

**King Saud University**  
**College of Computer & Information Science**  
**CSC111 – Lab03**  
**IO, Variables, Expressions**  
**All Sections**

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## Instructions

Web-CAT submission URL:

<http://10.131.240.28:8080/Web-CAT/WebObjects/Web-CAT.woa/wa/assignments/eclipse>

## Objectives:

- 1- Student should learn how to read a problem statement and analyze it as following:
  - a. Find out if program needs input, how many inputs it is going to accept and of what type.
  - b. Decide if variables are needed, how many variable and of what type.
  - c. Understand the computation operations that are needed to solve the problem and design a simple algorithm to solve it (i.e., if program needs to compute certain values using arithmetic expression).
  - d. Decide what is the program is going to output to the end user.
- 2- Student should learn how to define variable, and assign them values.
- 3- Students should learn how to write arithmetic expressions and use operators.
- 4- Students should learn about different numeric data types.

## Lab Exercise 1

Write a program that prompts the user to enter two points  $(x_1, y_1)$  and  $(x_2, y_2)$  and displays their distance between them. The formula for computing the distance is  $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ .

Note that you can use `Math.pow(a, 0.5)` to compute  $\sqrt{a}$ .

Here is a sample run:

```
Enter x1 and y1: 1.5 -3.4 ↵
Enter x2 and y2: 4 5 ↵
The distance between the two points is
8.764131445842194
```

## Solution

- 1- Create a new project in eclipse and name it **lab03**
- 2- Create a new class and name it **Distance**. Make sure you choose the public static void main option.
- 3- Write the program as following (you can ignore comments):

```
import java.util.Scanner;

public class Distance {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);

        // Enter the first point with two double values
        System.out.print("Enter x1 and y1: ");
        double x1 = input.nextDouble();
        double y1 = input.nextDouble();

        // Enter the second point with two double values
        System.out.print("Enter x2 and y2: ");
        double x2 = input.nextDouble();
        double y2 = input.nextDouble();
    }
}
```

```
// Compute the distance
double distance = Math.pow((x1 - x2) * (x1 - x2) +
    (y1 - y2) * (y1 - y2), 0.5);

System.out.println("The distance between the two points
is " + distance);
}
}
```

- 4- When you are done, save your program and run it. Make sure it prints the output as shown above.
- 5- Submit your program to WebCAT through eclipse to get familiar with WebCAT. Ask your TA for help.

## Lab Exercise 2

Write a program that reads an integer between 0 and 1000 and adds all the digits in the integer. For example, if an integer is 932, the sum of all its digits is 14.

Hint: Use the % operator to extract digits, and use the / operator to remove the extracted digit. For instance,  $932 \% 10 = 2$  and  $932 / 10 = 93$ .

Here is a sample run:

```
Enter an integer between 0 and 1000: 999 ←
The sum of all digits in 999 is 27
```

## Solution

- 1- Use the same project **lab03** that you created before
- 2- Create a new class and name it **SumDigits**. Make sure you choose the `public static void main` option.
- 3- Write the program as following (you can ignore comments):

```
// Summarize all digits in an integer < 1000
public class SumDigits {
    // Main method
    public static void main(String[] args) {
        java.util.Scanner input = new
java.util.Scanner(System.in);
        // Read a number
        System.out.print("Enter an integer between 0 and 1000:
");
        int number = input.nextInt();

        // Find all digits in number
        int lastDigit = number % 10;
        int remainingNumber = number / 10;
        int secondLastDigit = remainingNumber % 10;
        remainingNumber = remainingNumber / 10;
        int thirdLastDigit = remainingNumber % 10;

        // Obtain the sum of all digits
        int sum = lastDigit + secondLastDigit + thirdLastDigit;

        // Display results
        System.out.println("The sum of all digits in " + number
            + " is " + sum);
    }
}
```

- 6- When you are done, save your program and run it. Make sure it prints the output as shown above.
- 7- Submit your program to WebCAT through eclipse to get familiar with WebCAT. Ask your TA for help.

**Done...**