Chapter 2 Displaying and Describing Categorical Data

Three Rules of Data Analysis:

1. **Make a Picture** - to "Think" clearly; to see patterns and relationships you might not be able to see in a table of numbers.
2. **Make a Picture** – to "Show" the important features and patterns of your data.
3. **Make a Picture** – to "Tell" others about your data.

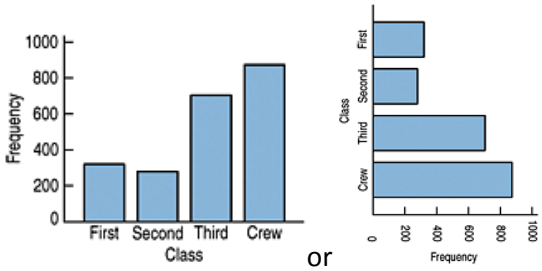
Frequency Table: A table with counts (frequencies) in each category.

Class	Count
First	325
Second	285
Third	706
Crew	885

Relative Frequency Table: A table with decimals or percents in each category. We find the decimals by taking the frequency of each category / total number of data values. We can leave that as a decimal or express it as a percentage.

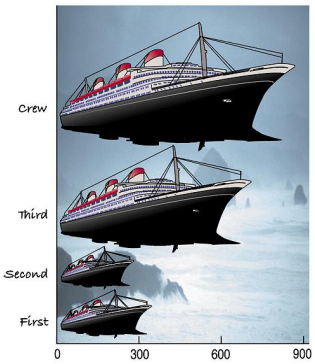
Class	%
First	14.77
Second	12.95
Third	32.08
Crew	40.21

Bar Chart – visual display of frequencies/relative frequencies for categorical data.

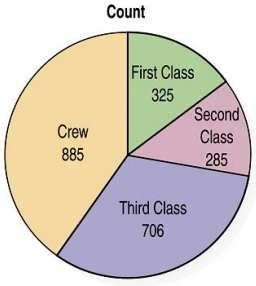


Area Principle: the area occupied by a part of the graph should correspond to the magnitude of the value it represents.

Example: Titanic data, p.16. Since there were about 3 times as many crew as second-class passengers, the ship depicting crew is about 3 times longer as the picture depicting 2nd class passengers, but it occupies about 9 times the area.



Pie Chart – visual display of categorical data; each "slice" is found by taking the relative frequency of each category and applying that same percentage to the 360° circle.



Contingency Tables: a table that allows us to look at two variables of the data at the same time.

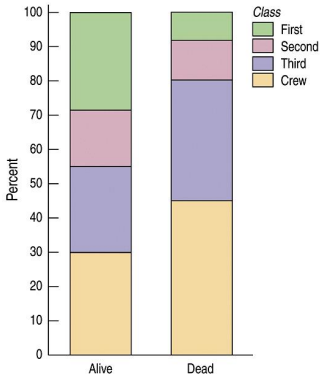
The variables are **independent** when the distribution of one variable is the same for all categories of the other.

		Class				
		First	Second	Third	Crew	Total
Survival	Alive	203	118	178	212	**711**
	Dead	122	167	528	673	**1490**
	Total	**325**	**285**	**706**	**885**	**2201**

Marginal distributions: row/column total percentages (margins of the table); a frequency distribution for one of the variables.

Conditional distributions: a specific row/column (NOT totals); show the distribution of one variable for just those cases that satisfy a condition on another variable.

Segmented Bar Charts: the bars represent the "whole" of one variable and is divided proportionally into segments corresponding to the percentage in each group of the other variable.



Simpson's Paradox: unfair averaging over different groups; comparing individual averages against overall averages can yield different (opposite) results.

Example, p.29

		Time of Day		
		Day	Night	Overall
Pilot	Moe	90 out of 100 90%	10 out of 20 50%	100 out of 120 83%
	Jill	19 out of 20 95%	75 out of 100 75%	94 out of 120 78%