Data Structure and Algorithm Practicum Searching

Name

Muhammad Baihaqi Aulia Asy'ari

NIM

2241720145

Class

1I

Department

Information Technology

Study Program

D4 Informatics Engineering

1.2 Sequential Search Method

1.2.1 Steps

1. Create a new project in NetBeans called `TestSearching`

2. Then, create a new package `week7`.

3. Create new `Students` class, then declare following attributes:

```java
public class Students {
    int nim, age;
    String name;
    double gpa;
}
```

4. Create a constructor in `Students` class with parameters (int ni, String nm, int age, double gpa). Convert it to program code as follows:

```java
public Students(int nim, int age, String name, double gpa) {
    this.nim = nim;
    this.age = age;
    this.name = name;
    this.gpa = gpa;
}
```

5. Create display() method with void as its return type

```java
public void display() {
    System.out.println("NIM =" + nim);
    System.out.println("Name =" + name);
    System.out.println("Age =" + age);
    System.out.println("GPA =" + gpa);
}
```

6. Create a new `SearchStudent` class as follows.

```java
public class SearchStudent {
    Students[] listStd = new Students[5];
    int idx;
}
```

7. Create method `add()` at that class! This will be used for adding objects from `Students` class to listStd attribute

```java
public void add(Students std) {
    if (idx < listStd.length) {
        listStd[idx] = std;
        idx++;
    } else {
        System.out.println("Data is already full");
    }
}
```

8. Create method `display()` in class `SearchStudent`! This display() method will be used to print all students data available in this class. Pay attention on how we use `for loops` differently. Even so, the concepts is still the same

```java
public void display() {
    for (Students students : listStd) {
        students.display();
        System.out.println("--------------------------------");
    }
}
```

9. Create method `FindSeqSearch` with integer as its return type. Then fill in the function with sequential search algorithm.

```java
public int findSeqSearch(int search) {
    int potition = 1;
    for (int i = 0; i < listStd.length; i++) {
        if (listStd[i].nim == search) {
            potition = i;
            break;
        }
    }
    return potition;
}
```

10. Create method `displayPosition` with void as its return type. And write these following code as follows

```java
public void showPotition(int x, int pos) {
    if (pos != 1) {
        System.out.println("Data : " + x + " is found in index-"
            + pos);
    } else {
        System.out.println("Data : " + x + "is not found");
    }
}
```

11. Create method `displayData` with void as its return type. And write these following code as follows

```java
public void showData(int x, int pos) {
    if (pos != 1) {
        System.out.println("NIM \t : " + x);
        System.out.println("Name \t : " + listStd[pos].name);
        System.out.println("Age \t : " + listStd[pos].age);
        System.out.println("IPK \t : " + listStd[pos].gpa);
    } else {
        System.out.println("Data " + x + " is not found");
    }
}
```

12. Create a main class named `StudentsMain` and add main method as follows

```java
public class StudentsMain {
    public static void main(String[] args) {

    }
}
```

13. In main method, instantiate an object in `SearchStudent` that consist of 5 `Students`, then add all students object by calling `add` function in object `SearchStudent`

```java
Scanner s = new Scanner(System.in);
Scanner sl = new Scanner(System.in);

SearchStudent data = new SearchStudent();
int amountStudent = 5;

System.out.println("-------------------------------");
System.out.println("Input student data accordingly from samllest
↪   NIM");
for (int i = 0; i < amountStudent; i++) {
    System.out.println("----------------");
    System.out.print("NIM\t: ");
    int nim = s.nextInt();
    System.out.print("Name\t: ");
    String name = sl.nextLine();
    System.out.print("Age\t: ");
    int age = s.nextInt();
    System.out.print("GPA\t: ");
    double gpa = s.nextDouble();
```

```java
        Students std = new Students(nim, age, name, gpa);
        data.add(std);
    }
```

14. Add method `display` to print all inserted data

```java
System.out.println("-------------------------------");
System.out.println("Entire Student Data");
data.display();
```

15. To search students by their NIM, create a search variable to hold input from user. Then call method FindSeqSearch with its parameter is the search variable we've declared before

```java
System.out.println("_____");
System.out.println("_____");
System.out.print("Search student by NIM: ");
int search = s.nextInt();
System.out.println("Using Sequential Search");
int potition = data.findSeqSearch(search);
```

16. Call method displayPosition from class SearchStudent.

```java
data.showPotition(search, potition);
```

17. Call method displayData from class SearchStudent

```java
data.showData(search, potition);
```

18. Run the program and see the result

```java
package week7;

public class Students {
    int nim, age;
    String name;
    double gpa;

    public Students(int nim, int age, String name, double gpa) {
        this.nim = nim;
        this.age = age;
        this.name = name;
        this.gpa = gpa;
    }
```

```java
    public void display() {
        System.out.println("NIM =" + nim);
        System.out.println("Name =" + name);
        System.out.println("Age =" + age);
        System.out.println("GPA =" + gpa);
    }
}

package week7;

public class SearchStudent {
    Students[] listStd = new Students[5];
    int idx;
    public void add(Students std) {
        if (idx < listStd.length) {
            listStd[idx] = std;
            idx++;
        } else {
            System.out.println("Data is already full");
        }
    }

    public void display() {
        for (Students students : listStd) {
            students.display();

            ↪  System.out.println("-------------------------------");
        }
    }

    public int findSeqSearch(int search) {
        int potition = 1;
        for (int i = 0; i < listStd.length; i++) {
            if (listStd[i].nim == search) {
                potition = i;
                break;
            }
        }
        return potition;
    }
```

```java
        public void showPotition(int x, int pos) {
            if (pos != 1) {
                System.out.println("Data : " + x + " is found in
                ↪   index-" + pos);
            } else {
                System.out.println("Data : " + x + "is not found");
            }
        }

        public void showData(int x, int pos) {
            if (pos != 1) {
                System.out.println("NIM \t : " + x);
                System.out.println("Name \t : " + listStd[pos].name);
                System.out.println("Age \t : " + listStd[pos].age);
                System.out.println("IPK \t : " + listStd[pos].gpa);
            } else {
                System.out.println("Data " + x + " is not found");
            }
        }
    }

package week7;

import java.util.Scanner;

public class StudentsMain {
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in);
        Scanner sl = new Scanner(System.in);

        SearchStudent data = new SearchStudent();
        int amountStudent = 5;

        System.out.println("--------------------------------");
        System.out.println("Input student data accordingly from
        ↪   samllest NIM");
        for (int i = 0; i < amountStudent; i++) {
            System.out.println("----------------");
            System.out.print("NIM\t: ");
            int nim = s.nextInt();
            System.out.print("Name\t: ");
            String name = sl.nextLine();
```

```java
                System.out.print("Age\t: ");
                int age = s.nextInt();
                System.out.print("GPA\t: ");
                double gpa = s.nextDouble();

                Students std = new Students(nim, age, name, gpa);
                data.add(std);
            }

            System.out.println("--------------------------------");
            System.out.println("Entire Student Data");
            data.display();

            System.out.println("_____");
            System.out.println("_____");
            System.out.print("Search student by NIM: ");
            int search = s.nextInt();
            System.out.println("Using Sequential Search");
            int potition = data.findSeqSearch(search);

            data.showPotition(search, potition);

            data.showData(search, potition);

            s.close();
            sl.close();
        }
    }
```

1.2.2   Result