

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.cpp* and provide a class *SimpleCalculator* with methods 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 method, *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 specify an operation (+, −, /, *, *m*) and to give 2 values. 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.

Assignment 2: A More Sophisticated Calculator

Extend your simple calculator from the previous assignment with methods to support the trigonometric operations (*sin*(πx), *cos*(πx), *tan*(πx)). Apply the necessary changes to the main function!

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

Homework Assignment 3 (advanced): Base Conversion

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, e.g. converting doubles instead of integers.

Questions:

- Which library files do you need to include in *simpleCalculator.cpp*?
- 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?