# Task 1

We consider three integer variables x, y and z.

We define the circular permutation between x, y and z as the operation which gives x the value of y, at y the value of z and at z the value of x.

Write an algorithm allowing circular permutation between x, y and z. The algorithm should read the 3 values then display them after permutations.

Example: if x = 3 y = -1 and z = 7, we will have after permutations: x = -1, y = 7 and z = 3.

# Task 2

A car rental organization offers two rental formulas:

1. Rental by the kilometer:
    a. for the first 100 kilometers: rate r1 per km,
    b. for the kilometers from 101 to 1000: rate r2 per km,
    c. beyond 1000 kilometers: rate r3 per km.
2. Daily rate: Unlimited mileage at the price per day p_d.

In both cases, it is necessary to add an insurance (whose cost per day is ins) and the value-added tax (VAT) .

The quantities r1, r2, r3, p_d, ins as well as the rate of VAT are considered as constants.

Take, for example: r1 = 0.7 r2 = 0.4 r3 = 0.2 p_d = 100 ins= 0.3 (expressed in dinars) and rate VAT = 0.18.

Write an algorithm which, given the total number of kilometers and the number of days of location, calculates the total costs of the two tariffs and indicates by a label the most suitable solution advantageous for the client.

# Task 3

A date is given as an integer of 6 digits. For example, the number 181019 represents October 18, 2019.

Develop an algorithm that has such a number as input, checks that this number corresponds to a valid date and displays the following result:

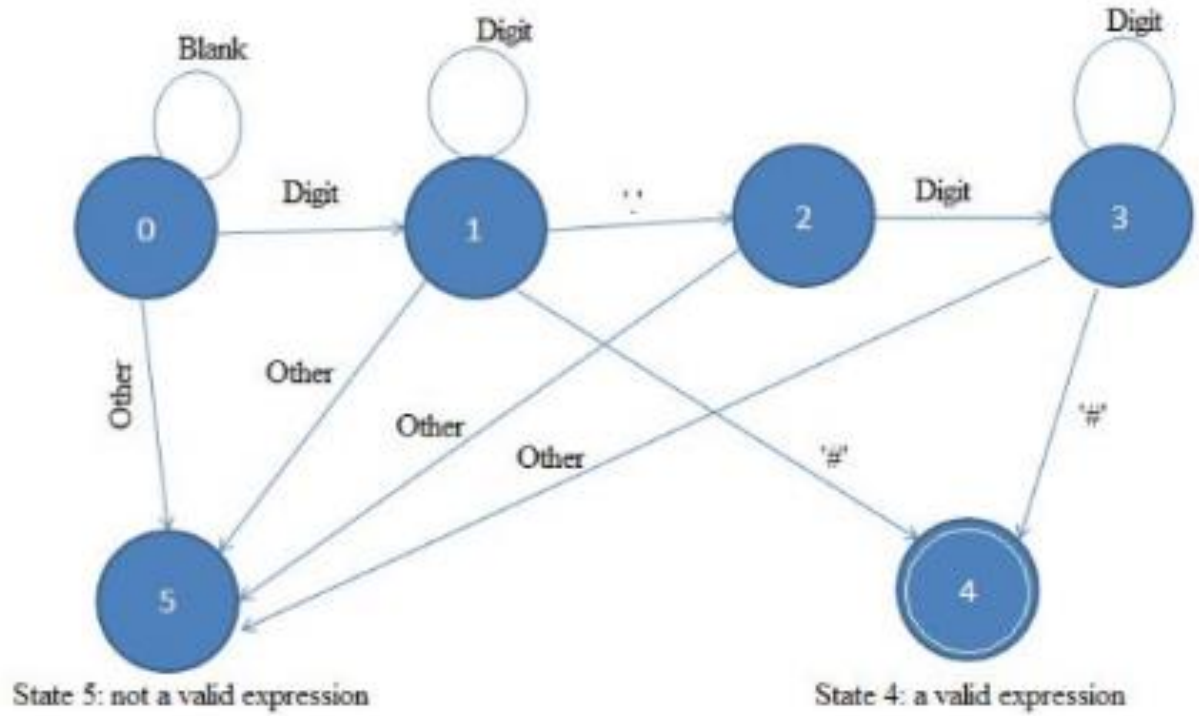
Day: 18

Month: October

Year: 2019

# Task 4

**The automaton of the figure below makes it possible to check whether a sequence of characters corresponds to a float or not.**



# Task 4

You are asked to:

1. Write this algorithm.
2. The automaton does not allow to validate a float expression which ends with a series of blanks. Propose a modification on the automaton which allows it to be able to validate a float expression which ends in a series of blanks. Then specify the instructions to add to the algorithm.
3. We want our algorithm to inform us in the case of the validity of the expression on the value of the integer part and the value of the decimal part. Write the new version.

To understand more the problem : https://www.youtube.com/watch?v=jAUQfvAkHrA

# Task 5

We propose to check the validity of an arithmetic expression containing numerical values, arithmetic operations and possibly opening parentheses '(' and closing parentheses ')'.

Such an expression is said to be valid if:

- Any character of this expression is: either a number, or an operator ('+', '-', '*', '/'), or an opening parenthesis '(' or a closing parenthesis ')'.

- The parentheses of this expression are consistent, that is to say that to an opening parenthesis '(' necessarily corresponds to a closing parenthesis ')' which is later.

Write an algorithm that decides the validity of an expression read character by character and ending with '#'.

A valid expression : 5+(6*9)#

An invalid expression : 6+(8+(9)#