

Write specification (matrix.h) and implementation(matrix.cpp) for the class ***Matrix***, matrix of integers. The numbers of rows and columns are provided by the user of the class. In addition, define an exception type, ***MatrixException*** which is the inner class of ***Matrix***. Provide the following operations:

- Use () operator to refer to an element. For instance, $m(i,j)$ refers to the element which locates in i^{th} row and j^{th} column of matrix m . If i or j is out of range, a ***MatrixException*** is thrown.

- Use << operator to output a matrix.

Format:

1st row, then a newline, 2nd row, then another newline, ...

Insert a space between two elements within a line.

- Get the number of rows and get the number of columns (constant member functions).
- Use + operator to add two matrixes. A ***MatrixException*** is thrown when two matrixes have different shapes(i.e. the number of rows and that of columns).
- Other necessary functions, such as constructors, destructor, copy constructors and assignment operators with COPY and MOVE semantics.

IMPORTANT NOTE:

When choosing data representation, you cannot use standard containers. Use low-level array in free store.