Assignment 4

Programming III in C++

Computer Science

In mathematics, vectors are an often used structure. In this exercise, we will implement a class *vector*. Our vector class should be able to process data of type double.

Develop a class *vector* with at least the following properties and methods:

- Private attribute: vector dimension.
- Private data storage of the numerical values in a dynamically allocated array.
- A constructor with two optional parameters:
  - The first one indicates the vector dimension. If the parameter is not specified, a vector of size 2 shall be created.
  - The second parameter can be used to specify a value for initializing all vector elements. If the second parameter is omitted, all values shall be initialized to 0.
- Destructor (if required). Justify your decision.
- Copy constructor (if needed). Justify your decision.
- Set / get methods for setting and reading values at the specified index.
- The [] operator is to be overloaded in such a way that reading and writing access to individual vector elements is made possible by index. An area check should be made for the index. If the index is within the valid range, the corresponding vector element is returned, otherwise an error is to be generated indicating which index was attempted to access.
- The assignment operator shall make a deep copy. If the dimensions of the vectors are different, the dimension shall be aligned.
- With the << operator, a vector shall be represented in the form: (2.71, 3.14, 9.81).