CSCI-101 Programming 2

Lab 5, Part b

INSTRUCTIONS

Inside the **lab5** directory create the following files, compile, and test.

1. Create a generic class named Matrix<E> that satisfies the following properties.

    1. The class has a constructor that takes two integers (rows and cols) as arguments and initializes a 2D array of Objects having dimensions equal to the values in the parameters. The constructor should throw an IllegalArgumentException if the values in the parameters are not positive.

    2. The class has a method named add that adds a new element to the matrix. The add method should fill each row before moving on to the next row. If there is no room to store the element the method should throw an ArrayStoreException.

    3. The class has a method named peek that has two integer parameters (row and col). The method returns the element at the row and col specified in the parameters. The method should throw a IndexOutOfBoundsException if the values in the parameters are outside the dimensions of the matrix.

    4. The class should have a method named getNumberOfRows which returns the number of rows in the matrix.

    5. The class should have a method named getNumberOfColumns which returns the number of columns in the matrix.

    6. The class should implement the Iterable interface. The iteratator should return the elements in the reverse order in which they were added, skipping over null elements.

2. Create a file named matrix.txt that contains the following data.

    ```
    4
    4
    1,2,6,7
    3,5,8,13
    4, 9,12,14
    10,11,15,16
    ```

3. Create a class named MatrixTest. In the class read the data from matrix.txt and store it in an instance of the Matrix class. Use the iterator to print to the screen the values in the matrix.