Python Numpy
(A master-key to numerical calculations)

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CODE SHALA

WHERE PRACTICAL APPROACH BEGINS

Services

What we can do for you

About Code Shala

1. 'Code Shala' is formed with a vision to give students a nice exposure to the practical aspect of programming languages, which helps them to finetune their coding skills.
2. Started on 14th Feb 2020 as classroom teaching but shifted to online mode, due to covid-19.
3. Most of the time, students know about the theory part of any programming language. Still, when it comes to performing practical, either they try to bypass the questions or are not able to act as per given requirements.
4. To overcome these, we at 'Code Shala' are emphasizing the algorithmic and practical aspect of programming languages, which work as a confidence booster for a student.
5. At present, we are running two courses named as 'Python 4 Kids' and 'Python Basics' for python lovers.
6. Three batches of 'Python Basics' completed with 12 students.
7. Our first batch started for 'Python 4 Kids with 6 kids'.
8. As we are moving on, following fits 100% correct on us:
   - No coding experience required (1-1 Student from BCom and MBA)
   - No age limit (Age 9+)
   - No branch/stream limit (5 (ECE), 5 (CSE-IT))

Why Code Shala

1. More than 4 years of Python work experience and more than 7 years of teaching experience.
2. Less emphasis on theory part and more on practical aspect.
3. Due to covid-19 issue, we are running in on-line mode but we assure that you learn and understand each concept properly from live class.
4. Class will be a live class and it is not a recording, which helps in better query handling.
5. More than 30 python programs will be created by students during the course, from very basic level to advance level.
6. Proper monitoring of student's work progress by Google Classroom.
7. Student have to pick a small project (In a team of 2) of their own choice/given by instructor, during M2-M3 module and refine it as much as he/she can do till the end of course, by adding various python concepts.
8. For project, advance concepts like socket programming, HTTP request handling, opencv for image reading/writing are discussed with individual teams.
9. Live class of 40-45 minutes, is scheduled on alternative days (Sunday Off), so that students gets enough time to revise, complete and submit their assignments.

Python Numpy

Introduction

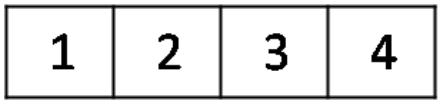
1. In many domains like scientific computing, financial analysis, relational data, multimedia data, deep learning, etc., we have to work with an array or most likely high dimensional array, which contains numbers as data items.
2. Python lists can store a collection of high dimensional numbers as an array, and we can operate on them by iterating. The list can store high dimensional data.
3. Even a list of lists can store a matrix, in which every row is a list. We can find a maximum or minimum of a high dimensional data stored in the list by simply iterating over it.
4. But this is very inefficient- almost 10 to 100 times slower than expected performance. (Why this performance downgrades??)
5. Because lists are designed to store heterogeneous data, so its need to do type checking, no low-level hardware mechanisms to accelerate operation on lists.
6. Numpy intended to bring performance and functionality improvements for numerical computing.
7. Numpy is a general-purpose array-processing package. It provides a high-performance multidimensional array object, and tools for working with these arrays.

How to use it

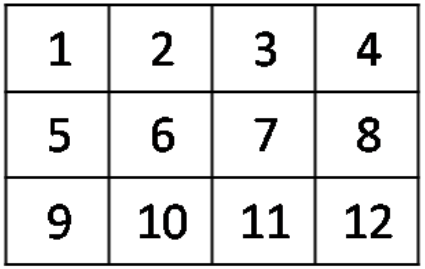
1. We need to install it using: pip install numpy
2. Make sure your system must be connected to Internet.
3. For using in python script, write: import numpy as np
4. Lecture Plan for today:
    1. What is n-d array
    2. How we can create it
    3. How to access various properties of numpy array
    4. How to access a single element and a slice from numpy array
    5. Broadcast operation on numpy operation
    6. Comparing its performance with python lists

What is n-d array

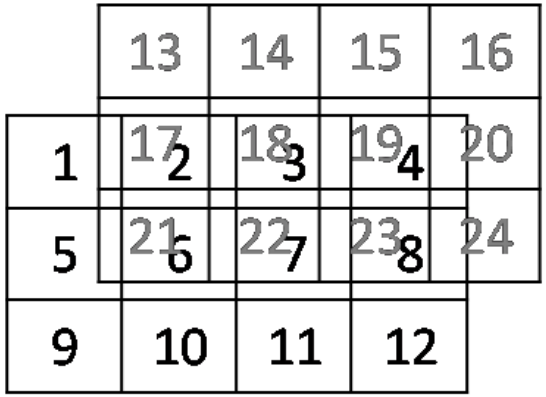
1. One Dimensional Array:



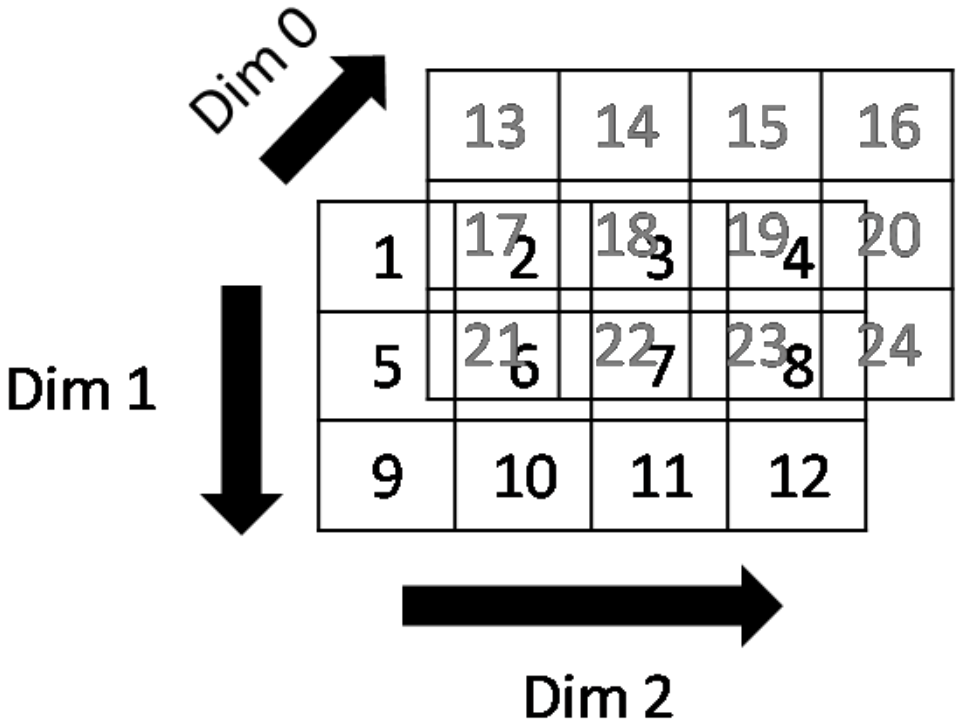
2. Two Dimensional Array:



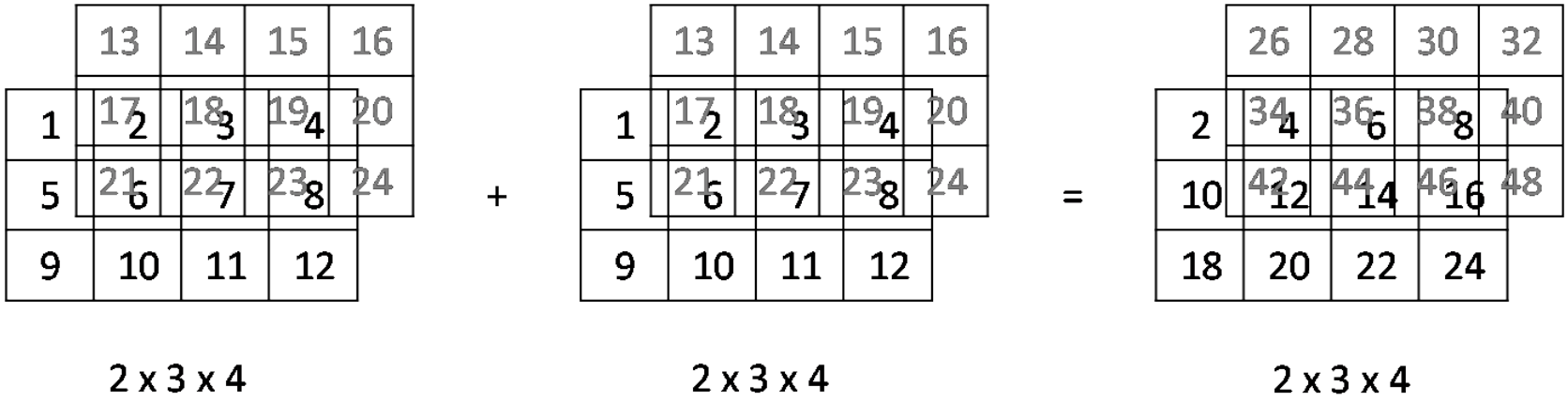
3. Three Dimensional Array:

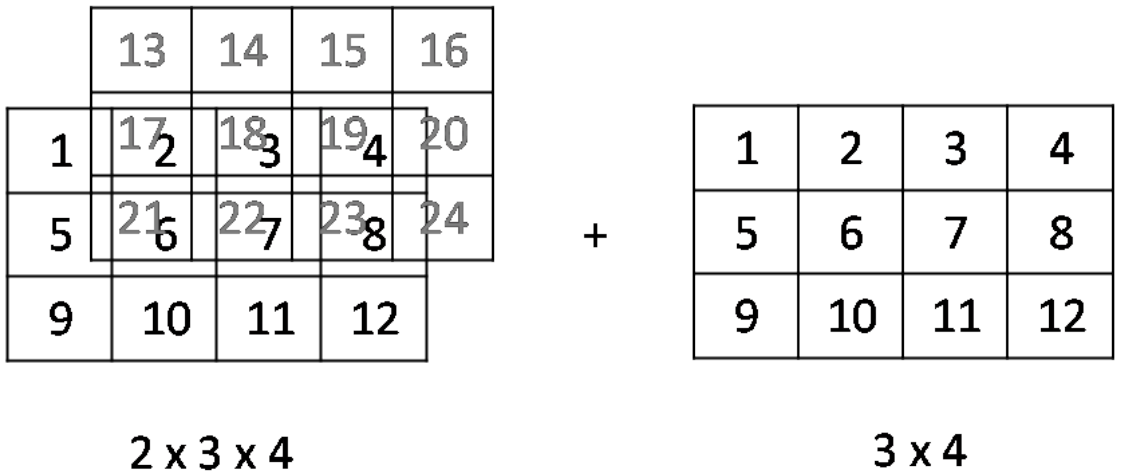


More details about 3-d array



Broadcasting Operation





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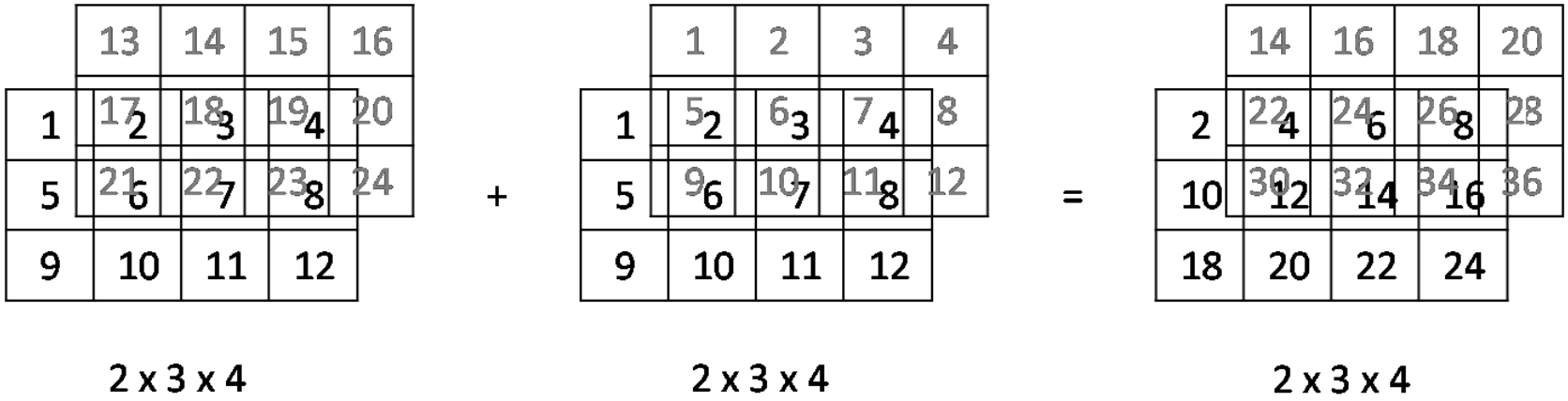

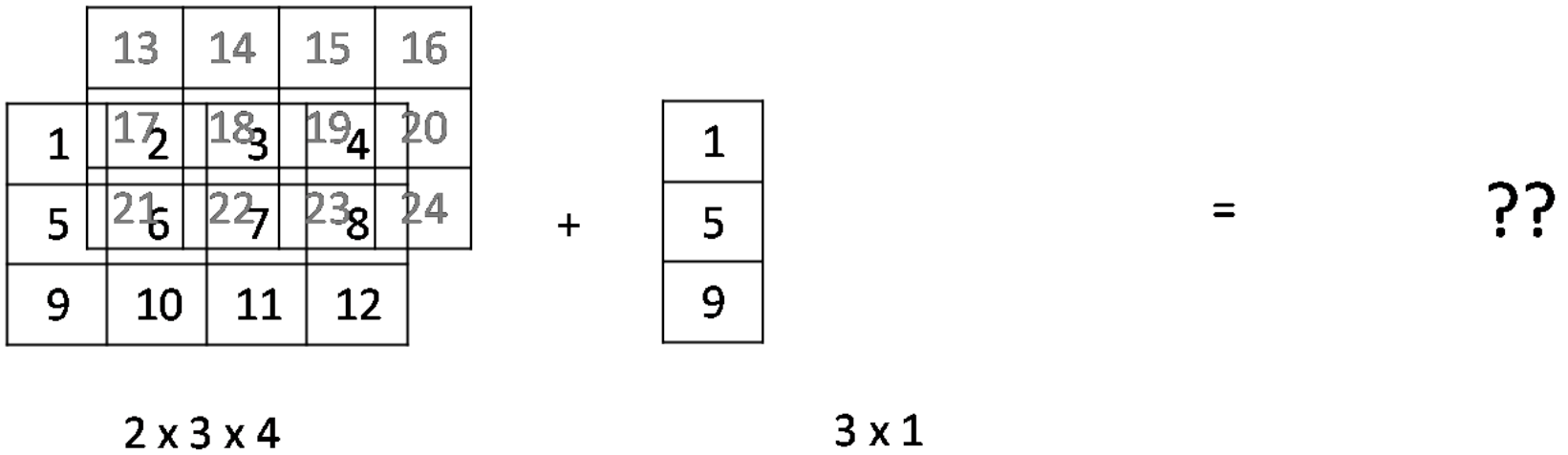

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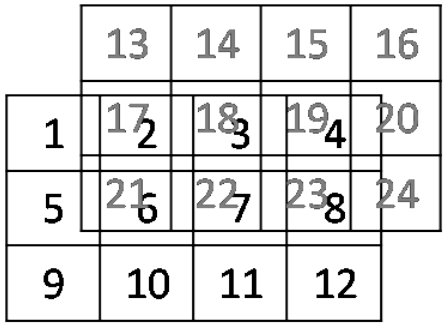

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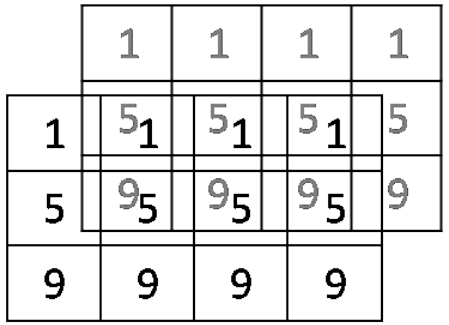

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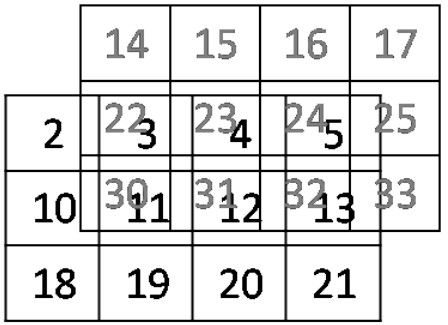

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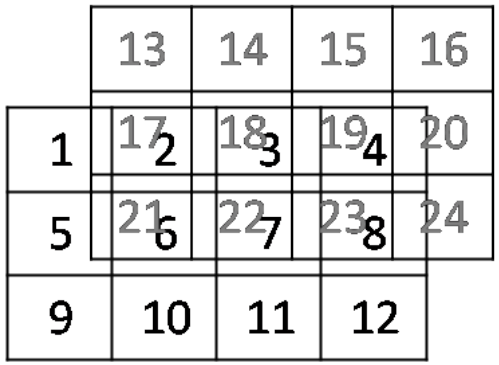

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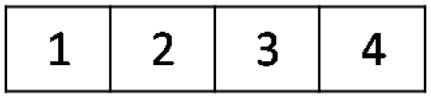

1 x 4

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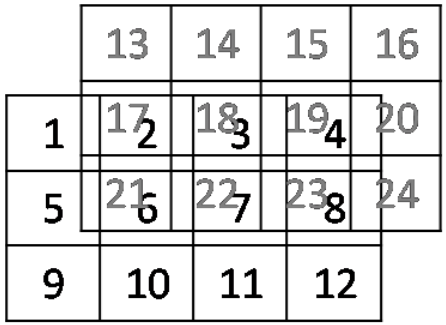
Broadcasting Operation



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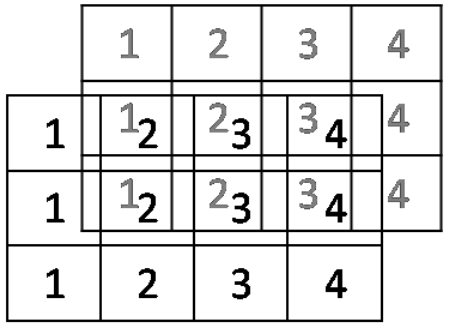

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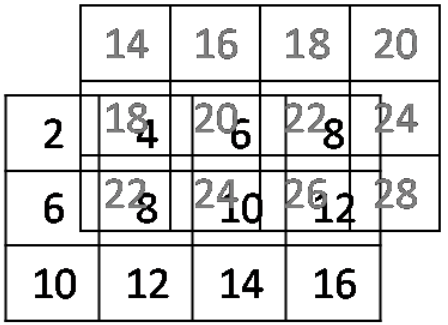
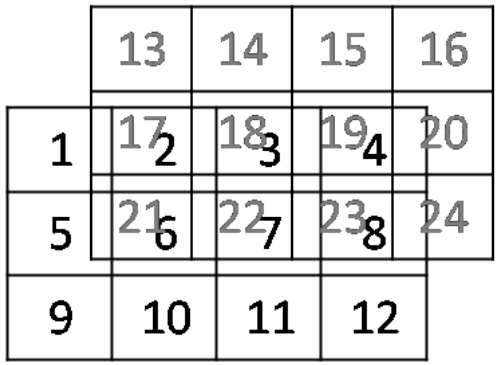


2 x 3 x 4 2 x 3 x 4 2 x 3 x 4



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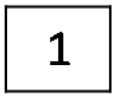

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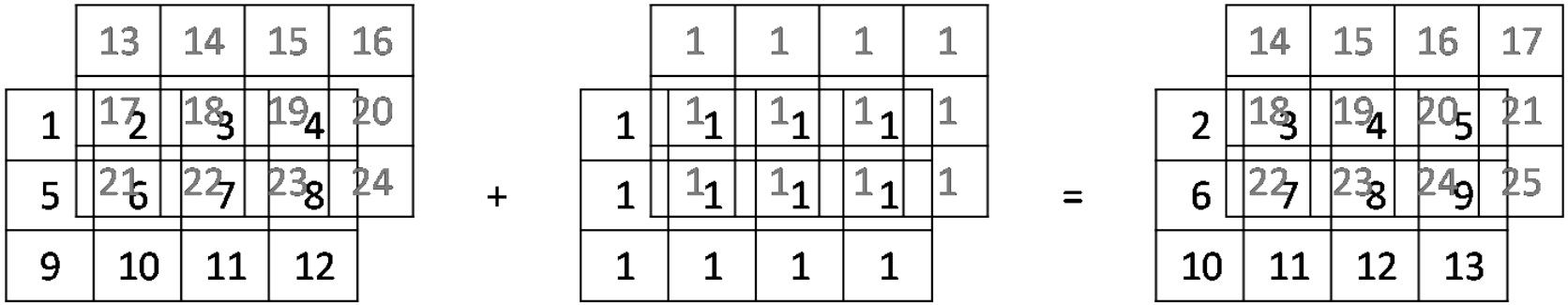
2 x 3 x 4 We have a scalar

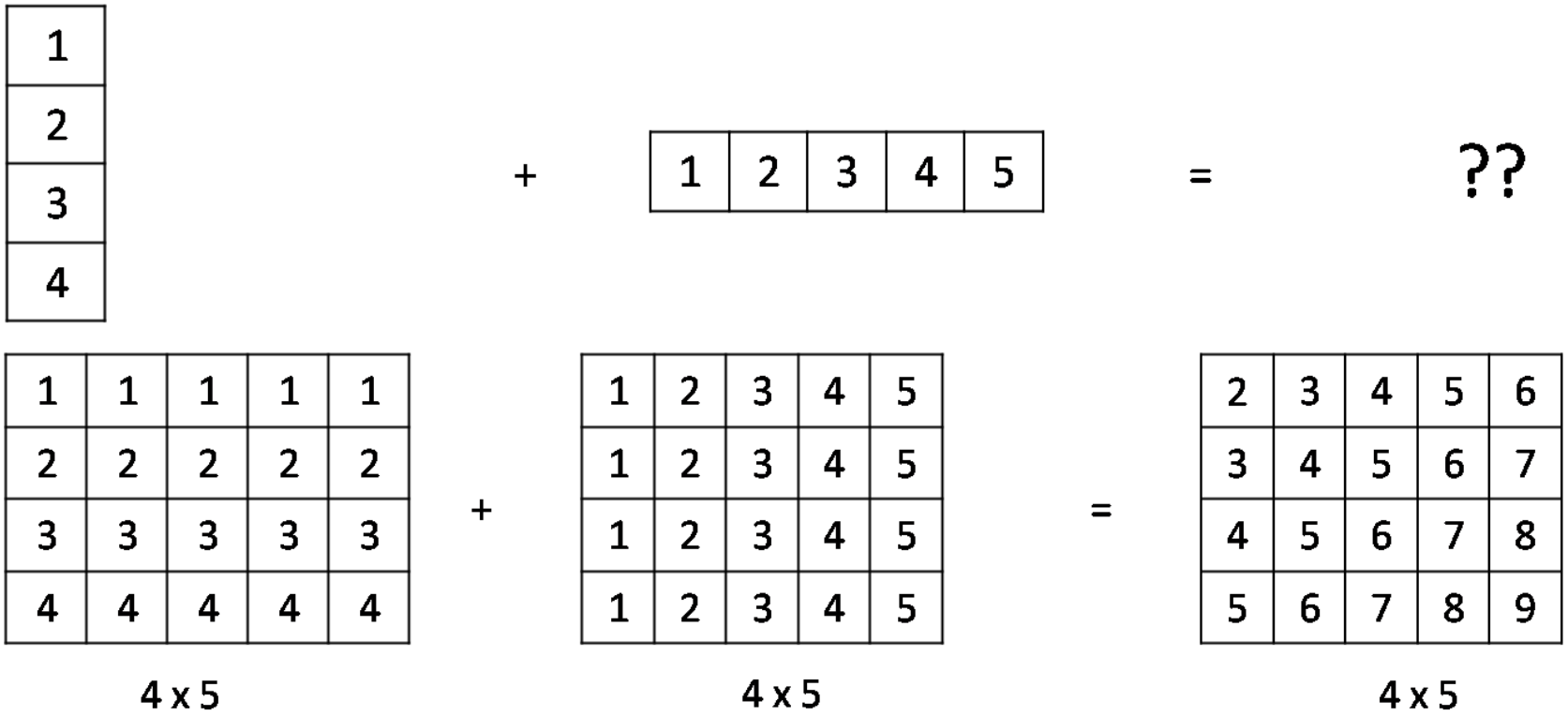
Broadcasting Operation



2 x 3 x 4 + 2 x 3 x 4 = 2 x 3 x 4

1 x 4 + 1 x 5 = ??

Broadcasting Operation



Practical Demonstration

Let's move to Jupyter Notebook for practical demonstration.