Program "hello world!"
Write a the program "hello world!". Your program has to print the text "hello world!" to the screen.

Program "line"
Write a program that has the following screen output:
```
line1 line2 line3 last line
```
The second step is to change the program that each "line" is written in a separate line on the screen.
The third step is to realize this program with only one printf statement.

Program "interest"
Write a program that shows the charges of interests on you account. In the ledger is a base capital of 1.000 EUR available and the interest rate is 3.4%. Your program should show the following table

```
interest table for a base capital of  EUR
the following table shows the capital at year-end:

year:  1          capital: 1034.00 EUR
year:  2          capital: 1069.16 EUR
year:  3          capital: 1105.51 EUR
year:  4          capital: 1143.09 EUR
year:  5          capital: 1181.96 EUR
year:  6          capital: 1222.15 EUR
year:  7          capital: 1263.70 EUR
year:  8          capital: 1306.67 EUR
year:  9          capital: 1351.09 EUR
year: 10          capital: 1397.03 EUR

you can achieve 1397.03 EUR out of you base capital of 1000.00 EUR
with an interest rate of 3.4% per year in 10 years
```


Program "algorithm of Euklid"
Write the program "algorithm of Euklid" which was part of one of the previous lessons. Make the program most flexible and implement an iteration that asks the users of the input and calculates values multiple times. Try to look for a condition to terminate the program normally.

Program "limits"
Look for a file named limits.h on your system. This is part of the development environment which you have installed on your system (last lesson). Remember the table which shows the range of the number types. Use the content of limits.h as much as possible to create such a table.

Program "ascii conversion"
You know that all ascii characters are represented by numbers inside. Write a program that asks the users for an input (number or character) and brings the appropriate number of character on the screen.

Program "small multiplication table"

You know the small format of the multiplication table? Yes, oh great! Write a program that prints the small format of the multiplication table on the screen. An output could look like this:

```
        ******  The small multiplication table  ******
           1    2    3    4    5    6    7    8    9   10
        ---------------------------------------------------
   1  |    1    2    3    4    5    6    7    8    9   10
   2  |    2    4    6    8   10   12   14   16   18   20
       ...      ...      ...
   9  |    9   18   27   36   45   54   63   72   81   90
  10  |   10   20   30   40   50   60   70   80   90  100
```

Program "factorial"

In mathematics the factorial is a very good example for a programming exercise. Write a program that asks the user for an input and calculates the factorial.

The first step is to use multiple functions like `input()`, `calculation()` and `output()`. In the first approach do the program with iterations.

The second step is to try to realize this recursively. You can use the functions from the first approach if they fit.

Program "resistance"

You know from physics and electronics the resistor. If we have multiple resistors in combination the value of the resistor is different. You can calculate the result of two resistors which are parallel with the following formula:

$$1/R = 1/R_1 + 1/R_2 \quad \text{or} \quad R = (R_1 * R_2) / (R_1 + R_2)$$

Write a program that asks the users for the values of resistor 1 and resistor 2 and calculates the value of the resistor that can be used instead of the two. Use sub-functions if you need.

Program "Easter"

Easter is one of the moveable feasts. The exact date of Easter can be calculated. It is something that has been agreed on the council of Nicaea (325 AD). They agreed the following:

> "Easter Sunday is the first Sunday that follows
> after the first full moon after beginning of spring."

That mean Easter is always between March 22nd and April 25th. Gauss has created a rule-set to determine the Easter date (this does not work for the years 1954 and 1981). The rule-set is the following:

```
Divide the date (year) by 19 and you will get the remain A,
divide the date (year) by 4 and you will get the remain B,
divide the date (year) by 7 and you will get the remain C,
divide (19 * A + 24) / 30 and you will get the remain D,
divide (2 * B + 4 * C + 6 * D + 5) / 7 and you will get the remain E.
Easter Sunday is now (D + E) days after March 22nd.
```

Your program should tell the user the information about Easter Sunday like this:

```
1900 is Easter Sunday on April 15th.
1901 is Easter Sunday on April 7th.
…
```