CMSC 124 Design and Implementation of Programming Languages
Exercise 03 - Tail Recursion in Scheme

1. Create a `.scm` file named `surname_e3.scm` (e.g. `tan_e3.scm`).

2. For this exercise, you are tasked to implement **matrix multiplication** in Scheme using tail recursion.

   Matrix Multiplication is an operation that accepts two matrices, A and B, where A is $n \times m$ and B is $m \times r$. The output of $A \times B$ is an $n \times r$ matrix C. Each element Cij is given by $\sum_{k=0}^{m} A_{ik} \times B_{kj}$. That is, Cij is the **dot product** of the *i*-th row of matrix A and the j-th column of matrix B.

   An example is given as follows:

1	2	3	x	1	2	3	4	=	44	46	48	50
4	5	6		8	7	6	5		98	103	108	113
				9	10	11	12					
A(nxm)				B(mxr)					C(nxr)			
(2x3)				(3x4)					(2x4)			

3. The requirements for this exercise are the following:
   a. Implement a tail-recursive **dot product**.
   b. Use the dot product to implement a tail-recursive **matrix multiplication.**