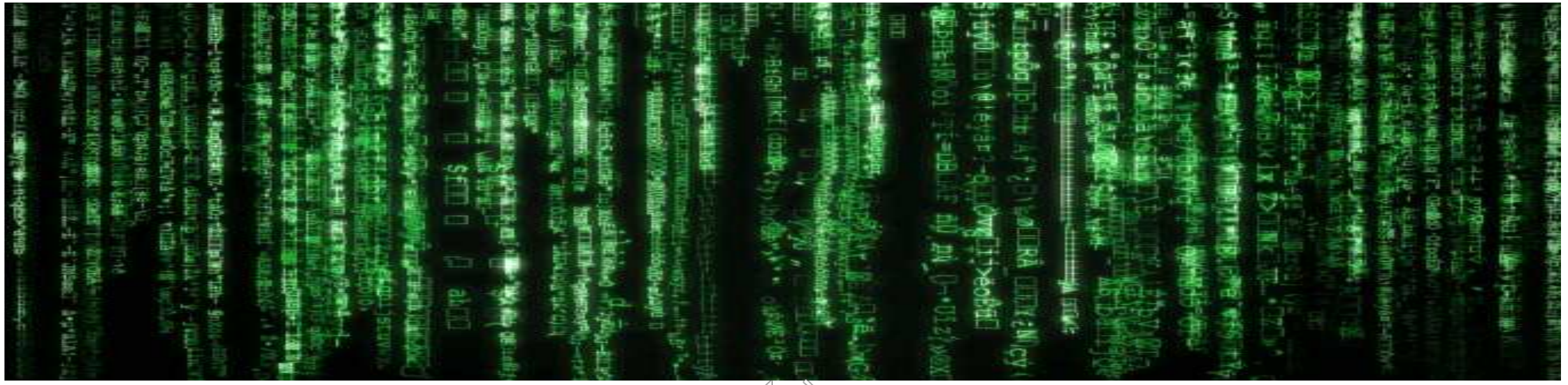

INF 110 Discovering Informatics

Arrays and Tables

NAU
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Arrays (numpy)

A sequence of the same type.

```
from datascience import *
import numpy as np
```

```
make_array(100, 200, 300)
make_array(1.0, 2.0, 3.0)
make_array("a", "b", "c")
```

Arrays from ranges

Ranges allow us to create a sequence of values

```
from datascience import *
import numpy as np
```

```
np.arange(5)
np.arange(1, 10)
np.arange(1, 10, 2)
```

Element from a slice

We can retrieve an element using an index (or get) operation

```
letters = make_array("a", "b", "c", "d", "e", "f")

letters[1]
```

Arrays from slices

We can also make an array from a subsequence

```
letters = make_array("a", "b", "c", "d", "e", "f")

letters[1:4]
```

Live Code Examples of Arrays

Task: Create some arrays and ranges that illustrate the construction process and options

Learning Outcomes

- Creating arrays with make_array()
- Creating ranges with np.arange()
- Pulling individual elements from sequences
- Creating arrays with slicing

Table Structure

- A Table is a sequence of labeled columns
- Each row represents one individual
- Data within a column represents one attribute of the individuals

Name	Code	Area (m2)
California	CA	163696
Nevada	NV	110567

Table Structure

- A Table is a sequence of labeled columns
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Name	Code	Area (m2)
California	CA	163696
Nevada	NV	110567

Column

Table Structure

- A Table is a sequence of labeled columns
- Each row represents one individual
- Data within a column represents one attribute of the individuals

Name	Code	Area (m2)
Californ	CA	163696
Nevada	NV	110567

Label

Table Structure

- A Table is a sequence of labeled columns
- Each row represents one individual
- Data within a column represents one attribute of the individuals

Name	Code	Area (m2)
California	CA	163696
Nevada	NV	110567

Row

Live Code Creating a table in Excel

Task: Create a table in Excel that describes some favorite food options for each student

Learning Outcomes

- Creating a table with labels, columns, and rows
- Sorting columns in Excel
- Using the CSV file format

Python tables

Tables in Python are objects that contain the same data as a table you might work with in Excel but with some differences:

- Bigger
- Faster
- Manipulation with methods
- Support scientific work flows

Some Table Operations

- `t.select(label)` - constructs a new table with just the specified columns
- `t.drop(label)` - constructs a new table in which the specified columns are omitted
- `t.sort(label)` - constructs a new table with rows sorted by the specified column
- `t.where(label, condition)` - constructs a new table with just the rows that match the condition

Live Code Getting Help

Task: Python has a lot of built-in documentation use “?” and “dir” to inspect the methods in the Table class.

Learning Outcomes

- Learn about methods in the Table class
- Become comfortable looking up documentation in Jupyter

Live Code Working with Tables

Task: Use the table you built in Excel earlier in Python

Learning Outcomes

- Loading tables
- Sorting columns
- Adding new columns


end