Tasks of the second stage of the Logia18 contest

- the subject IT competition
for junior high school students of the Mazowieckie Voivodeship
January 11, 2018

Task 1 (swirls).

The Polybius board is a square table containing letters of the alphabet Latin. Columns number from 0 to 4, and lines from 1 to 5. We encode word, replacing each letter with the sum of the row numbers and columns in which standing. For example, the letter `s` will be replaced by the number `6` .

Write a single parameter procedure / function `encode` , which parameter is a word consisting of at least 2 and at most 18 lowercase letters of the alphabet Latin. After it is called, a drawing is created in the center of the screen coded word. Each letter of the word is replaced by a number, according to the rule above, and then draw a step swirl such as a number corresponding to the coded letter. The first episode is horizontal line. Each subsequent episode of zawijasa is 4 shorter than the previous one. Distances between consecutive turns are equal to 1/5 of the longest one section. The drawing's width is 780.

calling effect: in Python - `encode ("fghjastuz")` , in Logo - `code "fghjastuz`

Task 2 (neon signs).

In Turtland, they prepare a neon for hanging on two pillars. Poles stand in a row, distance between two adjacent ones is 2. The marketing department makes the choice of columns dependent on the defined rating as the sum of their heights and distances between them.

Write a one-parameter `neon` function , which results in the highest possible rating. Parameter is a list of heights of subsequent columns (it has at least 2 elements, at most 500). Height of each the pole is from 1 to 10,000.

Examples:

in Python - the result of `neon ([10, 4, 5, 7, 1, 4, 1])` is `24` (because the highest score will be obtained with choosing the first and penultimate column, 24 = 10 + 4 + 5 · 2), the result of `neon ([1, 10, 1])` is `13` (13 = 1 + 10 + 1 · 2, also 13 = 10 + 1 + 1 · 2),

in Logo - the result of `neon [10 4 5 7 1 4 1]` is `24` (because the highest rating will be obtained when choosing the first and the last but one column, 24 = 10 + 4 + 5 · 2), the result of `neon [1 10 1]` is `13` (13 = 1 + 10 + 1 · 2, also 13 = 10 + 1 + 1 · 2).

Task 3 (candies).

Adam has a paper bag. He throws in candies and then treats friends with them. candy

they are thrown in and taken out individually. He does so many times: he throws in and he treats. Adam wonders how much times in the purse there were exactly `n` the candies.

Write a two-parameter function of an `aase` , whose first parameter is `n` (from 1 to 10,000). The second parameter of the function is an even length list of positive integers, containing alternately the number of thrown and removed candy. For example, a list with 4, 1, 3 and 2 means that in turn four candies were dropped into the bag, one removed, three put in and two removed. Length list is from 2 to 1 000. The result of the function is a number that determines how many times the purse was exactly `n` candies.

Examples:

in Python - the result of an `ilerase (2, [3, 2])` is `2` (the number of candies in the purse is 0, 1, 2, 3, 2, 1), the result of the `ileroase (4, [5, 3, 5, 3, 2, 1])` is `4` (the number of candies in the bag is in succession 0, 1, 2, 3, 4, 5, 4, 3, 2, 3, 4, 5, 6, 7, 6, 5, 4, 5, 6, 5),

in Logo - the result of `2 (2)` is `2` (the number of candies in the bag is 0, 1, 2, 3, 2, 1), the result `ilerazy 4 [5 3 5 3 2 1]` is `4` (the number of candies in the purse is in succession 0, 1, 2, 3, 4, 5, 4, 3, 2, 3, 4, 5, 6, 7, 6, 5 , 4, 5, 6, 5).