This and the following one or two assignments will be on matrices. You may consult the Wikipedia page for the definitions you will need – it is better to read it as you need, not all the information will be necessary.

The simplest way to implement a matrix in LISP is to have it as a list of lists. For instance the matrix:

$$\begin{bmatrix} 1 & 4 & 7 \\ 2 & 9 & 3 \\ 8 & 3 & 2 \\ 9 & 6 & 1 \end{bmatrix}$$

may be represented as:

```
((1 4 7)
 (2 9 3)
 (8 3 2)
 (9 6 1)
 )
```

In this assignment you are required to use this type of representation rather than more advanced representations like arrays.

Question 1

Define a procedure that takes a matrix as input and returns its shape, which will be a two element list, the first is the number of rows and the second is the number of columns. Your procedure should return `(4 3)` for the above matrix. You should return `NIL` if the input is not a valid matrix.

Question 2

Write a procedure `GET` that takes a matrix and a row and a column number and returns the element at the given position. First check whether the matrix is valid and the given row and column numbers do not exceed the size of the matrix. Row and column indices should start from 0.

Question 3

Write a procedure `S-MULTIPLY` that takes a number and a matrix, and returns another matrix with the same shape where each element of the given matrix is multiplied by the given number.