Lecture 8

Data 8
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Functions

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Announcements

Histogram Review

Histogram Axes

- By default, `hist` uses a scale (`normed=True`) that ensures the area of the chart sums to 100%

- The area of each bar is a percentage of the whole

- The horizontal axis is a number line (e.g., years), and the bins sizes don't have to be equal to each other

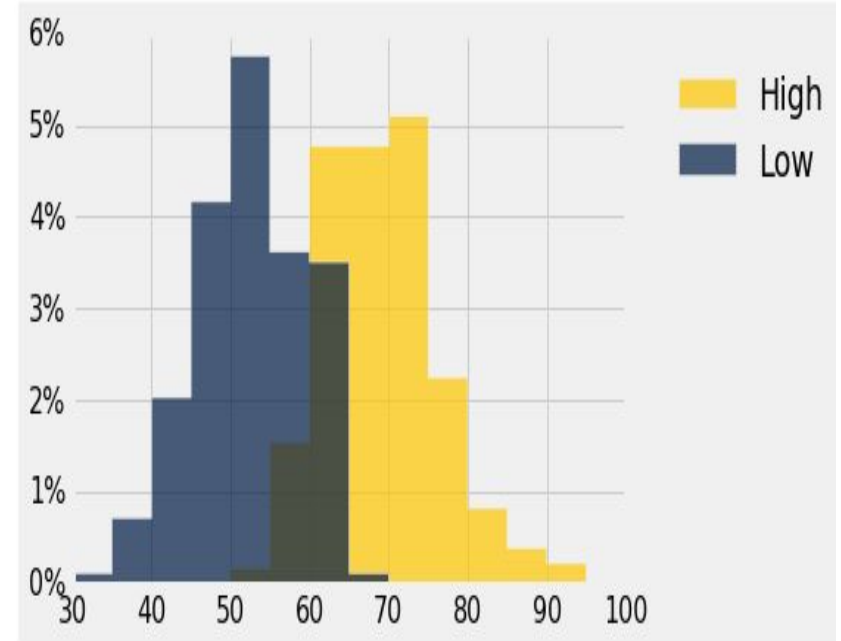- The vertical axis is a density (e.g., percent per year)

(Demo)

Discussion Question

This histogram describes a **year** of daily temperatures in Fahrenheit
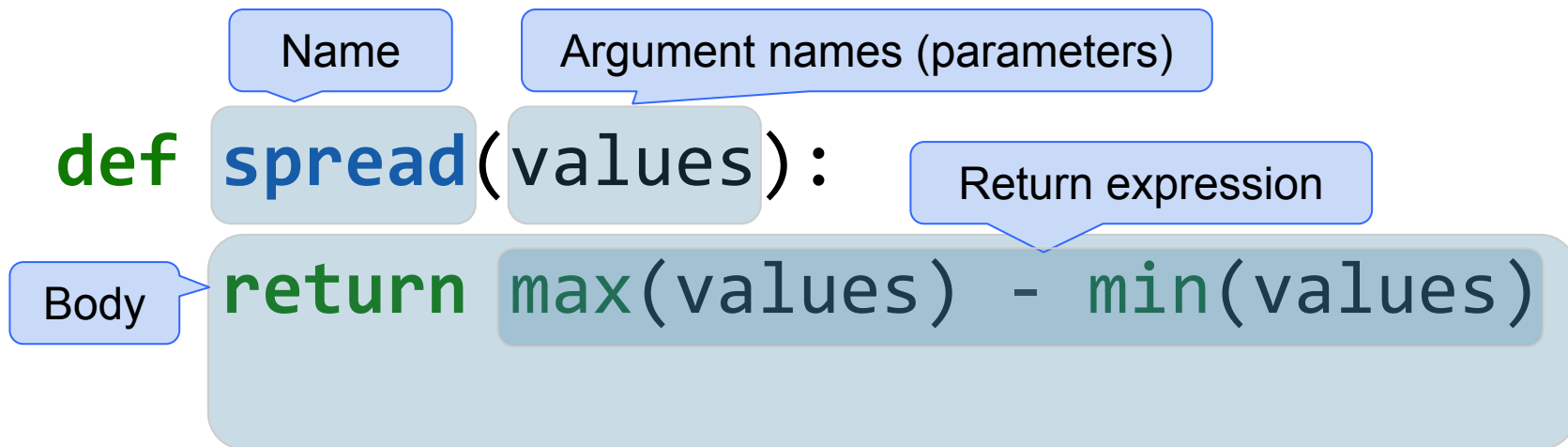
Answer these questions, if possible:

- What are the units of the vertical axis?
- What proportion of days had a high temp in the range 60-70?
- What proportion had a low of 45 or more?
- How many days had a difference of more than 20 degrees between their high & low temperatures?

Defining Functions

Def Statements

User-defined functions give names to blocks of code

Name

Argument names (parameters)

```
def spread(values):
        return max(values) - min(values)
```

Return expression

Body

(Demo)

Discussion Question

What does this function do? What kind of input does it take? What output will it give? What's a reasonable name?

```python
def f(s):
    return np.round(s / sum(s) * 100, 2)
```

(Demo)

Apply

Apply

The `apply` method creates an array by calling a function on every element in input column(s)

- First argument: Function to apply
- Other arguments: The input column(s)

`table_name.apply(function_name, 'column_label')`

(Demo)

Apply

The `apply` method with no second argument creates an array by calling a function on every row in a table

- First argument:　　　Function to apply

`table_name.apply(function_name)`

(Demo)

Example: Prediction

Sir Francis Galton

- 1822 - 1911 (knighted in 1909)

- A pioneer in making predictions

- Particular (and troublesome)

  interest in heredity

- Charles Darwin's half-cousin

  (Demo)