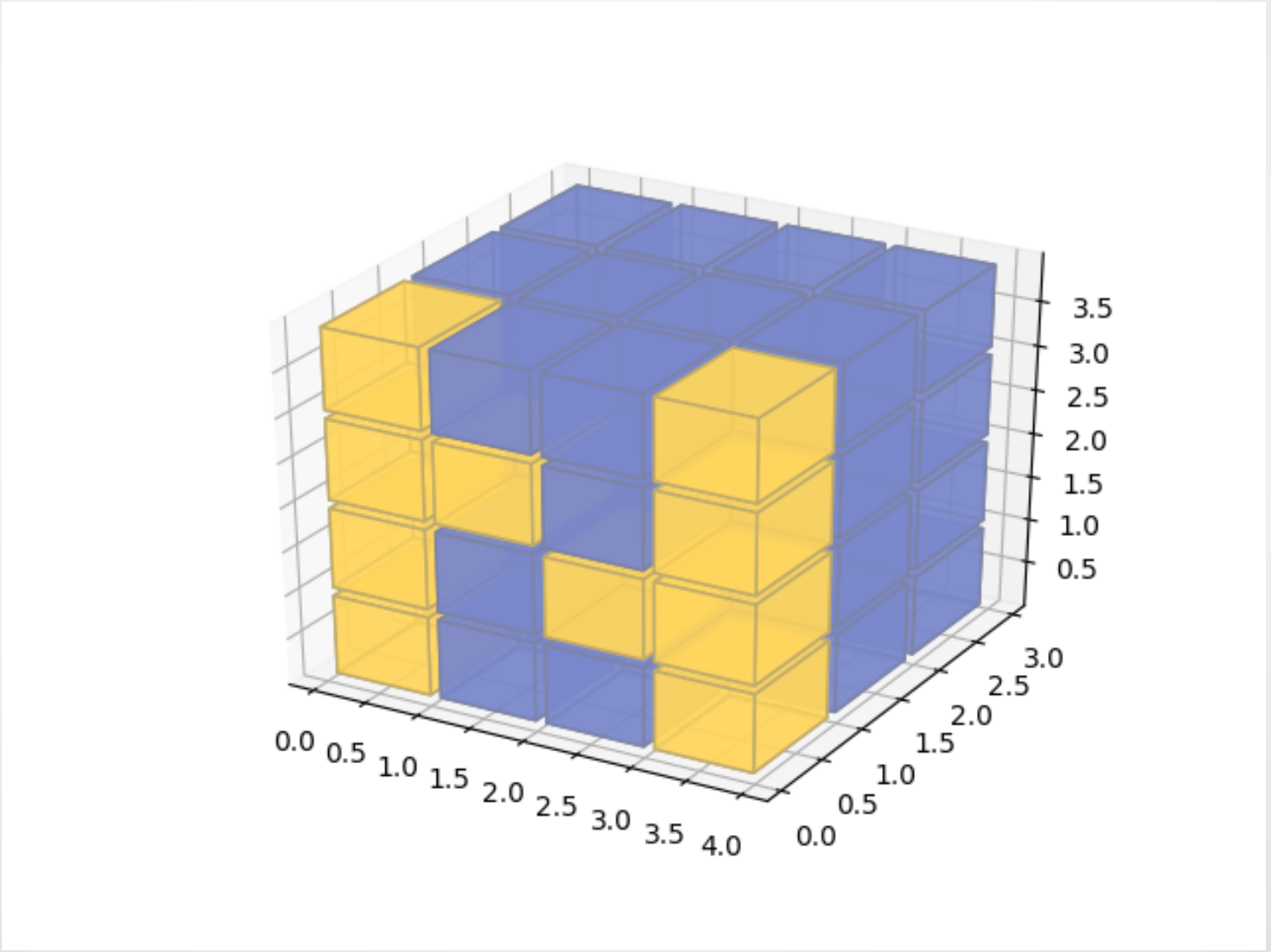
NumPy…..



What is NumPy?

- NumPy is the fundamental package for scientific computing in Python.
- It is a Python library that provides a multidimensional array object, various derived objects (such as matrices),

What is NumPy?

- Numpy Contains an assortment of routines for fast operations on arrays, including
  - mathematical
  - logical
  - shape manipulation
  - sorting
  - selecting
  - I/O
  - discrete Fourier transforms
  - basic linear algebra
  - basic statistical operations
  - random simulation and much more.

What is NumPy?

- NumPy’s features which are the basis of much of its power:
  - Vectorization
  - Broadcasting.

Vectorization

- Vectorization describes the absence of the following in the code
  - explicit looping,
  - indexing
- of course, these things are taking place, just “behind the scenes” in optimized, pre-compiled C code.

Vectorization

- Vectorized code has many advantages, among which are:
  - vectorized code is more concise and easier to read
  - fewer lines of code generally means fewer bugs
  - the code more closely resembles standard mathematical notation (making it easier, typically, to correctly code mathematical constructs)
  - vectorization results in more “Pythonic” code. Without vectorization, our code would be littered with inefficient and difficult to read for loops.

Broadcasting

- Broadcasting is the term used to describe the implicit element-by-element behavior of operations
  - In NumPy all operations, including
    - arithmetic operations
    - Logical
    - Bit-wise
    - functional, etc.,
    - behave in this implicit element-by-element fashion called broadcasting