

Lab Task 3: Introducing Input/ Output operations in JAVA.

OBJECTIVES:

- i. To be familiar with Scanner class
- ii. To learn how to take input from user for different data types
- iii. To learn how to create objects after taking input from user

Problems:

1. Take an integer input from user and check whether the number is palindrome or not.
2. Take a string input from user and reverse it
3. Solve Lab Sheet#2 using Scanner class (take the object variables as input from user)

Learning Outcomes:

- i. Ability to take input from the user of various data types in Java.
- ii. Understanding of the Scanner class and its methods for reading user input.
- iii. Familiarity with type conversion and parsing techniques in Java.

Problem Analysis:

Taking input from the user of various data types in Java involves the following steps:

- i. Create an instance of the Scanner class to read input from the user.
- ii. Prompt the user for input by displaying a message or a question.
- iii. Use the appropriate method of the Scanner class to read the input based on the desired data type.
- iv. Store the user's input in a variable of the corresponding data type.
- v. Use the input data in your program as needed.

Background Theory:

Data Types: In Java, data types determine the kind of values that variables can hold. Common data types include int (for integers), double (for floating-point numbers), char (for characters), and String (for text).

Scanner Class: The Scanner class in Java provides methods to read input from various sources, such as the console or files. It offers methods like nextInt(), nextDouble(), nextLine(), etc., to read input of different data types.

Type Conversion: Java supports automatic type conversion for certain data types, such as converting an int to a double. However, explicit type conversion is required in some cases, especially when reading user input. This can be achieved using methods like Integer.parseInt(), Double.parseDouble(), etc., to convert strings to the desired data type.

Example of integer input:

```
package userinput;

import java.util.*;

public class UserInput {

    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);
        System.out.print(s:"Enter first number- ");
        int a = sc.nextInt();
        System.out.print(s:"Enter second number- ");
        int b = sc.nextInt();
        System.out.print(s:"Enter third number- ");
        int c = sc.nextInt();
        int d = a + b + c;
        System.out.println("Total= " + d);
    }
}
```

Figure 1: Taking integer input from user

```
Enter first number- 50
Enter second number- 60
Enter third number- 70
Total= 180
```

```
BUILD SUCCESS
```

```
Total time: 11.085 s
Finished at: 2023-05-25T14:41:40+06:00
```

Figure 2: Output

Example of String input:

```
package userInput;

import java.util.Scanner;

public class UserInput {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter your name: ");
        String name = scanner.nextLine();

        System.out.println("Welcome, " + name + "!");
    }
}
```

Figure 3: Taking String input from user

```
Enter your name: John
Welcome, John!
```

```
-----
BUILD SUCCESS
-----
```

```
Total time: 8.388 s
Finished at: 2023-06-02T11:35:02+06:00
-----
```

Figure 4: Output

Solution for Problem 1:

```
package palindrome;
import java.util.Scanner;
public class Palindrome {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);

        System.out.print("Enter a number: ");
        int number = input.nextInt();

        if (isPalindrome(number)) {
            System.out.println("The number is a palindrome.");
        } else {
            System.out.println("The number is not a palindrome.");
        }

        input.close();
    }

    public static boolean isPalindrome(int number) {
        int originalNumber = number;
        int reverseNumber = 0;

        while (number != 0) {
            int remainder = number % 10;
            reverseNumber = reverseNumber * 10 + remainder;
            number /= 10;
        }

        return originalNumber == reverseNumber;
    }
}
```

Figure 5: Code to Check whether a number is palindrome or not

```
Enter a number: 3443
The number is a palindrome.
```

```
BUILD SUCCESS
```

```
Total time: 14.056 s
Finished at: 2023-05-25T13:29:18+06:00
```

Figure 6: Output

Solution for problem 2:

```
package userInput;
import java.util.Scanner;
public class UserInput {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter a string: ");
        String input = scanner.nextLine();

        String reversed = reverseString(input);
        System.out.println("Reversed string: " + reversed);
    }

    public static String reverseString(String input) {
        StringBuilder reversed = new StringBuilder();
        for (int i = input.length() - 1; i >= 0; i--) {
            reversed.append(input.charAt(i));
        }
        return reversed.toString();
    }
}
```

Figure 7: Code to reverse String

```
Enter a string: Learning Java is fun
Reversed string: nuf si avaJ gninraeL
```

BUILD SUCCESS

Total time: 34.682 s
Finished at: 2023-06-02T11:54:06+06:00

Figure 8: Output

*****Solve Problem 3 on your Own*****

Practice Problems

1. Create a Book class with properties such as title, author, year (object variables) and genre (class variable). Implement a parameterized constructor to initialize 3 objects (Get the object variables as input from the user). Include an object method to display the book details and a class method to display the total number of books.
2. Create a Student class with properties such as id, name, department, cgpa (object variables) and university (class variable). Implement a parameterized constructor to initialize 3 objects (Get the object variables as input from the user). Include an object method to display the student details and a class method to display the total number of students.