Albert-Ludwigs-Universität Freiburg
Institut für Informatik
Lecture: Introduction to Mobile Robotics
Summer term 2010
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Sheet 1

Topic: Setup

Submission deadline: April 27, 2010

Submit to:

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General Notice

To be admitted to the final exam, every student has to

- attend at least 7 of the exercise sessions in person,
- present at least two of the solutions in class.

The exercises should be solved in groups of two students. In general, assignments will be handed out on Wednesday and have to be submitted the following Tuesday before class. Submit programming exercises via email.

We will be using Octave for the programming exercises. Octave is a command line program for solving numerical computations. Octave is mostly compatible with MATLAB and is freely available from www.octave.org. It is available for Linux, Mac OS, and Windows. Install Octave on your system in order to solve the programming assignments.

Exercise 1: Defining functions

Functions in Octave are usually defined in files where they can be easily edited. Implement the function

$$f(x) = x^2$$

in a file named `f.m`. Next, launch Octave from the same folder in which you stored the function and use the newly defined function.

Whenever you define a new function it has to be placed in a file with the same name as the function you defined. This is required because otherwise Octave is not able to find the newly defined function.

Exercise 2: Plotting data

Like functions, entire Octave programs or scripts are usually placed in files and later evaluated.

a) Write an Octave script that plots the graph of the function f in the interval $[-10, 10]$. Save the script to a file named `plot_f.m`.

b) Save the resulting plot as a PNG-file to your hard disk.

Exercise 3: Generating random numbers

Random numbers are important in probabilistic robotics so it is preferable to know what kind of random variables are provided by Octave and how to use them.

a) Create a vector with 100000 random variables which are normally distributed with a mean of 5.0 and a standard deviation of 2.0.

b) Create a vector with 100000 uniformly distributed random variables between 0 and 10.

c) Compute the mean and standard deviation of the two vectors with random variables. Are the results what you would expect?

d) Plot histograms of the random variables you generated. The `hist` command can be used to plot histograms. Take a look at `help hist` for more information about how to use it.