1. BASICS OF SOFTWARE CODE DEVELOPMENT

To strengthen your skills on this topic, solve the following tasks.

LINEAR PROGRAMS

1. Find the value of the function: z = ((a - 3) * b / 2) + c

2. Calculate an expression according to the formula:

$$\frac{b+\sqrt{b^2+4ac}}{2a} - a^3c + b^{-2}$$

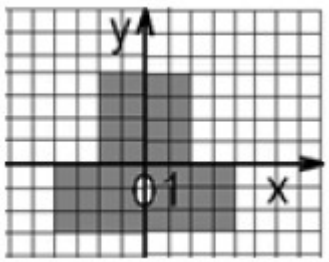
3. Calculate the value of the expression using the formula (all variables are valid)

$$\frac{\sin x + \cos y}{\cos x - \sin y} * tg\ xy$$

4. Real number R has the form nnn.ddd (three digits in fractional and integer parts). Swap the fractional and integer parts of the number and print it.

5. Enter a natural number T, which represents time in seconds. Print the given duration value in hours, minutes and seconds in the following form: HHh MMmin SSs.

6.For a given area compose a linear program that prints "true" if the point with coordinates (x, y) belongs to the filled area, and "false" otherwise.



BRANCHING

1. Find out, if with a given two angles of the triangle (in degrees) can such a triangle exists, and if so, whether it will be rectangular.

2. Find max{min(a, b), min(c, d)}.

3. Find out if three points A (x1, y1), B (x2, y2) and C (x3, y3) fall in a straight line.

4. Enter the dimensions A, B of the rectangular hole and the dimensions x, y, z of the brick. Find out if the brick can fit through the rectangular hole.

5. Find the value of the function:

$$F(x) = \begin{cases} x^2 - 3x + 9, & \text{если } x \le 3; \\ \dfrac{1}{x^3 + 6}, & \text{если } x > 3. \end{cases}$$

LOOPS

1. Write a program where a user can enter any positive integer.
The program should add up all numbers from 1 to the number entered by the user.

2. Find the values of the function on the segment [a, b] with step h:

$$y = \begin{cases} x, x > 2 \\ -x, x \le 2 \end{cases}$$

3. Find the sum of the squares of the first 100 natural numbers

4. Write a program for finding the product of the squares of the first two hundred numbers.

5. In a given series of numbers find the sum of series' elements, whose modulus is greater than or equal to a given e. The series of numbers is: an = 1 / (2 ^ n + 3 ^ n)

$$a_n = \frac{1}{2^n} + \frac{1}{3^n}$$

6. Display the correspondences between symbols and their numerical designations in the computer memory. (Converting between characters and numeric (ASCII) values).

7. For each natural number in the range from m to n, show all divisors except 1 and the number itself. m and n are entered from the keyboard.

8. Find the common character included in the two given numbers.