Institut für Informatik — TUM
Scientific **C**omputing in **C**omputer **S**cience
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Tutorial (Advanced Programming) Worksheet 2:

Assignment 1: Simple Calculator

We want to implement the functionality of a very simple calculator. Create a file called *simpleCalculator.c* and provide functions for the 4 basic arithmetic operations for the floating point type *double*:

- $sum(a, b)$, which returns $a + b$;
- $subtract(a, b)$, which returns $a - b$;
- $multiply(a, b)$, which returns $a * b$;
- $divide(a, b)$, which checks if b is non-zero and returns a/b;

Implement another function, *mean*, calculating the mean value of two specified doubles. All functions are to return their results as doubles.

Next, write a main function in which the user is prompted to give 2 values and specify an operation $(+, -, /, *, m)$. Print the result and finish the run. Use your experience from the last worksheet with reading and printing text and variables from resp. to the terminal via streams `cin` and `cout`.

NOTE: Use *if*-statements to interpret the different operations entered from the terminal.

Homework Assignment 2: A More Sophisticated Calculator

Extend your simple calculator from the previous assignment with functions to support the trigonometric operations $(sin(\pi x), cos(\pi x), tan(\pi x))$. Apply the necessary changes to the main function!

NOTE 1: For this assignment, use *switch-case* to catch the different operations.

NOTE 2: Change the order in which the user enters the values and operations (trigonometric functions only need 1 input variable).

Homework Assignment 3 (advanced): Base Convertion

Write a function to convert a given integer from the decimal system to another base and print the result. You can do so by extending the calculator with an operation $base(a, b)$, where b is the target base. Instead of returning a value, just print the numbers directly to the terminal.

NOTE 1: Integer division returns *truncated* integers, which is useful here. Be also aware of the *modulo* operator %.

NOTE 2: Feel free to experiment with other features, like converting doubles instead of integers.

Questions:

Answer the following questions:

- Which library files do you need to include in *simpleCalculator.c*? (think of the trigonometric functions and the streams)
- What is the difference between an *if*-statement and *switch-case*?
- What would you have to do if you wanted to implement the main function in another file?