

# INTRODUCTION TO COMPUTER SCIENCE

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## First programs, iostream, variables

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### Preparing the environment:

Before you write your first code, you have to prepare a development environment. To do so:

1. Download the appropriate IDE (Integrated Development Environment), e.g. **Clion**. To get the free educational license, register using the link below <https://www.jetbrains.com/community/education/#students> and create the JetBrains account using your student's ekul email address.

Alternatively, you can download the IDE Code::Blocks or Dev-C++.

2. Download and install C++ Compiler, e.g. **MinGW** (link to the official site: <http://mingw-w64.org/doku.php/download/mingw-builds> )  
Configuration guide on CLion: <https://www.jetbrains.com/help/clion/quick-tutorial-on-configuring-clion-on-windows.html>

### Output Stream:

**Exercise 1.** Write a program that prints: `My first program in C++`.

**Exercise 2.** Write a program that prints on the screen the following information about you and the university: name, surname, field of study, semester, subject, university address.

**Exercise 3.** Write a program that prints the lyric of your favourite song.

### Variables, Input Stream:

**Exercise 4.** Write a program which enters an integer from user and then displays it on the screen.

**Exercise 5.** Write a program which inputs two integers  $a$ ,  $b$  from user and then displays their difference  $a - b$  and  $b - a$ .

**Exercise 6.** Write a program which inputs the user name and year of birth and displays these values and his age.

**Exercise 7.** Write a program which inputs two numbers and displays their sum and product.

**Exercise 8.** Write a program which calculates and prints the area of a rectangle.

**Exercise 9.** Write a program which converts Euro to Polish Zloty ( $1 \text{ Euro} = 4,24 \text{ Polish Zloty}$ ). It enters the amount of Polish Zloty and displays the converted value of Euro.

**Exercise 10.** Write a program that converts millimeters to centimeters and meters. The program is supposed to input one number (millimeters) and then it prints the converted value of centimeters and metres.

**Exercise 11.** Write a program that converts inches to centimeters. The program is supposed to input one number (inches) and then it prints the converted value of centimeters ( $1 \text{ inch} = 2.54 \text{ centimeters}$ ).

**Exercise 12.** Write a program that calculates and prints the Body Mass Index (BMI) according to the values given by user. The BMI is defined as the body mass (weight) divided by the square of the body height and is expressed in units of  $\text{kg}/\text{m}^2$ , resulting from the weight in kilograms and height in meters. The formula is:

$$BMI = \frac{\text{weight}}{\text{height}^2}$$

**Exercise 13.** Write a program that asks the user to type 2 integers X and Y and exchanges the value of X and Y.

**Exercise 14.** Write a program that asks the user to type 4 integers and prints their average.

**Exercise 15.** Write a program that asks the user to type an integer and then prints the next 5 numbers.

The example of the output:

```
Type an integer:
10
The next 5 numbers are: 11 12 13 14 15
```

**Exercise 16.** Write a program that asks the user to type the coordinates of two points, A and B (in a plane), and then prints the distance between A and B.

Help:

<https://www.mathsisfun.com/algebra/distance-2-points.html>

<https://www.programiz.com/cpp-programming/library-function/cmath/sqrt>

**Exercise 17.** Write a program that asks the user to type the price without tax of one kilogram of apples, then the number of kilograms you want to buy and the tax in percent units. The program prints the total price including taxes.

The example of the output:

```
Type the price of 1 kg of apples without taxes: 2.99
How much apples do you want to buy (in kilogram): 0.5
What is the tax in percent: 7
The total price = 1.59965
```