Міністерство освіти і науки України

Національний університет «Львівська Політехніка»

Кафедра ЕОМ

ЗВІТ

з лабораторної роботи № 3
з дисципліни: «Кросплатформні засоби програмування»
на тему: «Спадкування та інтерфейси»

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Мета роботи: ознайомитися з спадкуванням та інтерфейсами у мові Java.

1. Написати та налагодити програму на мові Java, що розширює клас, що реалізований у лабораторній роботі №2, для реалізації предметної області заданої варіантом. Суперклас, що реалізований у лабораторній роботі №2, зробити абстрактним. Розроблений підклас має забезпечувати механізми свого коректного функціонування та реалізовувати мінімум один інтерфейс. Програма має розміщуватися в пакеті Група.Прізвище.Lab3 та володіти коментарями, які дозволять автоматично згенерувати документацію до розробленого пакету. 2. Автоматично згенерувати документацію до розробленого пакету.
3. Завантажити код на GitHub згідно методичних вказівок по роботі з GitHub.
4. Скласти звіт про виконану роботу з приведенням тексту програми, результату її виконання та фрагменту згенерованої документації та завантажити його у ВНС.
5. Дати відповідь на контрольні запитання.

16. Диктофон

Виконання:

Main.java

```
package KI306.Pryimak.Lab5;
public class Main {
    public static void main(String[] args) {
        Dictaphone Dictaphone = new Dictaphone(new Screen(7.8, "720x1980"),
new HardDisk(1000, "Harman"));
```

```
        Dictaphone.AddSong("Stepan Giga - Zoloto Karpat");
        Dictaphone.AddSong("Stepan Giga - Yvoruna");
        Dictaphone.AddSong("Victor Pavlic - Shikidim");
        Dictaphone.AddSong("Zhadan i Sobaku - Madona");
        Dictaphone.AddSong("Zhadan i Sobaku - Kobzon");

        Dictaphone.TurnOnPrevSong();
        Dictaphone.TurnOnPrevSong();
        Dictaphone.TurnOnPrevSong();

        Dictaphone.TurnOnPrevSong();
        Dictaphone.TurnOnPrevSong();
        Dictaphone.TurnOnPrevSong();
        Dictaphone.TurnOnPrevSong();

        System.out.println(Dictaphone);
    }
}
```

Logger.java

```
package KI306.Pryimak.Lab5;

import java.io.File;
import java.io.FileWriter;
import java.io.IOException;
import java.text.SimpleDateFormat;
import java.util.Date;

/**
 * Class Logger. Was created to log information, errors and warnings. Also there was implemented Singelton
 * @author
 * @version 1.0
 */
public class Logger
{
    private static Logger logger;
    private final String fileName;

    protected final String infoFlag = new String("[INFO] ");
    protected final String errorFlag = new String("[ERROR] ");
    protected final String warningFlag = new String("[WARNING] ");

    /**
     * Constructor
     * @param fileName
     */
    private Logger(String fileName)
    {
        this.fileName = fileName;
        File loggerFile = null;
        FileWriter fout = null;
        try
        {
            loggerFile = new File(fileName);
            fout = new FileWriter(loggerFile, true);
            SimpleDateFormat formatter= new SimpleDateFormat("yyyy-MM-dd 'at' HH:mm:ss z");
            Date date = new Date(System.currentTimeMillis());
            fout.write("[" + formatter.format(date) + "] " + "Logger start to work\n");
        }
        catch (IOException e)
        {
            System.err.println("Something wrong with log file" + e.getMessage());
            System.exit(1);
        }
        finally
        {
            try
            {
                fout.flush();
                fout.close();
            }
            catch (IOException e)
            {
                System.out.println(e.getMessage());
            }
        }
```

```
    }

    /**
     * Method to do logging
     * @param massege
     */
    public void log(String massege)
    {
        File loggerFile = null;
        FileWriter fout = null;
        try
        {
            loggerFile = new File(this.fileName);
            fout = new FileWriter(loggerFile, true);
            SimpleDateFormat formatter= new SimpleDateFormat("yyyy-MM-dd
'at' HH:mm:ss z");
            Date date = new Date(System.currentTimeMillis());
            fout.write("[" + formatter.format(date) + "] " + massege +  "\n");
        }
        catch (IOException e)
        {
            System.err.println("Something wrong with log file" + e.getMessage());
            System.exit(1);
        }
        finally
        {
            try
            {
```

```
            fout.flush();
            fout.close();
        }
        catch (IOException | NullPointerException e)
        {
            System.out.println(e.getMessage());
        }
    }
}

/**
 * Singleton implementation
 * @param fileName
 * @return
 */
public static Logger getLogger(String fileName)
{
    if (logger == null)
    {
        logger = new Logger(fileName);
    }
    return logger;
}

/**
 * Getter for logger
 * @return logger
```

```
     */
    public static Logger getLogger()
    {
        return logger;
    }

}
```

AudioPlayer.java

```
package KI306.Pryimak.Lab5;
import java.util.ArrayList;



public abstract class AudioPlayer
{
    protected final Button nextSong = new Button("next song");
    protected final Button prevSong = new Button("prev song");
    protected final Button pause = new Button("pause");
    protected Logger logger = Logger.getLogger("logs.txt");
    protected Screen screen;
    protected HardDisk hardDisk;
    protected ArrayList<String> songs = new ArrayList<>();
    protected int curSong = 0;

    /**
     * Constructor
```

```
 * @param screen
 * @param hardDisk
 */
public AudioPlayer(Screen screen, HardDisk hardDisk) {
    logger.log(logger.infoFlag + "AudioPlayer constructor called");
    this.screen = screen;
    this.hardDisk = hardDisk;
}

/**
 * Method to add new song to player
 * @param song
 */
public void AddSong(String song)
{
    songs.add(song);
    System.out.println(song + " was added to audio player");
    logger.log(logger.infoFlag + "AudioPlayer AddSong method was called");
}


/**
 * Method to turn on next song
 */
public abstract void TurnOnNextSong();

/**
```

```
 * Method to turn on prev song
 */
public abstract void TurnOnPrevSong();



public Button getNextSong() {
    return nextSong;
}

public Button getPrevSong() {
    return prevSong;
}

public Button getPause() {
    return pause;
}

public Logger getLogger() {
    return logger;
}

public void setLogger(Logger logger) {
    this.logger = logger;
}

public Screen getScreen() {
    return screen;
```

```
}

public void setScreen(Screen screen) {
    this.screen = screen;
}

public HardDisk getHardDisk() {
    return hardDisk;
}

public void setHardDisk(HardDisk hardDisk) {
    this.hardDisk = hardDisk;
}

public ArrayList<String> getSongs() {
    return songs;
}

public void setSongs(ArrayList<String> songs) {
    this.songs = songs;
}

public int getCurSong() {
    return curSong;
}

public void setCurSong(int curSong) {
        this.curSong = curSong;
    }

    @Override
    public String toString() {
        return "AudioPlayer{ " +
                " screen=" + screen + "\n" +
                ", hardDisk=" + hardDisk +  "\n" +
                ", songs=" + songs + "\n" +
                ", curSong=" + curSong + "\n" +
                '}';
    }
}
```

Sreen.java

```
package KI306.Pryimak.Lab5;
public class Screen
{
    private double diagonal;
    private String expansion;

    /**
     * Constructor
     * @param diagonal
     * @param expansion
     */
```

```
public Screen(double diagonal, String expansion) {
    this.diagonal = diagonal;
    this.expansion = expansion;
}

/**
 * Getter for Diagonal
 * @return diagonal
 */
public double getDiagonal() {
    return diagonal;
}

/**
 * Setter for diagonal
 * @param diagonal
 */
public void setDiagonal(double diagonal) {
    this.diagonal = diagonal;
}

/**
 * Getter for expansion
 * @return
 */
public String getExpansion() {
    return expansion;
    }

    /**
     * Setter for expansion
     * @param expansion
     */
    public void setExpansion(String expansion) {
        this.expansion = expansion;
    }

    @Override
    public String toString() {
        return "Screen{ " +
                "diagonal = " + diagonal +
                ", expansion = '" + expansion + '\'' +
                '}';
    }
}
```

HardDisk.java

```
package KI306.Pryimak.Lab5;
public class HardDisk
{
    private double capacity;
    private String producer;

    /**
```

```
 * Constructor
 * @param capacity
 * @param producer
 */
public HardDisk(double capacity, String producer)
{
    this.capacity = capacity;
    this.producer = producer;
}

/**
 * Getter for capacity
 * @return capacity
 */
public double getCapacity() {
    return capacity;
}

/**
 * Setter for capacity
 * @param capacity
 */
public void setCapacity(double capacity) {
    this.capacity = capacity;
}

/**
```

```
     * Getter for producer
     * @return producer
     */
    public String getProducer() {
        return producer;
    }

    /**
     * Setter for producer
     * @param producer
     */
    public void setProducer(String producer) {
        this.producer = producer;
    }

    @Override
    public String toString() {
        return "HardDisk{ " +
                "capacity = " + capacity + " mb." +
                ", producer = '" + producer + '\'' +
                '}';
    }
}
```

Button.java

```
package KI306.Pryimak.Lab5;
public class Button
{
    private String action;

    /**
     * Constructor
     * @param action
     */
    public Button(String action) {
        this.action = action;
    }

    /**
     * Getter for action
     * @return action
     */
    public String getAction() {
        return action;
    }

    /**
     * Setter for action
     * @param action
     */
    public void setAction(String action) {
        this.action = action;
    }

    @Override
    public String toString() {
        return "Button{ " +
                "action = '" + action + '\'' +
                '}';
    }
}
```

Dictaphone.java

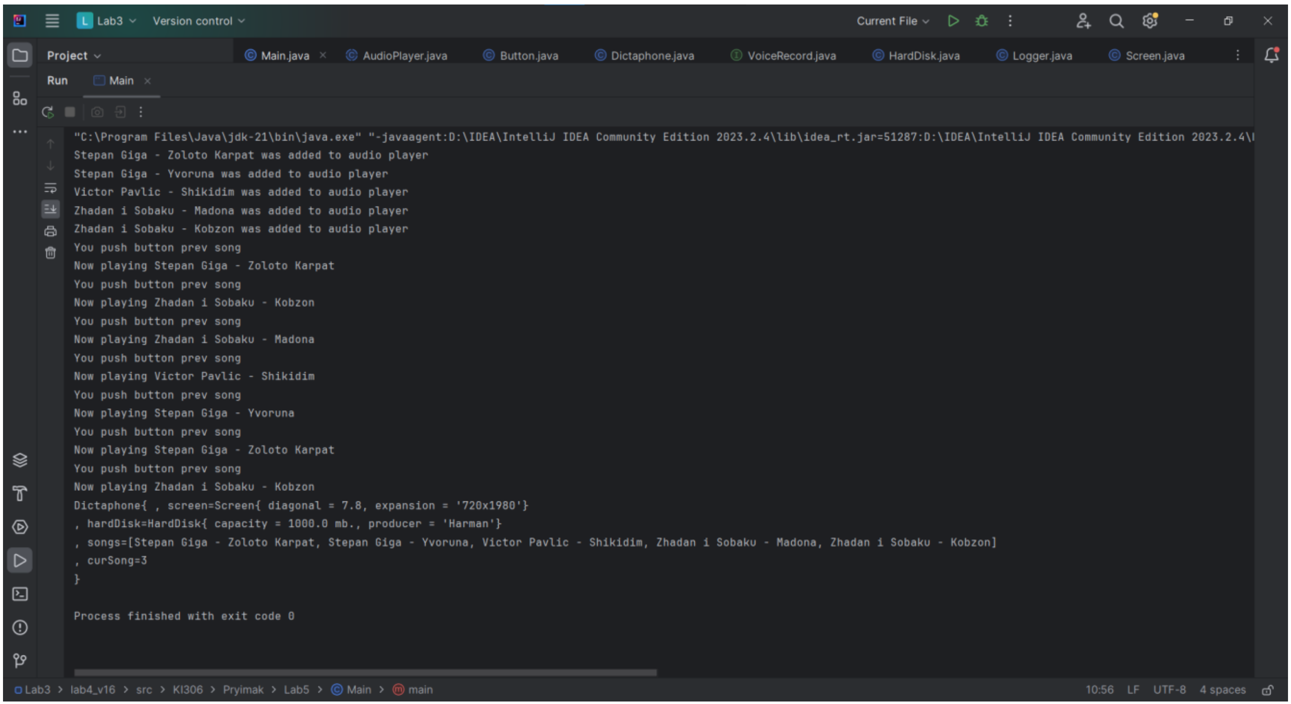
```
package KI306.Pryimak.Lab5;
public class Dictaphone extends AudioPlayer implements VoiceRecord
{
    /**
     * Constructor
     *
     * @param screen
     * @param hardDisk
     */
    public Dictaphone(Screen screen, HardDisk hardDisk) {
        super(screen, hardDisk);
    }

    /**
     * Overrided method to turn on next song
     */
    @Override
    public void TurnOnNextSong() {
        logger.log(logger.infoFlag + "TurnOnNextSong Dictaphone method was called");
        if(curSong == songs.size() - 1)
        {
            System.out.println("You push button " + nextSong.getAction());
            System.out.println("Now playing " + songs.get(curSong));
            curSong = 0;
        } else if (curSong < songs.size() - 1) {
            System.out.println("You push button " + nextSong.getAction());
            System.out.println("Now playing " + songs.get(curSong));
            curSong++;
        }
    }
    /**
     * Overrided method to turn on prev song
     */
    @Override
    public void TurnOnPrevSong() {
        logger.log(logger.infoFlag + "TurnPrevNextSong Dictaphone method was called");
        if(curSong == 0)
        {
            System.out.println("You push button " + prevSong.getAction());
            System.out.println("Now playing " + songs.get(curSong));
            curSong = songs.size() - 1;
        } else if (curSong > 0) {
            System.out.println("You push button " + prevSong.getAction());
            System.out.println("Now playing " + songs.get(curSong));
            curSong--;
        }
    }

    @Override
    public void RecordVoice(String voice) {
        songs.add("Voice Record - " + voice);

        System.out.println("Voice recorded: " + voice);
    }
    @Override
    public String toString() {
        return "Dictaphone{ " +
                ", screen=" + screen + "\n" +
                ", hardDisk=" + hardDisk + "\n" +
                ", songs=" + songs + "\n" +
                ", curSong=" + curSong + "\n" +
                '}';
    }
}
```

VoiceRecord.java

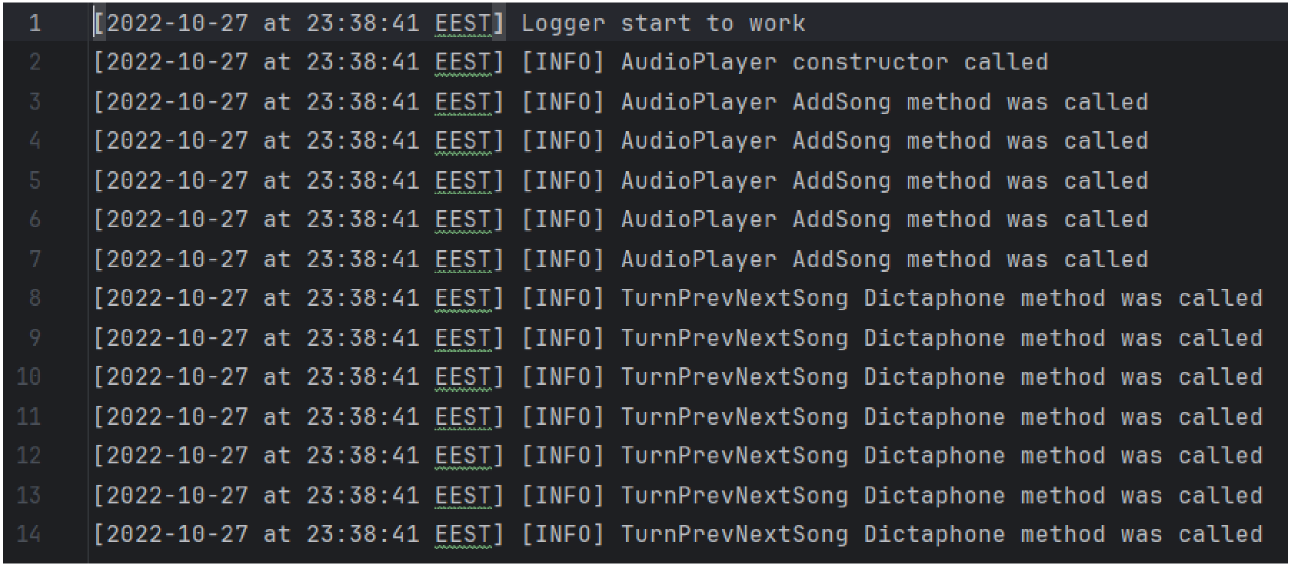
```
package KI306.Pryimak.Lab5;
```

```
public abstract interface VoiceRecord
{
    void RecordVoice(String voice);
}
```

Результати:



```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:D:\IDEA\IntelliJ IDEA Community Edition 2023.2.4\lib\idea_rt.jar=51287:D:\IDEA\IntelliJ IDEA Community Edition 2023.2.4\
Stepan Giga - Zoloto Karpat was added to audio player
Stepan Giga - Yvoruna was added to audio player
Victor Pavlic - Shikidim was added to audio player
Zhadan i Sobaku - Madona was added to audio player
Zhadan i Sobaku - Kobzon was added to audio player
You push button prev song
Now playing Stepan Giga - Zoloto Karpat
You push button prev song
Now playing Zhadan i Sobaku - Kobzon
You push button prev song
Now playing Zhadan i Sobaku - Madona
You push button prev song
Now playing Victor Pavlic - Shikidim
You push button prev song
Now playing Stepan Giga - Yvoruna
You push button prev song
Now playing Stepan Giga - Zoloto Karpat
You push button prev song
Now playing Zhadan i Sobaku - Kobzon
Dictaphone{ , screen=Screen{ diagonal = 7.8, expansion = '720x1980'}
, hardDisk=HardDisk{ capacity = 1000.0 mb., producer = 'Harman'}
, songs=[Stepan Giga - Zoloto Karpat, Stepan Giga - Yvoruna, Victor Pavlic - Shikidim, Zhadan i Sobaku - Madona, Zhadan i Sobaku - Kobzon]
, curSong=3
}

Process finished with exit code 0
```



```
[2022-10-27 at 23:38:41 EEST] Logger start to work
[2022-10-27 at 23:38:41 EEST] [INFO] AudioPlayer constructor called
[2022-10-27 at 23:38:41 EEST] [INFO] AudioPlayer AddSong method was called
[2022-10-27 at 23:38:41 EEST] [INFO] AudioPlayer AddSong method was called
[2022-10-27 at 23:38:41 EEST] [INFO] AudioPlayer AddSong method was called
[2022-10-27 at 23:38:41 EEST] [INFO] AudioPlayer AddSong method was called
[2022-10-27 at 23:38:41 EEST] [INFO] AudioPlayer AddSong method was called
[2022-10-27 at 23:38:41 EEST] [INFO] TurnPrevNextSong Dictaphone method was called
[2022-10-27 at 23:38:41 EEST] [INFO] TurnPrevNextSong Dictaphone method was called
[2022-10-27 at 23:38:41 EEST] [INFO] TurnPrevNextSong Dictaphone method was called
[2022-10-27 at 23:38:41 EEST] [INFO] TurnPrevNextSong Dictaphone method was called
[2022-10-27 at 23:38:41 EEST] [INFO] TurnPrevNextSong Dictaphone method was called
[2022-10-27 at 23:38:41 EEST] [INFO] TurnPrevNextSong Dictaphone method was called
[2022-10-27 at 23:38:41 EEST] [INFO] TurnPrevNextSong Dictaphone method was called
```

Висновок: у ході данної лабораторної роботи я ознайомився зі спадкуванням та інтерфейсами у мові Java.