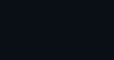


# Recitation 04

01:198:210 Data management for Data Science

Xinxi (Chris) Zhang

# Recitation Github

**CS210-RC05**

Public

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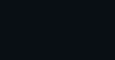
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main 1 branch 0 tags

Go to file

Add file

Code

 **Xinxi-Zhang** update

4437044 5 days ago 2 commits

RC02	update	5 days ago
RC03	update	5 days ago
Recitation PPTs	update	5 days ago

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Add a README

About

the notebooks for CS210 (Section 5)

Activity

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Releases

No releases published

Create a new release

Packages

No packages published

View all commits by Xinxi-Zhang

Languages

Jupyter Notebook 100.0%

<https://github.com/Xinxi-Zhang/CS210-RC05>

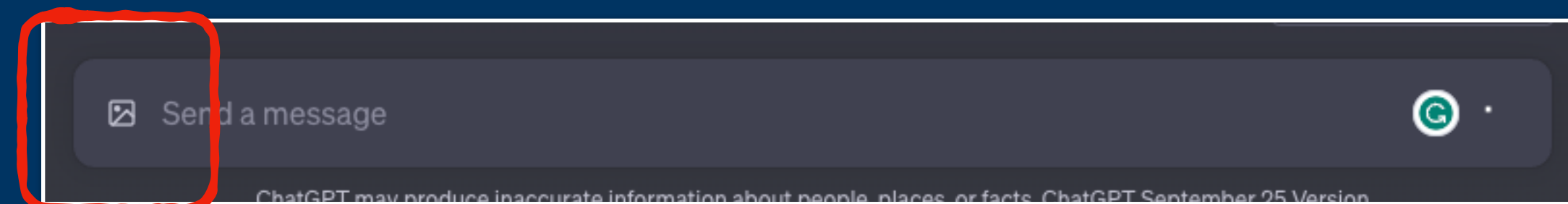
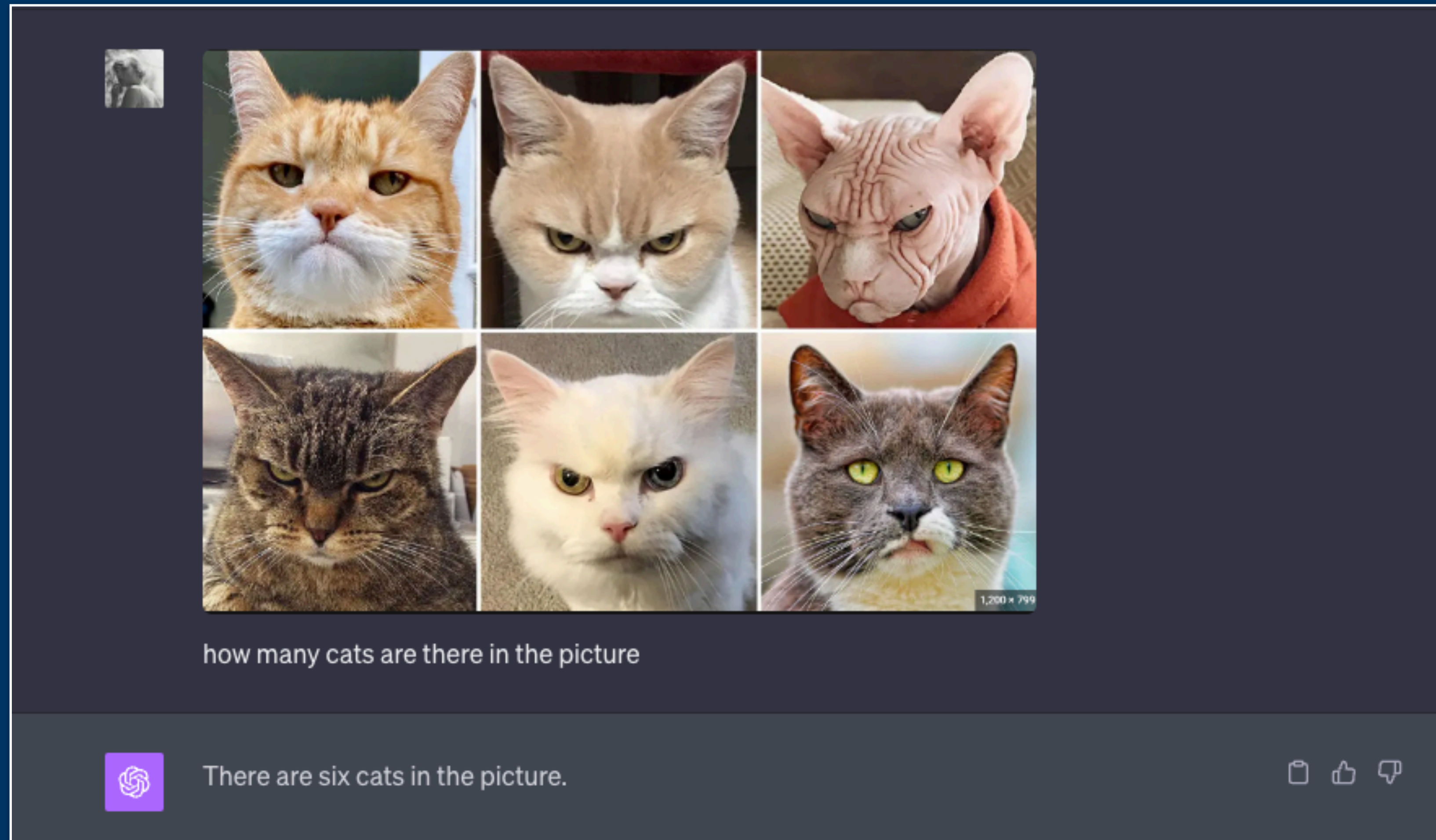
# Recap

- GPT Start-UP Ideas
  - ◆ Professor Filtering
- Python Basic
  - ◆ Table, Set
  - ◆ List Comprehension
  - ◆ I/O, Yaml, JSON
  - ◆ Counter
- Introduction to NumPy

# GPT New Update!

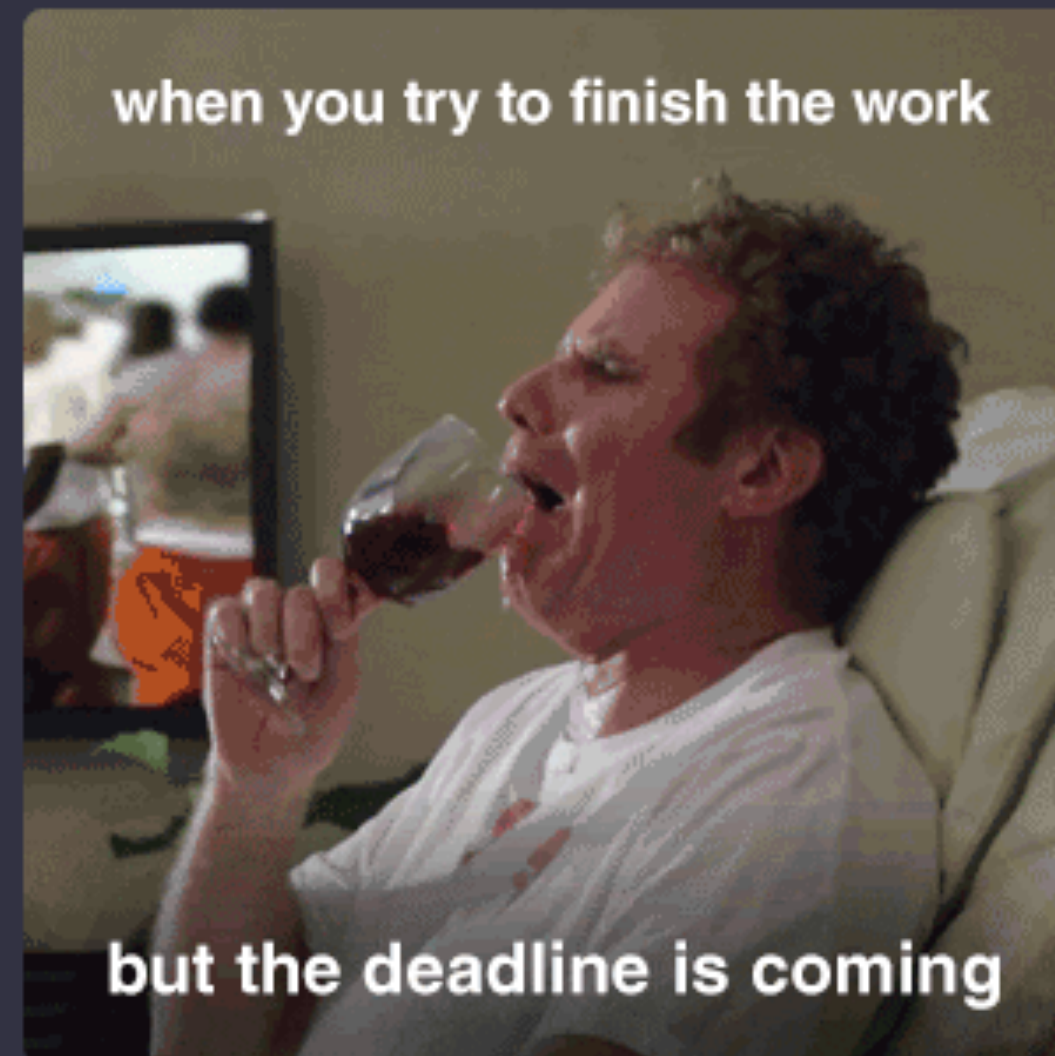
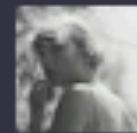
Can “See” Now

# GPT Can Read Images Now





# Good Reasoning



what's so funny about this gif




The GIF depicts a man looking distressed and hurriedly drinking wine with overlaid text: "when you try to finish the work" and "but the deadline is coming". It humorously captures the anxiety and rush many people feel when they're approaching a deadline. The exaggerated facial expression and the act of quickly sipping wine add to the comedic element, suggesting a dramatic and possibly relatable reaction to an impending deadline.



element, suggesting a dramatic and possibly relatable reaction to an impending deadline.

# Cheating on Quiz?



Question 10

10 pts

What is the value of `mywordmap["three"]` after executing the following snippet of Python code?

```
mywordmap = defaultdict(lambda: -1)
mywordmap["one"] = mywordmap["three"] + mywordmap["two"] + 3
mywordmap["two"] += 2 * mywordmap["one"]
mywordmap["three"] += mywordmap["one"] + mywordmap["two"]
```

☐ 9


☐ 0

☐ 1

☐ 3

[Previous](#)

can you please solve this question



Of course. Let's break down the Python code step by step:

- `mywordmap = defaultdict(lambda: -1)`: This creates a defaultdict where any key that doesn't exist will return `-1`.
- `mywordmap["one"] = mywordmap["three"] + mywordmap["two"] + 3`: Given that neither "three" nor "two" exists yet in the dictionary, their values will be the default `-1`. So this evaluates to:  
`mywordmap["one"] = -1 - 1 + 3 = 1`
- `mywordmap["two"] += 2 * mywordmap["one"]`: Since "two" doesn't exist yet, its default value is `-1`. After adding `2` and `mywordmap["one"]` which is `1`, this evaluates to:  
`mywordmap["two"] = -1 + 2 + 1 = 2`
- `mywordmap["three"] += mywordmap["one"] + mywordmap["two"]`: Again, the default value for "three" is `-1`. So after adding the values of "one" (which is `1`) and "two" (which is `2`), this evaluates to:  
`mywordmap["three"] = -1 + 1 + 2 = 2`

[Regenerate](#)

# NumPy Basics 02

## Some Highlights



# Some Useful Resources

- [Stanford cs231n](#)
- [NumPy Quick Start](#)
- [Python Data Science Handbook](#)
- [NumPy Excerice with Solution](#)

# Creating a NumPy Array

- Convert from other forms
  - List, Numbers, Strings ...
- Built-in Functions
  - Normal, Random, Special
- From Functions
  - DIY

# Data Type

## NumPy vs List

- List
  - Versatility: +
  - Performance: -
- Numpy
  - Homogeneity: -
  - Efficient: +



# Data Type

## NumPy

- Int - (int8, int16, int32, int64), (uint8, uint16, uint32, uint64)
- Float - (float16, float32, float64)
- Complex
- Boolean
- Strings
- Datetime



# Insert Data

Append?

- Append
- Insert
- Stack ★

# Indexing

## List vs NumPy

- Basic
- Boolean Indexing
- Fancy Indexing
  - Index an array using another **Integer** array

# Matrix Operations

## The Key of NumPy

- Element-wise Operations
- Matrix Multiplications
- Advanced Operations
  - Transpose
  - Determinant
  - Inverse
  - Rank, Trace

# Broadcasting

## A Powerful Feature

- Dimension Expansion
- Unintentional Broadcasting
- Visualize the Shapes
- Explicitly Reshape

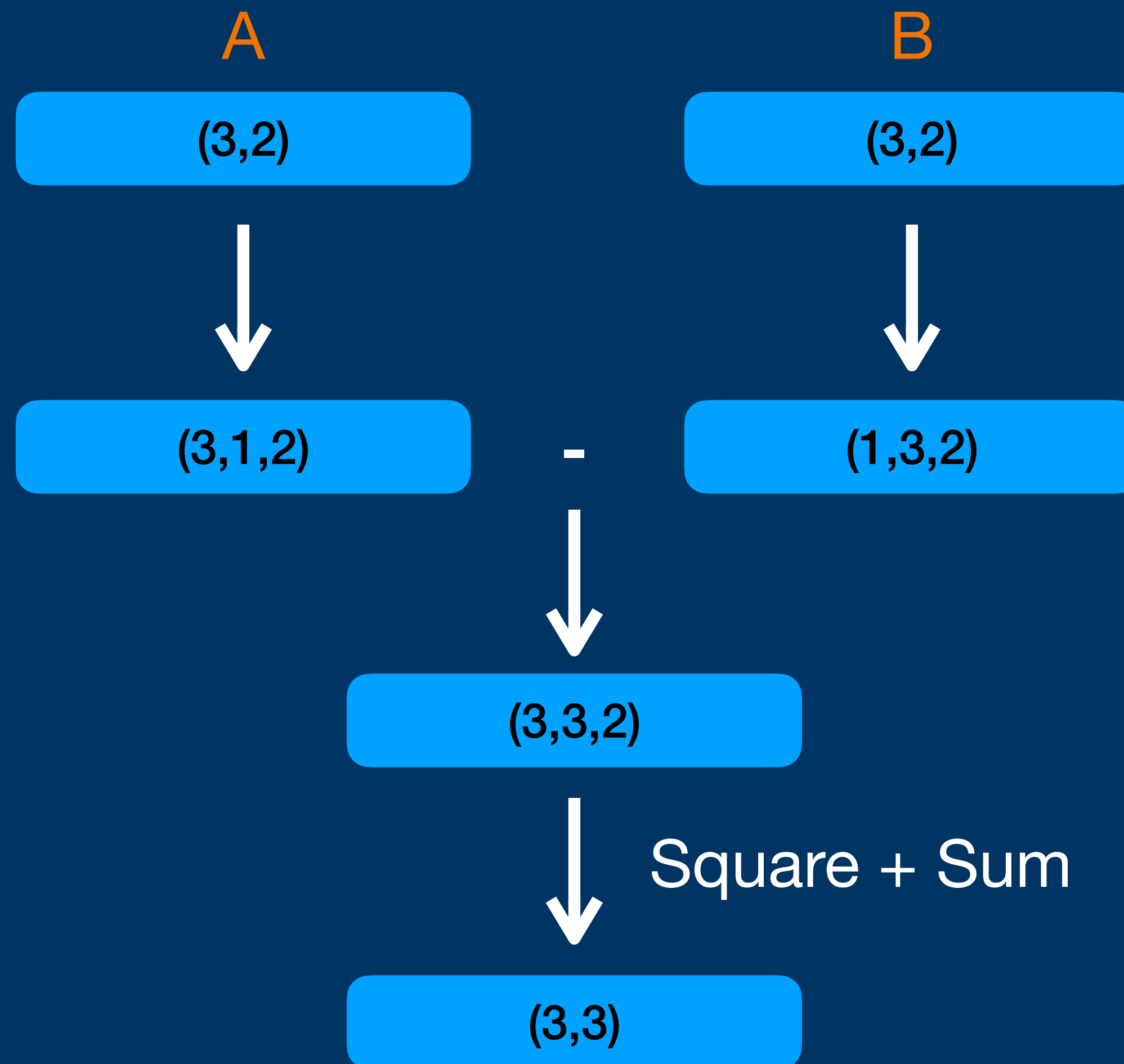


# Vectorization

## The Key to Parallel Computing

- Broad-casting
- Matrix Vectorization

# Vectorization Example 01



# Vectorization Example 02

$$y = A\bar{x}$$

$$\frac{\delta y}{\delta \bar{x}}$$