ITTalents Training Camp Season 13

Test 1

Introduction to programming

Name:

Points on theory: _____ of 100 %

Points on practice tasks: _____ of 100 %

Time available to complete the test: 3 hours.

Minimum passing score: 50% on theory and 50% on practice tasks.

Theory

1: (25%) Describe all operations you can do with variables in Java. Describe arithmetic operators, logical operators and bitwise operators. Explain with examples.

2: (25%) What are functions? Why do use them? How to define and call a function? What happens when you call a function? What is IIFE (immediately invoked function expression)? How to pass function to another function? What is a Closure? What is the difference between function expression and function declaration?

3: (25%) What is the difference between stack and heap? How are the reference data types stored in memory? What is stack frame? What is variable scope? How we can define variables with different scopes? What is garbage collector?

4: (25%) What is an array? How are the arrays stored? How do you define a 2D array in JS? How do you access elements? Describe some built-in functions working with arrays. How to change the value of string variable?

Practice tasks

1: (25%) Write a program that reads five characters separated by space – each one – the strength of a card. Possible inputs are from **2..9** or **T, J, Q, K, A**. If the input is invalid the program must output the following: **"Invalid cards given!"**. The inputs are **infinite**. The program must stop when **4 consecutive packs with a pair** are dealt. A pack with a pair is a group of five cards where there is **at least one card that is dealt twice**. Finally, the program must print the number of tries.

Example (program output is in bold):

3 A T 4 Q

J A A T T

1 T Q K A

Invalid cards given!

A J Q K A

4 8 T K K

4 4 T Q Q

2 Q 7 T A

2 2 7 6 T

A 4 7 A 9

2 Q 7 Q K

4 7 8 4 A
Number of tries: 10

2: (25%) Write a function that takes a **String** variable that holds some text. The method must output the sentence with the longest word, the longest sentence and the number of sentences. It`s given that each sentence ends with a dot and each word is separated with a space.

Example:

Today is a good day for test. The sun is shining. The students are happy. The birds are blue.

Output:

Total sentences: 4
Longest sentence: Today is a good day for test.
Sentence with the longest word: The students are happy.

3: (25%) Write a method that by given array of integers checks if the average value of the array is positive or negative. The method should return either "Positive", "Non-positive" as a result (zero is non-positive). Use recursion!

4: (25%) Write a method that by given map of a parking lot and the coordinates of the entrance of the parking lot, finds the smallest amount of steps you need to park your car. You can drive on squares marked with ' ' (space). A free parking spot is marked with '**F**'. Spots that are already taken are marked with '**T**'. You cannot pass through taken parking spots. The method must return an integer value equal to the smallest amount of moves that are needed to park the car or **-1** if there are no available parking spots that you can reach from the entrance.