

Exercise 3 Control flow

Topics

- Arrays
- Conditions (*if*, *switch*)
- Loops (*for*, *while*, *do .. while*)

Exercise 3.1

Implement a program that reads from the keyboard the notes of a student's practical (gradeP) and theoretical (gradeT) component (both rounded to tenths) and prints the final grade, calculated as follows:

- 66 (disapproved by minimum grade), if he obtained less than 7.0 in at least one of the components;
- $0.4 * \text{gradeT} + 0.6 * \text{gradeP}$ (rounded to units), in other cases.

Note: Verify if the values entered by the user are valid [0..20].

Exercise 3.2

Write a program that prints a countdown (up to 0) from a positive value N, entered by the user using the keyboard.

Exercise 3.3

Write a program that reads a positive integer number from the keyboard and determines if it is a prime number. A natural number is a prime number when it has exactly two distinct natural divisors: the number 1 and itself. Note that you must validate the input value, and you should repeat the reading if the value is not valid (positive).

Exercise 3.4

Write a program that reads a set of real numbers on the keyboard, ending with a value equal to the first one entered. In the end, indicate the maximum value, the minimum value, the average, and the total number read.

Exercise 3.5

An investment fund provides a fixed monthly interest rate, which accumulates with the previous balance of the investment (interest on interest). Write a Java program that asks the user for the amount invested (positive and multiple of 1000) and the monthly interest rate (between 0% and 5%). Check that the values are valid and present the monthly value of the fund in the next 12 months, printing the value each month.

Exercise 3.6

Write a program that reads from the keyboard a date composed by month and year (validating them), calculates and writes on the monitor the number of days of that month. Note: don't forget the leap years.

Exercise 3.7

The *HighLow* game consists of trying to guess an (integer) number between 1 and 100. The program chooses a number at random. Then, the user enters an attempt and the program indicates whether it is too high, or too low. This is repeated until the user hits the number. The game should indicate how many attempts have been made and then ask: "Do you intend to continue? Press (Y)es ". The program ends if the answer is different from "Y" or "Yes".
Suggestion: to read a word use the next method: String answer = sc.next () ;.

Exercise 3.8

Change the program of Exercise 1 so that you can process all students (16 students) in a class. Create a two-dimensional array to store the theoretical and practical component grades for all students and fill it with random values (but valid, note that grades can vary from 0.0 to 20.0). Then you should process the grades and print the results in the following format:

NotaT	NotaP	Pauta
11.3	9.3	10
16.7	5.1	66
7.8	18.9	14
10.6	15.9	14
16.9	5.9	66
1.9	12.7	66
17.6	4.8	66
0.7	12.1	66
8.7	8.6	9
19.2	1.4	66
17.5	3.4	66
11.6	11.4	11
7.2	8.5	8
1.9	1.4	66
19.3	14.9	17
0	12.1	12