

**OBJECTIVE :** Methods, One Dimensional Arrays

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1. Write a method that calculates and returns  $n!$

Write a method that calculates and returns the result of the summation  $m + (m+2) + \dots + n$ .

Write a method for  $f$ . Use methods in (a) and (b) wherever necessary. Returns the result.

$$f(n) = \begin{cases} n^5 + |n|! & n \leq 0 \\ n! - 120 & 1 \leq n < 10 \\ 2 + 4 + \dots + n & n \geq 10 \text{..and..is..even} \\ 1 + 3 + \dots + n & n \geq 10 \text{..and..is..odd} \end{cases}$$

Write a main method that gets the value of  $n$  as input, calculates  $\sum_{i=-5}^n f(i)$  and displays the result of the calculation.

**Project Name:** LabGuide5\_1

**Example Run#1:**

Enter  $n$  ( $\geq -5$ ): 15

Result of the calculation: 404039

**Example Run#2:**

Enter  $n$  ( $\geq -5$ ): -6

Enter  $n$  ( $\geq -5$ ): -2

Result of the calculation: -4272

2. Write a method that takes the line number as a parameter and prints a number triangle and pattern filled out with asterisks (\*) to form a rectangle.

Write a main method that reads an integer number (1-9) until a **non-positive number** is entered and displays by using the method above.

**Project Name:** LabGuide5\_2

**Example Run:**

Enter a number (1-9 or non-positive to stop): 10

Enter a number (1-9 or non-positive to stop): 7

1\*\*\*\*\*

12\*\*\*\*\*

123\*\*\*\*\*

1234\*\*\*

12345\*\*

123456\*

1234567

Enter a number (1-9 or non-positive to stop): 14

Enter a number (1-9 or non-positive to stop): 4

1\*\*\*

12\*\*

123\*

1234

Enter a number (1-9 or non-positive to stop): 0

3. Write a Java program which initializes an array with the values 43, 91, 82, 456, 11, 10, 34, 76 and displays it on console.

Project Name: LabGuide5\_3

**Example Run:**

The array has the following numbers:  
43 91 82 456 11 10 34 76

4. A company sells 10 different items whose unit prices are 6.5, 4.15, 3.50, 2.30, 3.45, 4.80, 8.10 and 4.15, 3.10, 2.76. Write a Java program which inputs the quantity purchased of each of these ten items, and then outputs the total price to be paid. The unit prices of each item should be stored in an array.

**Example Run:**

Enter the quantity of item 1: 10  
Enter the quantity of item 2: 4  
Enter the quantity of item 3: 5  
Enter the quantity of item 4: 6  
Enter the quantity of item 5: 3  
Enter the quantity of item 6: 2  
Enter the quantity of item 7: 12  
Enter the quantity of item 8: 11  
Enter the quantity of item 9: 7  
Enter the quantity of item 10: 9

Total Cost is 322.2

Project Name: LabGuide5\_4

5.

Write a method that gets a **character array** and checks if the number of blanks between two words is more than one. The method copies all of the array content into a new array by **eliminating** the extra blanks and returns the new form of the array.

Write a program that gets a **sentence** with the maximum size of 100 characters from the user Then, it displays the sentence without extra blanks.

**Example Run:**

Enter a sentence: Authentication is the action of identifying your digital identity .Is  
New sentence is:  
Authentication is the action of identifying your digital identity .Is

Project Name: LabGuide5\_5

6.

a) Write a program that puts the following integer numbers into an array named **grades**: 89, 95, 72, 83, 99, 54, 86, 75, 92, 73, 79, 75, 82, 73, calculate the average of the numbers and use average to determine the deviation of each value from the average. Store each deviation in an array named **deviation**. Each deviation is obtained as the difference of a value and the average of all values.

**Example Run:**

Average is 80.50

DEVIATION ARRAY

8.50

14.50

8.50

2.50

18.50

26.50

5.50

5.50

11.50

7.50

1.50

5.50

1.50

7.50

Project Name: LabGuide5\_6A

b) Calculate the variation of data used in 4-a. The variation is obtained by using the following formula.  $x_i$  represents each individual deviation and **MAXITEM** represents the number of deviations.

$$\text{Variation} = \sqrt{\frac{\sum_{i=0}^{\text{MAXITEM}-1} x_i^2}{\text{MAXITEM}}}$$

**Example Run:**

The variation is 14.32

Project Name: LabGuide5\_6B