Expand Method – Use Elaborated

```
expand(self,  dimx,  dimy,  list1,  list2 = [])
```

Params:

dimx ➔ Designates number of new number of columns

dimy ➔ Designates number of new number of rows

list1 ➔ This is an array mapping the **source row** to the **destination row**

The values listed in the array explicitly are the indices of the destination rows in the expanded matrix. The "***position***" of each value in the array is the indices of the row in the source matrix.

Row Mappings - Example 1:

```
M = matrix([[1,  2,  3],
            [4,  5,  6]])

M2 = M.expand(6, 6,  [ 1, 3 ],   [ 0, 1, 2 ])
     Src Indices →    0  1
```

In this case, see the mapping the chart below:

Src Matrix Row Index	Dest Matrix Row Index
0	1
1	3

-- M Matrix --

```
[1,  2,  3]
[4,  5,  6]
```

-- M2 Expanded Matrix --

```
[0,  0,  0,  0,  0,  0]
[1,  2,  3,  0,  0,  0]
[0,  0,  0,  0,  0,  0]
[4,  5,  6,  0,  0,  0]
[0,  0,  0,  0,  0,  0]
[0,  0,  0,  0,  0,  0]
```

Row Mappings - Example 2:

```
M = matrix([[1,  2,  3],
            [4,  5,  6]])

M2 = M.expand(6, 6,  [ 3, 2 ],  [ 0, 1, 2 ])
     Src Indices →    0  1
```

In this case, see the mapping the chart below:

Src Matrix Row Index	Dest Matrix Row Index
0	3
1	2

-- M Matrix --
```
[1,  2,  3]
[4,  5,  6]
```

-- M2 Expanded Matrix --
```
[0,  0,  0,  0,  0,  0]
[0,  0,  0,  0,  0,  0]
[4,  5,  6,  0,  0,  0]
[1,  2,  3,  0,  0,  0]
[0,  0,  0,  0,  0,  0]
[0,  0,  0,  0,  0,  0]
```

list2 ➔ This is an array mapping the **source column** to the **destination column**

The values listed in the array explicitly are the indices of the destination **columns** in the expanded matrix. The "***position***" of each value in the array is the indices of the column in the source matrix.

Column Mappings - Example 1:

```
M = matrix([[1, 2, 3],
            [4, 5, 6]])

M2 = M.expand(6, 6, [ 0, 1 ],  [ 1, 3, 4 ])
                Src Indices →    0  1  2
```

In this case, see the mapping the chart below:

Src Matrix Column Index	Dest Matrix Column Index
0	1
1	3
2	4

-- M Matrix --
```
[1,  2,  3]
[4,  5,  6]
```

-- M2 Expanded Matrix --
```
[0,  1,  0,  2,  3,  0]
[0,  4,  0,  5,  6,  0]
[0,  0,  0,  0,  0,  0]
[0,  0,  0,  0,  0,  0]
[0,  0,  0,  0,  0,  0]
[0,  0,  0,  0,  0,  0]
```

Column Mappings - Example 2:

```
M = matrix([[1, 2, 3],
            [4, 5, 6]])

M2 = M.expand(6, 6, [ 0, 1 ],  [ 2, 4, 3 ])
              Src Indices →    0  1  2
```

In this case, see the mapping the chart below:

Src Matrix Column Index	Dest Matrix Column Index
0	2
1	4
2	3

-- M Matrix --

```
[1,  2,  3]
[4,  5,  6]
```

-- M2 Expanded Matrix --

```
[0,  0,  1,  3,  2,  0]
[0,  0,  4,  6,  5,  0]
[0,  0,  0,  0,  0,  0]
[0,  0,  0,  0,  0,  0]
[0,  0,  0,  0,  0,  0]
[0,  0,  0,  0,  0,  0]
```

Combined Example

Below is an example with **both** row and column mappings:

Row and Column Mappings - Example 1:

```
M = matrix([[1,  2,  3],
            [4,  5,  6]])

M2 = M.expand(6,  6,  [ 3,  1 ],   [ 4,  1,  3 ])
       rc Indices →    0   1        0   1   2
```

In this case, see the mapping the chart below:

Src Matrix Row Index	Dest Matrix Row Index
0	3
1	1

Src Matrix Column Index	Dest Matrix Column Index
0	4
1	1
2	3

-- M Matrix --

```
[1,  2,  3]
[4,  5,  6]
```

-- M2 Expanded Matrix --

```
[0,  0,  0,  0,  0,  0]
[0,  5,  0,  6,  4,  0]
[0,  0,  0,  0,  0,  0]
[0,  2,  0,  3,  1,  0]
[0,  0,  0,  0,  0,  0]
[0,  0,  0,  0,  0,  0]
```