Shri Ramdeobaba College of Engineering & Management Nagpur-13

Department of Computer Application

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Submission for

Course Name: Design Analysis and Algorithm Lab

Course Code: MCP546

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Class Roll No: 26

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Shift: 2

Batch: 2

Under the Guidance of

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Date of submission:

Practical 1

Aim: Perform Linear search on all the three data sets which you have created in practical_0.

Display the time taken to search a key from this file occurring in the first, middle and last position / not found case.

Compare the time taken for all these cases.

For file 1:

Code:
```java
import java.io.FileReader;
import java.io.IOException;
import java.util.Scanner;

public class LinearSearchFile1 {
    public static void main(String[] args) throws IOException {
        Scanner scanner = new Scanner(System.in);
        int flag = 0;
        FileReader f = new
FileReader("C:\\Users\\HP\\IdeaProjects\\DAA_Practical_1\\src\\sequentialUnrep
eatedNumbers.txt");
        System.out.println("Enter element to search : ");
        String element = scanner.next();
        long start = 0;
        Scanner scanner2 = new Scanner(f);
        start = System.currentTimeMillis();
        while (scanner2.hasNext()) {
            if (scanner2.next().equals(element)) {
                long finish = System.currentTimeMillis();
                long timeElapsed = finish - start;
                System.out.println("Element found \nAnd time taken is " + timeElapsed
+ "ms");
                flag = 1;
                break;
            }
        }
        if (flag == 0) {
            long finish = System.currentTimeMillis();
            long timeElapsed = finish - start;
            System.out.println("Element not found \nAnd time taken is " +
timeElapsed + "ms");
        }
        scanner.close();
        scanner2.close();
    }
}
```

Output:

Element present at beginning:

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:
Enter element to search :
42
Element found
And time taken is 4ms

Process finished with exit code 0
```

Element present at middle:

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent
Enter element to search :
50000
Element found
And time taken is 361ms

Process finished with exit code 0
```

Element present at end:

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:
Enter element to search :
99999
Element found
And time taken is 455ms

Process finished with exit code 0
```

Element not present:

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent
Enter element to search :
1000000
Element not found
And time taken is 331ms

Process finished with exit code 0
```

For File 2:

Code:
```java
import java.io.FileReader;
import java.io.IOException;
import java.util.Scanner;

public class LinearSearchFile2 {
    public static void main(String[] args) throws IOException {
        Scanner scanner = new Scanner(System.in);
        int flag = 0;
        FileReader f = new
FileReader("C:\\Users\\HP\\IdeaProjects\\DAA_Practical_1\\src\\randomUnrepea
tedNumbers.txt");
        System.out.println("Enter element to search : ");
        String element = scanner.next();
        long start = 0;
        Scanner scanner2 = new Scanner(f);
        start = System.currentTimeMillis();
        while (scanner2.hasNext()) {
            if (scanner2.next().equals(element)) {
                long finish = System.currentTimeMillis();
                long timeElapsed = finish - start;
                System.out.println("Element found \nAnd time taken is " + timeElapsed
+ "ms");
                flag = 1;
                break;
            }
        }
        if (flag == 0) {
            long finish = System.currentTimeMillis();
            long timeElapsed = finish - start;
            System.out.println("Element not found \nAnd time taken is " +
timeElapsed + "ms");
        }
        scanner.close();
        scanner2.close();
    }
}
```

Output:

Element present at beginning:

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:
Enter element to search :
42
Element found
And time taken is 432ms

Process finished with exit code 0
```

Element present at middle:

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent
Enter element to search :
50000
Element found
And time taken is 631ms

Process finished with exit code 0
```

Element present at end:

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent:
Enter element to search :
99999
Element found
And time taken is 161ms

Process finished with exit code 0
```

Element not present:

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent
Enter element to search :
1000000
Element not found
And time taken is 693ms

Process finished with exit code 0
```

For File 3:

Code:
```java
import java.io.FileReader;
import java.io.IOException;
import java.util.Scanner;

public class LinearSearchFile3 {
    public static void main(String[] args) throws IOException {
        Scanner scanner = new Scanner(System.in);
        int flag = 0;
        FileReader f = new
FileReader("C:\\Users\\HP\\IdeaProjects\\DAA_Practical_1\\src\\randomRepeate
dNumbers.txt");
        System.out.println("Enter element to search : ");
        String element = scanner.next();
        long start = 0;
        Scanner scanner2 = new Scanner(f);
        start = System.currentTimeMillis();
        while (scanner2.hasNext()) {
            if (scanner2.next().equals(element)) {
                long finish = System.currentTimeMillis();
                long timeElapsed = finish - start;
                System.out.println("Element found \nAnd time taken is " + timeElapsed
+ "ms");
                flag = 1;
                break;
            }
        }
        if (flag == 0) {
            long finish = System.currentTimeMillis();
            long timeElapsed = finish - start;
            System.out.println("Element not found \nAnd time taken is " +
timeElapsed + "ms");
        }
        scanner.close();
        scanner2.close();
    }
}
```

Output:

Element present at beginning:

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent
Enter element to search :
42
Element found
And time taken is 204ms

Process finished with exit code 0
```

Element present at middle:

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent
Enter element to search :
50000
Element found
And time taken is 43ms

Process finished with exit code 0
```

Element present at end:

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent
Enter element to search :
99999
Element found
And time taken is 212ms

Process finished with exit code 0
```

Element not present:

```
"C:\Program Files\Java\jdk-21\bin\java.exe" "-javaagent
Enter element to search :
1000000
Element not found
And time taken is 355ms

Process finished with exit code 0
```

Comparison between time taken:

File	File 1				File 2				File 3			
Element At	Start	Middle	End	Not Found	Start	Middle	End	Not Found	Start	Middle	End	Not Found
Time Taken (ms)	4	361	455	331	432	631	161	693	204	43	212	355