

# Lab 1: Variables and functions

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Please don't worry if you encounter problems when first attempting to complete the exercises. This module draws on teamwork, and we will always discuss and solve your problems in class. Please make sure that you report any problem you may encounter during our next meeting or on Matrix.

## Part A: Using libraries

1. Go to the [math library documentation](#) and experiment with some of the mathematical functions. Note that you need to use the command "import math" before these functions become available.
2. Go to the [random library documentation](#) and import the random library in Python.
3. Experiment with the following functions: random(), uniform(), randint(), gauss().

## Part B: Writing functions

All the following questions will ask you to write a function. Make sure each function and each variable has an easily interpretable name, that makes it very intuitive what the function does.

Every time you write a new function - throughout the course - you should also immediately write a number of tests for the function. Think about some examples where you know or can guess what the outcome should be, and write Python code to see if that outcome indeed occurs.

1. Write a function dice() that returns the result of a normal dice throw (i.e. one with six sides).
2. Write a function that has as input parameter "guess" a guessed dice value, then throws a dice, and returns the difference between the thrown value and the guessed value.
3. Change the above function to guess the sum of three throws instead.

## Part C: Utilities for the main simulation

1. Write a function that takes the parameters x1 and x2 and returns the absolute difference between the two. Note the faps() function provided in the math library in Python.
2. Write a function that takes the parameters m, x1, and x2 and returns mu as in Equation 2 in the Chen and Lan (2021) paper. Note that the tanh() function is provided in the math library in Python.