

Lecture 1

Introduction to Data Science

1. Introduction to Data
2. A Look Ahead

1. Introduction to Data

What Does Data Look Like?

What Does Data Look Like?

	titanic													
T	name	pclass	survived	sex	age	sibsp	parch	ticket	fare	cabin	embarked	boat	body	home.dest
2	Allen, Miss. Elisabeth Walton	1	1	female	29	0	0	24160	211.3375	B5	S	2		St Louis, MO
3	Allison, Master. Hudson Trevor	1	1	male	0.9167	1	2	113781	151.5500	C22 C26	S	11		Montreal, PQ / Chesterville, ON
4	Allison, Miss. Helen Loraine	1	0	female	2	1	2	113781	151.5500	C22 C26	S			Montreal, PQ / Chesterville, ON
5	Allison, Mr. Hudson Joshua Creighton	1	0	male	30	1	2	113781	151.5500	C22 C26	S		135	Montreal, PQ / Chesterville, ON
6	Allison, Mrs. Hudson J C (Bessie Walde	1	0	female	25	1	2	113781	151.5500	C22 C26	S			Montreal, PQ / Chesterville, ON
7	Anderson, Mr. Harry	1	1	male	48	0	0	19952	26.5500	E12	S	3		New York, NY
8	Andrews, Miss. Kornelia Theodosia	1	1	female	63	1	0	13502	77.9583	D7	S	10		Hudson, NY
9	Andrews, Mr. Thomas Jr	1	0	male	39	0	0	112050	0.0000	A36	S			Belfast, NI
10	Appleton, Mrs. Edward Dale (Charlotte	1	1	female	53	2	0	11769	51.4792	C101	S	D		Bayside, Queens, NY
11	Artagaveytia, Mr. Ramon	1	0	male	71	0	0	PC 17609	49.5042		C		22	Montevideo, Uruguay
12	Astor, Col. John Jacob	1	0	male	47	1	0	PC 17757	227.5250	C62 C64	C		124	New York, NY

- **pclass** → Indicator of children asocio-economic status (1 = highest class).
- **sibsp** → Number of siblings or spouses aboard the ship.
- **parch** → Number of parents or board the ship.
- **fare** → Ticket fare (price paid for the ticket).
- **embarked** → Port where the passenger boarded the ship.
- **boat** → The number of the lifeboat that the passenger boarded.
- **body** → if found dead body number

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Code Port Name
 (English) Country

C Cherbourg France

Q Queenstown Ireland

S Southampton England

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What Does Data Look Like?

observations

units

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What Does Data Look Like?

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observations

units

quantitative variables

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quantitative variables

categorical variables

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What Does Data Look Like?

variables

The diagram shows a table of data from the Titanic dataset. A vertical arrow labeled "units" points down the first column. A horizontal arrow labeled "observations" points across the first row. Three arrows point from the word "variables" to the columns: "titanic" points to the first column, "age" points to the fifth column, and "survived" points to the second column. A blue arrow labeled "quantitative variables" points to the "age" and "fare" columns. A red arrow labeled "categorical variables" points to the "survived", "sex", "embarked", and "home.dest" columns. The "pclass" column is circled in orange.

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How is Tabular Data Represented on Disk?

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"Astor, Col. John Jacob",1,0,male,47,1,0,PC 17757,227.5250,C62 C64,C,,124,"New York, NY"

Comma-Separated Values (CSV) format

How is Tabular Data Represented in Python?

name	pclass	survived	sex	age	sibsp	parch	ticket	fare	cabin	embarked	boat	body	home.dest
Allen, Miss. Elisabeth Walton	1	1	female	29	0	0	24160	211.3375	B5	S	2		St Louis, MO
Allison, Master. Hudson Trevor	1	1	male	0.9167	1	2	113781	151.5500	C22 C26	S	11		Montreal, PC
Allison, Miss. Helen Loraine	1	0	female	2	1	2	113781	151.5500	C22 C26	S			Montreal, PC
Allison, Mr. Hudson Joshua Creighton	1	0	male	30	1	2	113781	151.5500	C22 C26	S		135	Montreal, PC
Allison, Mrs. Hudson J C (Bessie Walde	1	0	female	25	1	2	113781	151.5500	C22 C26	S			Montreal, PC
Anderson, Mr. Harry	1	1	male	48	0	0	19952	26.5500	E12	S	3		New York, N
Andrews, Miss. Kornelia Theodosia	1	1	female	63	1	0	13502	77.9583	D7	S	10		Hudson, NY
Andrews, Mr. Thomas Jr	1	0	male	39	0	0	112050	0.0000	A36	S			Belfast, NI
Appleton, Mrs. Edward Dale (Charlotte	1	1	female	53	2	0	11769	51.4792	C101	S	D		Bayside, Qu
Artagaveytia, Mr. Ramon	1	0	male	71	0	0	PC 17609	49.5042		C		22	Montevideo,
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DataFrame

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DataFrame

Let's interact with this data using Python in a **notebook**.

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DataFrame

Let's interact with this data using Python in a **notebook**.

All of our code will be written in Jupyter notebooks like this one.

Review: Categorical Variables

To *summarize* a categorical variable, we report the **counts** of each possible category.

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To *visualize* a categorical variable, we make a **bar plot**.

```
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Review: Categorical Variables

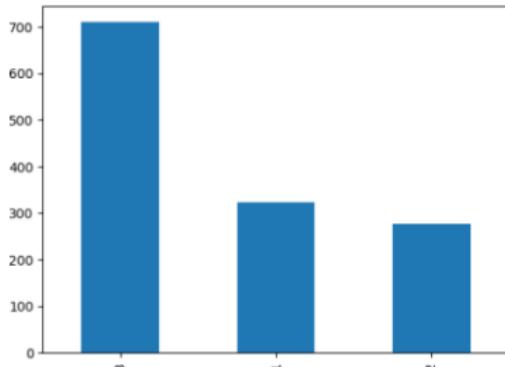
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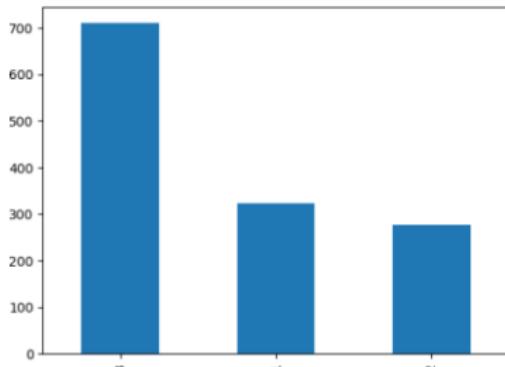
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Hmm...why are the
classes out of order?

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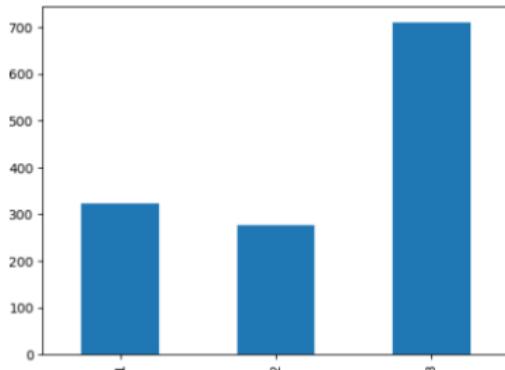
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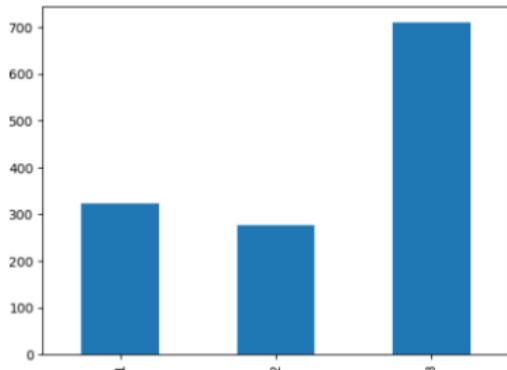
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Notice that we can chain methods, one after the other.



1 Introduction to Data

2 A Look Ahead

The Three Parts of Data Science

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