

EXERCISES LESSON 0x01



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SWOOP1
LESSON 0x01



OPGAVE 0

Implement a program taking two integers as input

And that writes to output:

if

The first is greater than the second (if that is the case!)

else if

The second is greater than the first (if that is the case!)

else

The numbers are equal

The program should additionally write the sum and the product of the numbers to output

OPGAVE 1

Implement a program that prompts the user to input an integer, and subsequently determines the numbers sign and parity(even or odd). The program should present the following output:

- "The number is positive and even."
- "The number is positive and odd."
- "The number is negative and even."
- "The number is negative and odd."
- "The number is zero."

Depending on the number of course

Hints:

Nested if statement can be used here.

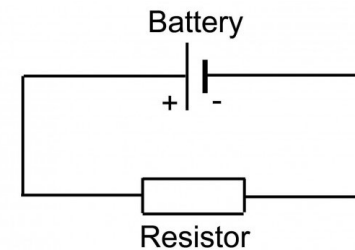
To test an integer for parity, use the **modulus** operator %, which gives the rest in division. That is $7\%3=1$ because the rest is 1 $23\%3=2$ because the rest 2. In this way

$x\%2==0$ if x is even og $x\%2!=0$ if x is odd

OPGAVE 2

Implement a program that asks the user to input current(milliAmpere) and resistance(Ohm)

Assume that we are concerned with the simple circuit



Write the voltage over the resistor in Volts and the dissipated effect in Watts to the output

Beware of units!

Formulas: $U=RI$, $P=UI$

OPGAVE 3

Implement a program where the user inputs two 3d vectors (x_1, x_2, x_3) (y_1, y_2, y_3)
And the result an output to the user of the distance between the two vectors

Distance is defined as:

The max value of the three values: $\{|y_1 - x_1|, |y_2 - x_2|, |y_3 - x_3|\}$,

That is the maximal numerical coordinate distance

Try the same by defining distance to be the usual distance between two vectors.

OPGAVE 4

Implement a program that solves two linear equations with two unknowns **IF** there exists a unique solution.

$$a_{11}x + a_{12}y = c_1$$

$$a_{21}x + a_{22}y = c_2$$

First the program writes: **"input the matrix values in order a_{11} a_{12} a_{21} a_{22} "**

Read these values into the program.

Write immediately to the user whether a unique solution exists.

IF NOT terminate the program

ELSE

Prompt the user with: **"input the values c_1 c_2 "**

Read these values from the input

Present the solution to the user.

Formulate a piece of pseudocode before implementing See hints on next page->

OPGAVE 4 HINTS

Hint: $\det \neq 0$ guarantees unique solution. $\det = a_{11} a_{22} - a_{21} a_{12}$

The solution if exists and is unique:

$$x = (1/\det)(a_{22} * c_1 - a_{12} * c_2)$$

$$y = (1/\det)(-a_{21} * c_1 + a_{11} * c_2)$$

Example of two equations that have a solution:

- $2x + 3y = 7$
- $x - y = 1$
- Take a look on the graph and see what the solution is.
Verify that your program finds the same solution

