    }
}
```

Task2.java

```
public class task2 {
    public static void main(String[] args){
        Page page = new Page();
        page.addParagraph(new Paragraph("first paragraph"));
        page.addParagraph("second paragraph");
        System.out.println(page);
    }
}
```

Пример

```
D:\СПП\lab4\out\production\lab4>java task2
first paragraph
second paragraph
```

Applicant.java

```
import java.util.Vector;

public class Applicant {
    private String firstName;
    private String lastName;
    private Vector<Mark> markList= new Vector<>();

    public Applicant(String firstName, String lastName) {
        this.firstName = firstName;
```

```
        this.lastName = lastName;
    }

    public String getFirstName() {
        return firstName;
    }

    public void setFirstName(String firstName) {
        this.firstName = firstName;
    }

    public String getLastName() {
        return lastName;
    }

    public void setLastName(String lastName) {
        this.lastName = lastName;
    }

    public Vector<Mark> getMarkList() {
        return markList;
    }

    public void setMarkList(Vector<Mark> markList) {
        this.markList = markList;
    }
    public void addMark(Mark mark){
        markList.add(mark);
    }
    @Override
    public String toString(){
        String resultStr=getLastName()+" "+getFirstName();
        return resultStr;
    }
    public void printMarkList(){
        for(Mark mark:markList){
            System.out.println(mark);
        }
    }
}
```

Exam.java

```
import java.util.Scanner;
import java.util.Vector;

public class Exam {
    private static String name;
    private Teacher teacher;

    public Exam(String name, Teacher teacher) {
        this.name = name;
        this.teacher = teacher;
    }

    public static String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }
    public void giveMarks(Vector<Applicant> applicantList){
        System.out.println("Exam name: "+Exam.getName());
        Scanner scanner=new Scanner(System.in);
```

```
        for(Applicant applicant:applicantList){
            System.out.print("Set mark for applicant
"+applicant.getLastName()+" "+applicant.getFirstName()+": ");
            int mark = scanner.nextInt();
            applicant.addMark(new Mark(mark, this));
        }
    }
    @Override
    public String toString(){
        String resultStr="Exam name: "+getName()+"\nteacher: "+teacher;
        return resultStr;
    }
}
```

Faculty.java

```
import java.util.Vector;

public class Faculty {
    private String name;
    private Vector<Applicant> applicantList= new Vector<>();
    private Vector<Applicant> acceptedApplicantsList= new Vector<>();
    private Vector<Exam> examList= new Vector<>();

    public Faculty(String name) {
        this.name = name;
    }

    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }
    public void registerApplicant(Applicant applicant){
        applicantList.add(applicant);
    }
    public void addExam(Exam exam){
        examList.add(exam);
    }
    public void passExams(){
        for(Exam exam:examList){
            exam.giveMarks(applicantList);
        }
        for(Applicant applicant:applicantList){
            float GPA=0;
            for(Mark mark:applicant.getMarkList()){
                GPA+= mark.getMark();
            }
            GPA/=applicant.getMarkList().size();
            if(GPA>=6){
                acceptedApplicantsList.add(applicant);
            }
        }
    }
    public void printInfo(){
        System.out.println("Faculty name: "+getName()+"\nexam
list:\n"+examList);
    }
    public void printAcceptedApplicantsList(){
        System.out.println("Accepted applicants:");
        for(Applicant applicant:acceptedApplicantsList){
            System.out.println(applicant);
```

```
        }
    }
public void printApplicantList(){
    System.out.println("Applicants:");
    for(Applicant applicant:applicantList){
        System.out.println(applicant);
    }
}

}
```

Mark.java

```
public class Mark {
    private int mark;
    private Exam exam;

    public Mark(int mark, Exam exam) {
        this.mark = mark;
        this.exam = exam;
    }

    public int getMark() {
        return mark;
    }

    public void setMark(int mark) {
        this.mark = mark;
    }

    public Exam getExam() {
        return exam;
    }

    public void setExam(Exam exam) {
        this.exam = exam;
    }
    @Override
    public String toString(){
        String resultStr=getExam()+"\nmark: "+getMark();
        return  resultStr;
    }
}
```

Teacher.java

```
public class Teacher {
    private String firstName;
    private String lastName;

    public Teacher(String firstName, String lastName) {
        this.firstName = firstName;
        this.lastName = lastName;
    }

    public String getFirstName() {
        return firstName;
    }

    public void setFirstName(String firstName) {
        this.firstName = firstName;
    }

    public String getLastName() {
        return lastName;
    }
```

```
    public void setLastName(String lastName) {
        this.lastName = lastName;
    }
    @Override
    public String toString(){
        String resultStr=getLastName()+" "+getFirstName();
        return resultStr;
    }
}
```

Task3.java

```
public class task3 {
    public static void main(String[] args){
        Faculty faculty1 = new Faculty("Faculty a");
        Faculty faculty2 = new Faculty("Faculty b");
        Teacher teacher1 = new Teacher("a", "teacher");
        Teacher teacher2 = new Teacher("b", "teacher");
        Teacher teacher3 = new Teacher("c", "teacher");
        Applicant applicant1 = new Applicant("a", "applicant");
        Applicant applicant2 = new Applicant("b", "applicant");
        Applicant applicant3 = new Applicant("c", "applicant");
        Applicant applicant4 = new Applicant("d", "applicant");
        faculty1.addExam(new Exam("exam1", teacher1));
        faculty1.addExam(new Exam("exam2", teacher2));
        faculty2.addExam(new Exam("exam3", teacher3));
        faculty1.registerApplicant(applicant1);
        faculty1.registerApplicant(applicant2);
        faculty2.registerApplicant(applicant3);
        faculty2.registerApplicant(applicant4);
        faculty1.passExams();
        faculty1.printApplicantList();
        faculty1.printAcceptedApplicantsList();
        faculty2.passExams();
        faculty2.printApplicantList();
        faculty2.printAcceptedApplicantsList();
    }
}
```

Пример:

```
D:\СПП\lab4\out\production\lab4>java task3
Exam name: exam1
Set mark for applicant applicant a: 4
Set mark for applicant applicant b: 8
Exam name: exam2
Set mark for applicant applicant a: 7
Set mark for applicant applicant b: 7
Applicants:
applicant a
applicant b
Accepted applicants:
applicant b
Exam name: exam3
Set mark for applicant applicant c: 5
Set mark for applicant applicant d: 5
Applicants:
applicant c
applicant d
Accepted applicants:
```

Вывод: научились создавать и использовать классы в программах на языке программирования Java.