

## Sample tasks for midterm exam (06.12.2018)

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### 1. Simple programs: variables, console input / output, conditional branching

- a) Write a program that loads 3 real numbers from the keyboard and then displays them in the order of increasing values.
- b) Write a program that loads 4 real numbers and calculates the arithmetic average of the two numbers, remaining after the rejection of the two smallest values.
- c) Write a program that loads 4 integers and checks these data, if there are any repetitions (pairs, triples or fours).
- d) Write a program that loads 4 integers from the keyboard and check, how many pairs (two numbers with the same value) can be composed from them.
- e) Write a program that loads 4 characters from the keyboard and checks if the word "byte" can be arranged from them (by swapping positions) .
- f) Write a program that loads 4 characters from the keyboard and checks if more of them are letters or numbers.
- g) Write a program that loads 4 real numbers and calculates the arithmetic mean of the two selected numbers, which remains after rejecting the extreme values (rejecting maximum and minimum).

### 2. Loops and simple iterative algorithms

- a) Write a program that prints on the screen, the sequence of **N** successive numbers which are (at the same time) odd and divisible by **7** . The value **N** should be a parameter.
- b) Write a program that loads characters from the keyboard, until three consecutive characters with the same codes are given.  
At the end, the program should display a statistics info: whether more pressed keys were "letters" or "numbers".
- c) Write a program, that loads series of characters from the keyboard, until the word " **dad** " can be collected together.
- d) Write a program that checks numerically how many pairs of integers, from the interval [ **a**, **b** ], satisfy the formula:  $x^2 + y^2 \leq 50$ .  
Values of **a**, **b** should be read as a parameters.
- e) Write a program numerically calculating the sum of **N** elements, of the sequence:  $a_0 = 1$ ;  $a_1 = \sin(1)$ ;  $a_2 = \sin(2)$ ; ....;  $a_n = \sin(n)$
- f) Write a program that sums up the squares of all **even** numbers, from the interval [**A**, **B**]. The values **A** and **B** should be loaded from console.
- g) Write a program that displays on the screen, all possible 4-letter palindromes (words equally read from the front and from the back).

### 3. Arrays, iterative processing of larger amount of data, functions

- a) Write a function that checks, whether the array of **N** real numbers (given as a function parameter) has a symmetric content (i.e. whether the first element is equal to the last one, the second == the one before last, etc. )
- b) Write the function, receiving 100-element **Tab** array of integers as input parameter . The function should return the minimum value from positive elements of the given array **Tab** .
- c) Write a function that cyclically moves/shifts all content of the 50-element array "one place up" (ie the first element to the second position, element with the index "i" to the position with the index "i+1", and the last element to the first position in the table)
- d) Write a function that checks, how many repetitions occurs in a 200-element character table (given as an input parameter for this function).