Advanced Programming in C++
Winter Semester 2023

HOMEWORK 3: Templates, Headers, and Libraries

1. Write a simple calculator code performing the four basic arithmetic operations in C++ using a **class template**. The template of the class should consist of two variables whose values are passed at the time of object creation. The constructor of this class takes two arguments of generic datatypes. Further, this Calculator class template should consist of five main functions – show(), addition(), subtraction(), multiplication(), and division().

2. Create generic class Stack<> by using templates and implement generic methods to push/pop elements from the stack and to find the sum, the maximal element and the number of elements in the Stack (Not for string type!)

3. Create a console-based application that takes **positive** binary numbers of no more than 16 digits as an input from the user. Read this value in as **an int/long int** type value (**you can use templates**). The first function of your program will be to make sure that the user indeed entered a binary number (only 1's and 0's). If it isn't, then the user is prompted again. If it is binary, then your program should calculate the equivalent decimal value (base 10 -- the number system we commonly use). **You have to use headers and libraries for this assignment!**