One dimensional arrays

- One dimensional array (List) can be used as a vector

  Ex: Given two vectors **{A}** and **{B}** calculate de scalar (dot) product

```
START
INPUT( N);
(* Read vector A *)
FOR I = 1 TO N
   INPUT( A(I) );
END FOR
(* Read vector B *)
FOR I = 1 TO N
   INPUT( B(I) );
END FOR
(* Compute the scalar product *)
ScalarProd <- 0;
FOR I = 1 TO N
 ScalarProd <- ScalarProd + A(I) * B(I);
END FOR
(* Print the scalar product *)
PRINT( "Scalar product: ", ScalarProd );
END
```

```python
"""
Created in 2020

@author: António Brito / Carlos Bragança

#objective: Calculate the scalar product of two vectors.
"""
n = int(input("Number of elements ="))
a = [0] * n
b = [0] * n
for i in range(n):
    a[i] = float(input("a[" + str(i) + "]="))
for i in range(n):
    b[i] = float(input("b[" + str(i) + "]="))
scalarprod = 0.0
for i in range(n):
    scalarprod = scalarprod + a[i] * b[i]
print("Scalar product =",scalarprod)
```

Two dimensional arrays

- Two dimensional arrays (List of Lists) can be used as matrices

  Ex: Calculate the sum of two matrices **[A]** and **[B]**

```
START
(* Read the matrices [A] e [B] *)
(* number of lines and columns *)
INPUT( Nrows, Ncols);
(* Read the matrices [A] e [B] *)
FOR I = 1 ATÉ Nrows
   FOR J = 1 ATÉ Ncols
      INPUT( A(I,J) );
   END FOR
END FOR
FOR I = 1 TO Nrows
   FOR J = 1 TO Ncols
      INPUT( B(I,J) );
   END FOR
END FOR
(* Calculate [C]  adding [A] and [B]*)
FOR I = 1 ATÉ Nrows
   FOR J = 1 ATÉ Ncols
      C(I,J) <- A(I,J) + B(I,J);
   END FOR
END FOR
(* Print the matrix [C] *)
FOR I = 1 TO Nrows
   FOR J = 1 TO Ncols
      PRINT( C(I,J) );
   END FOR
END FOR
END
```

```python
"""
Created in 2020

@author: António Brito / Carlos Bragança

#objective: Calculate the sum of two matrices.
"""
n = int(input("Number of rows ="))
m = int(input("Number of columns ="))
a = [[0] * m for i in range(n)]
b = [[0] * m for i in range(n)]
c = [[0] * m for i in range(n)]
for i in range(n):
    for j in range(m):
        a[i][j] = float(input("a[" + str(i) + "][" + str(j) + "]="))
for i in range(n):
    for j in range(m):
        b[i][j] = float(input("b[" + str(i) + "][" + str(j) + "]="))
for i in range(n):
    for j in range(m):
        c[i][j] = a[i][j] + b[i][j]
for i in range(n):
    for j in range(m):
        print("c[" + str(i) + "][" + str(j) + "]=",c[i][j])
```