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# Introduction to Mathematical Software Exercise 1



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## Advice

Visit the [course website](#) at least once a week to stay up-to-date with recent announcements.

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## Problem 1 Getting Started

Check that your computer is operational. Log in to the account that is provided. If you experience difficulties, ask your tutors for help. Start a browser and check if the internet connection is working by opening a search engine (e.g. <http://www.google.com>). If it is not working, you have to set the proxy in your browser preferences to `proxy.mathematik.tu-darmstadt.de` with Port 80 for every protocol. Your internet connection should work now. You will need it in order to solve future exercises.

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## Problem 2 First Contact with Maple

Start Maple. One way to do this is to open a terminal window and type `xmaple`. The command `maple` would just start a command-line version of Maple.

Take the *Ten Minute Tour* by clicking `Help` → `Take a Tour of Maple` → `Ten Minute Tour`. Also have a look at our topic *Numeric and Symbolic Computations*.

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## Problem 3 Basic Maple Usage

Let Maple calculate the following expressions:

$$\frac{7}{9} + \frac{5}{\frac{4}{13}}$$

$$\sqrt{3} \cdot \sin\left(\frac{2}{3} \cdot \pi\right)$$

$$\int_0^{\pi} \frac{x^{\frac{5}{2}}}{x^2 + 1} dx$$

$$\frac{d}{dt} \operatorname{arccosh}(t)$$

$$e^{\ln(42)}$$

$$0^0$$

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## Problem 4 Prime Numbers

Find out which of the following numbers are prime numbers:

- a) 11111111111111111111
- b) 11111111111111111111
- c) 4776913109852041418248056622882488319
- d) 56713727820156410577229101238628035243
- e) 317810483173934359805482319433298719761

**Problem 5 Fibonacci Numbers**

The fibonacci series is defined as follows:

$$\text{fib}(0) = 0$$

$$\text{fib}(1) = 1$$

$$\text{fib}(n + 1) = \text{fib}(n - 1) + \text{fib}(n)$$

We would like to know whether  $\text{fib}(n)$  might be expressible as

$$\text{fib}(n) = \frac{1}{\sqrt{5}} \cdot \left( \left( \frac{1 + \sqrt{5}}{2} \right)^n - \left( \frac{1 - \sqrt{5}}{2} \right)^n \right).$$

We would like to get some information fast and without lots of handwork. How can we start working at the exercise? How can Maple help us?