NumPy

- The fundamental package for numerical computing with Python
- Fast, memory-efficient *N*-dimensional arrays
- Excellent choice for large, homogeneous data sets
- A foundation for many mathematical packages, and to integrate Python with C/Fortran

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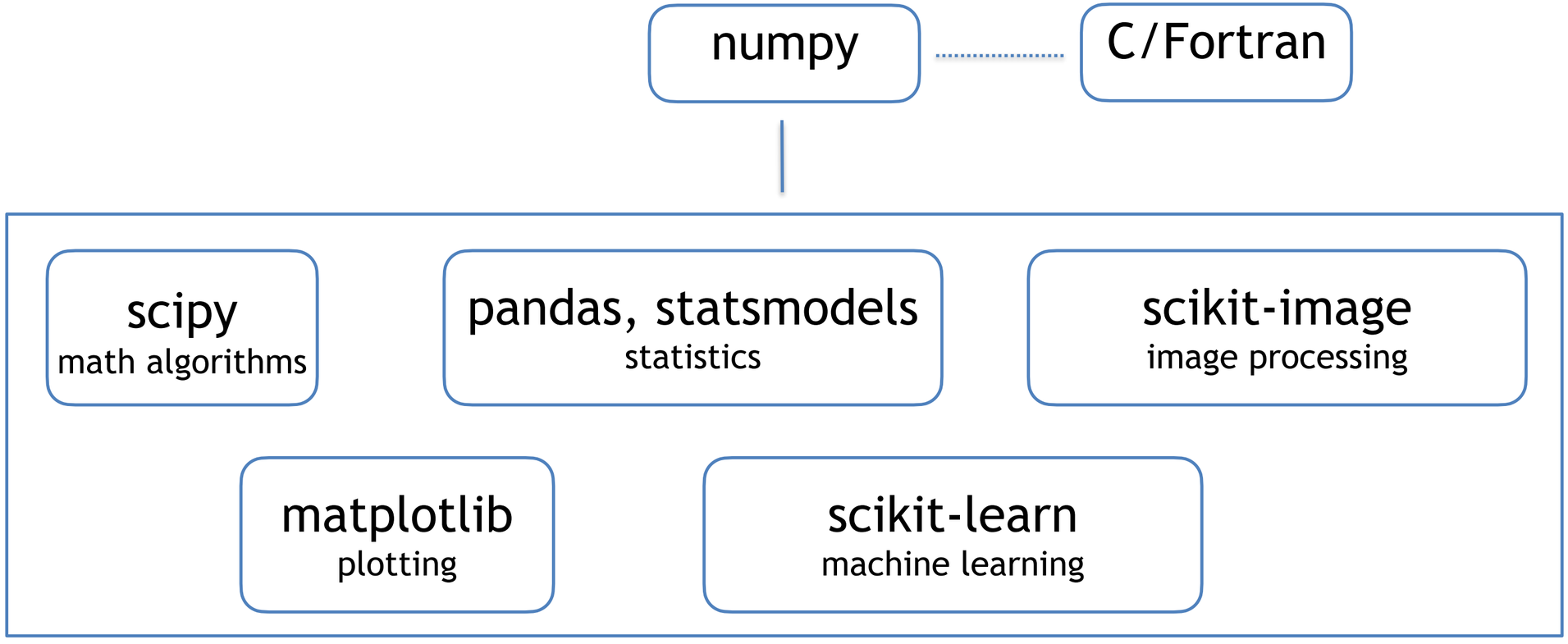
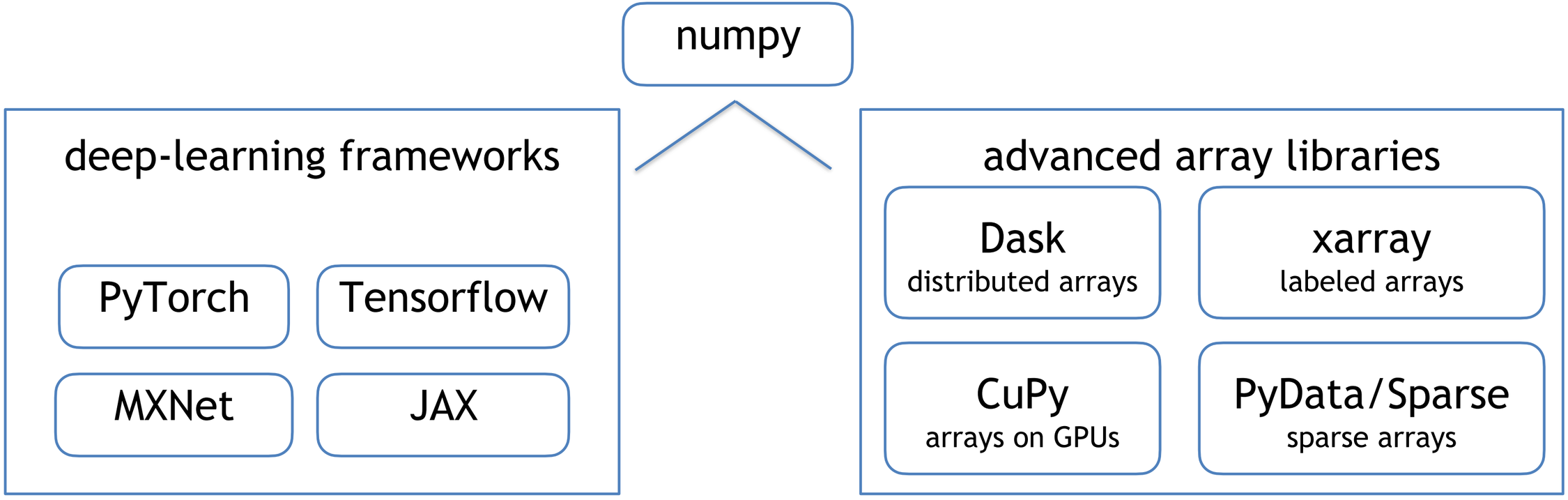
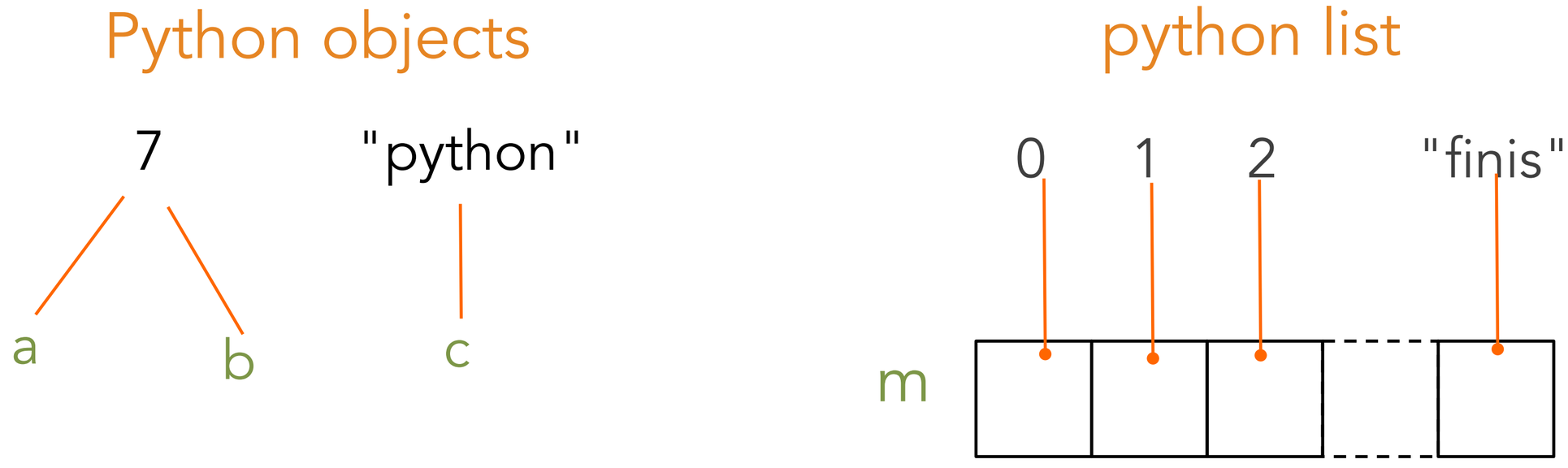


NumPy

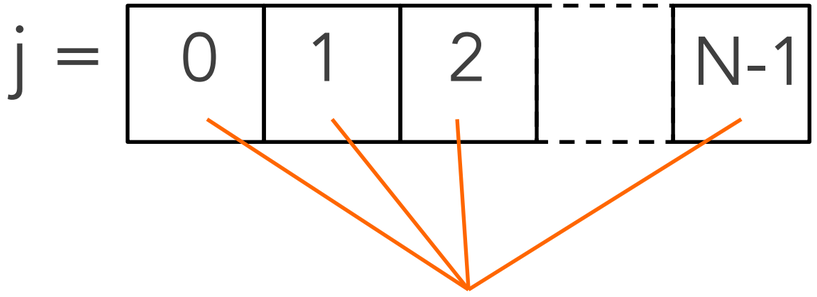
- Deep learning frameworks reproduce the NumPy array interface
- Specialized array libraries are interoperable with NumPy



Python variables and lists



NumPy Arrays

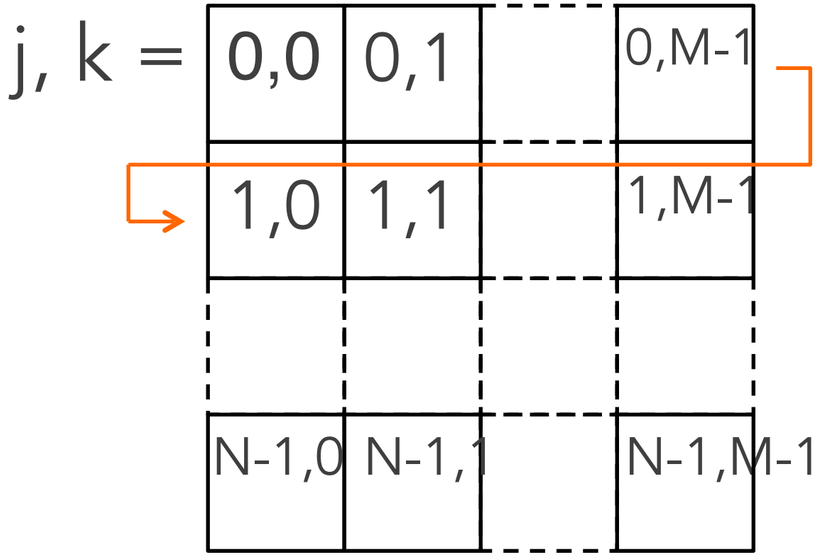


actual data items;
all have same byte size

v[j]

ndim = 1

shape = (N,)



A[j,k]

ndim = 2

shape = (N,M)

NumPy Data Types (dypes)

- **Integers**: numpy.int8, numpy.int16, numpy.int32, numpy.int64.
  Unsigned integers: numpy.uint8, etc.

- **Floating point**: numpy.float32, numpy.float64, numpy.float128.
  Complex floating point: numpy.complex64, etc.

- **Others**: numpy.bool_; numpy.string_, numpy.unicode_ (fixed length); numpy.void_ (composite); numpy.object_ (reference)