SfwrEng/CompSci 2S03 Fall 2015
Homework 2

You are to develop a Java program that implements a set of linear algebra operations. The program should get as input the following in order:

- N: the number of matrices (say $M_1, M_2, \ldots, M_N$)

- m_1, n_1: the size of the first matrix

- m_2, n_2: the size of the second matrix

- ...

- m_N, n_N: the size of the last matrix

- $m_1 \times n_1$ integer elements for the first matrix row by row

- $m_2 \times n_2$ integer elements for the second matrix row by row

- ...

- $m_N \times n_N$ elements for the Nth matrix row by row.

Your program should then compute (1) the multiplication $M = M_1 \times M_2 \times \ldots \times M_N$, and (2) M^{-1} (i.e., the inverse of M). The output should print the elements of M^{-1} row by row.

Example
Suppose we have

$$M_1 = \begin{bmatrix} 1 & 4 & 5 \\ 2 & 3 & 6 \end{bmatrix}$$

and

$$M_2 = \begin{bmatrix} 7 & 3 \\ 1 & 5 \\ 2 & 1 \end{bmatrix}$$

Then

$$(M_1 \times M_2)^{-1} = \begin{bmatrix} -0.11 & 0.11 \\ 0.12 & -0.09 \end{bmatrix}$$

The corresponding execution is the following

```
$java HW2_borzoo 2 2 3 3 2 1 4 5 2 3 6 7 3 1 5 2 1

-0.11 0.11 0.12 -0.09
```

Rounding to 2 decimals is sufficient.

Sanity checks
Your program should check

- $n_1 = m_2$, $n_2 = m_3$, ..., and $n_{N-1} = m_N$. If this is not the case, it should print ''Multiplication error.''

- whether M is invertible. If not, it should print ''Matrix not invertible".

Documentation
Your program must be commented properly: each section of the code as well as each line.

Deliverable
Only the .java source file. If your program does not compile, you will receive no credit. Your file must be submitted by **8:30am on Friday, October 2** on Avenue to Learn.

Format
Your file name should be of the form HWK2_MacID.java.

Also, you should add the following to the beginning of your source java file:

```
/*
Name:  [Your full name (no nicknames or chosen names)]
MacID: [Your MacID]
Student Number:  [Your student number]
Description:  [This is an informative excerpt about this file.]
*/
```

Failure in meeting this format will result in 0 credit.

Extra credit
You will receive extra credit if your code for computing the determinant of M is **iterative** (i.e., non-recursive). If you choose to write the program iteratively, you should clearly state that as a comment on the first line of your .java file.