Census
Announcements

- Homework 2 due Thursday 2/8
- Lab 3 will be released tomorrow
Tables Review
# Table Structure

- A Table is a sequence of labeled columns
- Labels are strings
- Columns are arrays, all with the same length

<table>
<thead>
<tr>
<th>Name</th>
<th>Code</th>
<th>Area (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>CA</td>
<td>163696</td>
</tr>
<tr>
<td>Nevada</td>
<td>NV</td>
<td>110567</td>
</tr>
</tbody>
</table>
Table Methods

- Creating and extending tables:
  - `Table().with_columns` and `Table.read_table`
- Finding the size: `t.num_rows` and `t.num_columns`
- Referring to columns: labels, relabeling, and indices
  - `t.labels` and `t.relabeled`; column indices start at 0
- Accessing data in a column
  - `t.column` takes a label or index and returns an array
- Using array methods to work with data in columns
  - `a.item(row_index)` returns a value in an array
  - `a.sum(), a.min(), a.max()` or `sum(a), min(a), max(a)`
- Creating new tables containing some of the original columns:
  - `select, drop`
Manipulating Rows

- \texttt{t.sort(column)} sorts the rows in increasing order
- \texttt{t.take(row_numbers)} keeps the numbered rows
  - Each row has an index, starting at 0
- \texttt{t.where(column, are.condition)} keeps all rows for which a column's value satisfies a condition
- \texttt{t.where(column, value)} keeps all rows for which a column's value equals some particular value
- \texttt{t.with_row} makes a new table that has another row

(Demo)
The table `nba` has columns `NAME`, `POSITION`, and `SALARY`.

a) Create an array containing the names of all point guards (PG) who make more than $15M/year

```
nba.where(1, 'PG').where(2, are.above(15)).column(0)
```

b) After evaluating these two expressions in order, what's the result of the second one?

```
nba.with_row([['Samosa', 'Mascot', 100]])
nba.where('NAME', are.containing('Samo'))
```
Census Data
The Decennial Census

● Every ten years, the Census Bureau counts how many people there are in the U.S.

● In between censuses, the Bureau estimates how many people there are each year.

● Article 1, Section 2 of the Constitution:
  ○ “Representatives and direct Taxes shall be apportioned among the several States … according to their respective Numbers …”
Analyzing Census Data

Leads to the discovery of interesting features and trends in the population

(Demo)
Census Table Description

- Values have column-dependent interpretations
  - The SEX column: 1 is Male, 2 is Female
  - The POPESTIMATE2010 column: 7/1/2010 estimate

- In this table, some rows are sums of other rows
  - The SEX column: 0 is Total (of Male + Female)
  - The AGE column: 999 is Total of all ages

- Numeric codes are often used for storage efficiency

- Values in a column have the same type, but are not necessarily comparable (AGE 12 vs AGE 999)