Matrix Calculator

Description

Be similar to a simple calculator. In the problem, you're asked to write a syntax and sematic checker for a matrix expression compiler. The objective of this problem contents two part. The first part is to build a AST for the input expression. The second part is to check if the dimension on both side of each operator is valid.

For example of multiplication: $A_{1\times2}B_{2\times1}$ is valid which will generate a matrix with 1 x 1 dimension. But $A_{2\times3}B_{2\times4}$ is invalid.

But if we take transpose of A in expression: $A_{2\times3}^{T}B_{2\times4}$ which equals to $A_{3\times2}B_{2\times4}$ the whole expression can be valid. The following are supported operators in this compiler:

addition '+', subtraction '-',multiplication '*',transpose '^T',

parenthesis '( )'. All matrix are 2-dimensional matrices which are represented as [column number , row number] e.g. [2, 3] is a 2x3 matrix and [5,1] is a 5x1 matrix. Your output should show "Syntax Error" if the input expression does not follow the grammar. If it follows the grammar, then apply sematic check to see if the dimension on both side of each operator is correct. Print "Sematic error on col " followed by the location of the first operator which makes the sematic error occur in post order of AST and add a new line. If no any syntax error or sematic error, just print "Accepted".

Sample Input	Sample Input
[2,1]^T*[2,1]	([2,3]*[2, 3]^T)^T+[4,1]
Sample Output	**Sample Output**
Accepted	Semantic error on col 19
Sample Input	**Sample Input**
([1,2]+[2,1]^T)*[1,3]*[1,3]^T*[3,3]	((([2,3]^T)^T)^T + [2,3]^T
Sample Output	**Sample Output**
Semantic error on col 16	Accepted