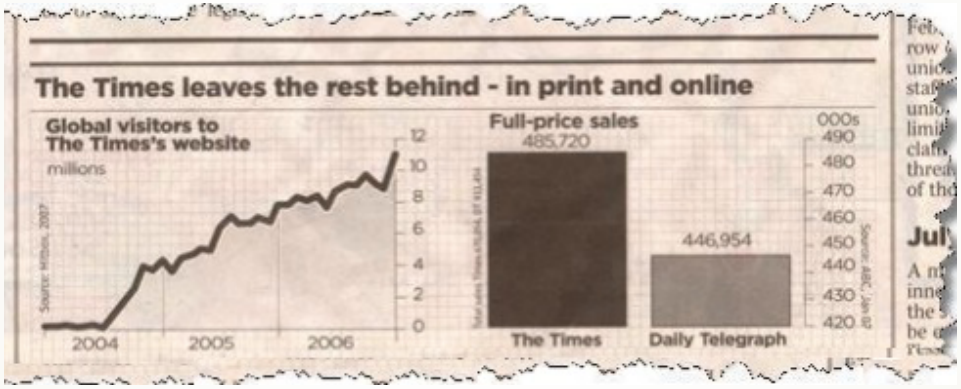
Graph Frequency Distributions

5-3: Automobile Ownership

Why are graphs used so frequently in daily life?

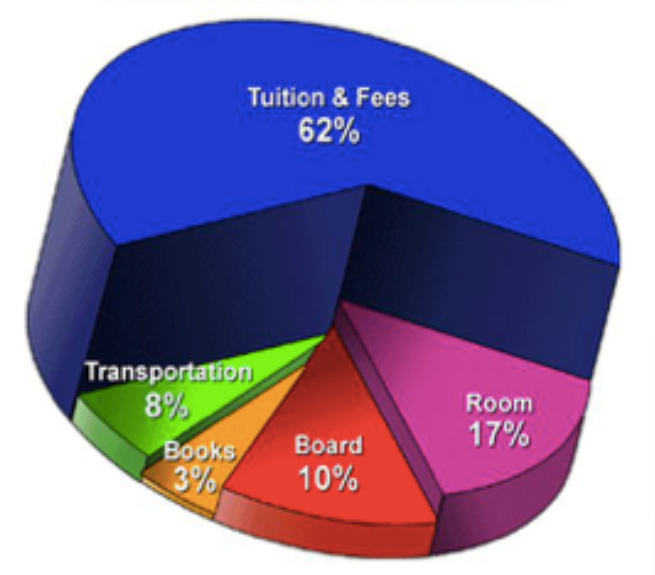
- Graphs appear in textbooks, news articles, magazines, social media, and on TV.



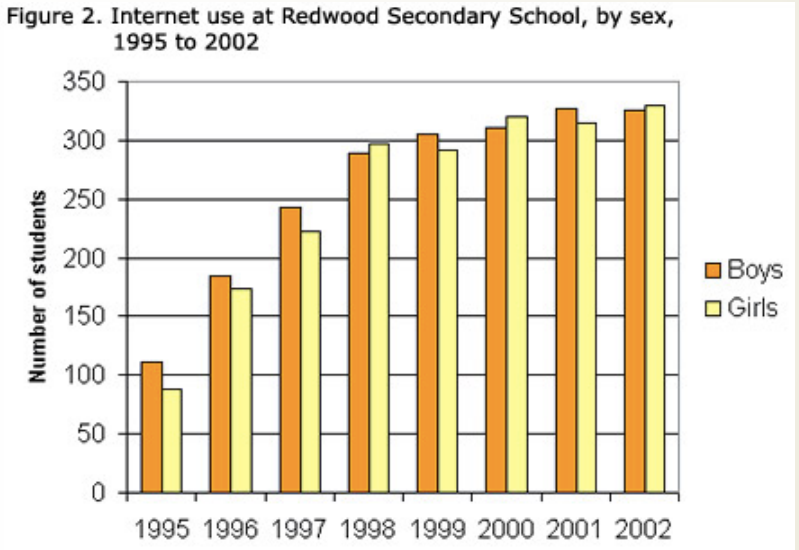
- Graphs gather and present information in an easy-to-see format that can be interpreted quicker than information from a long list of numbers.

Examples of commonly used graphs:

- Circle graphs

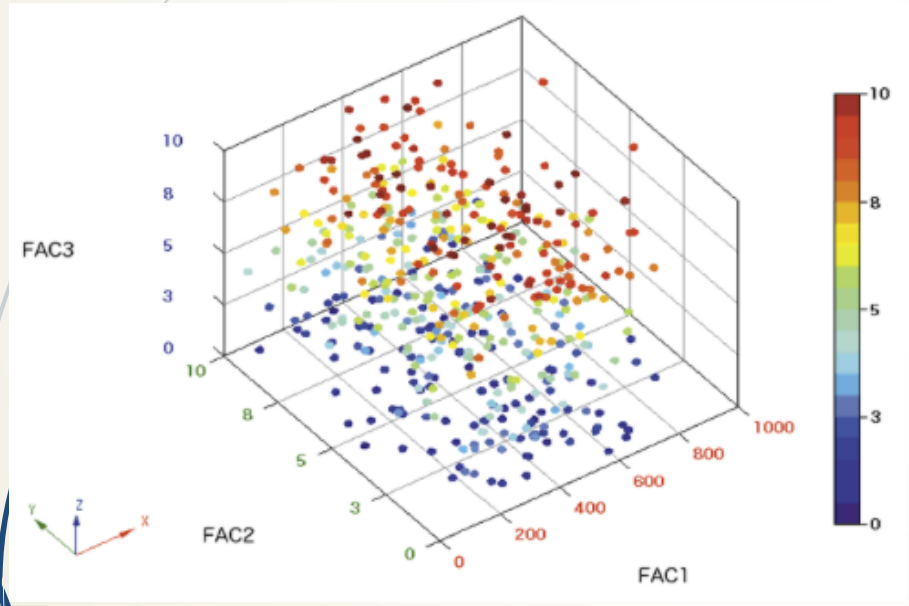


- Bar graphs

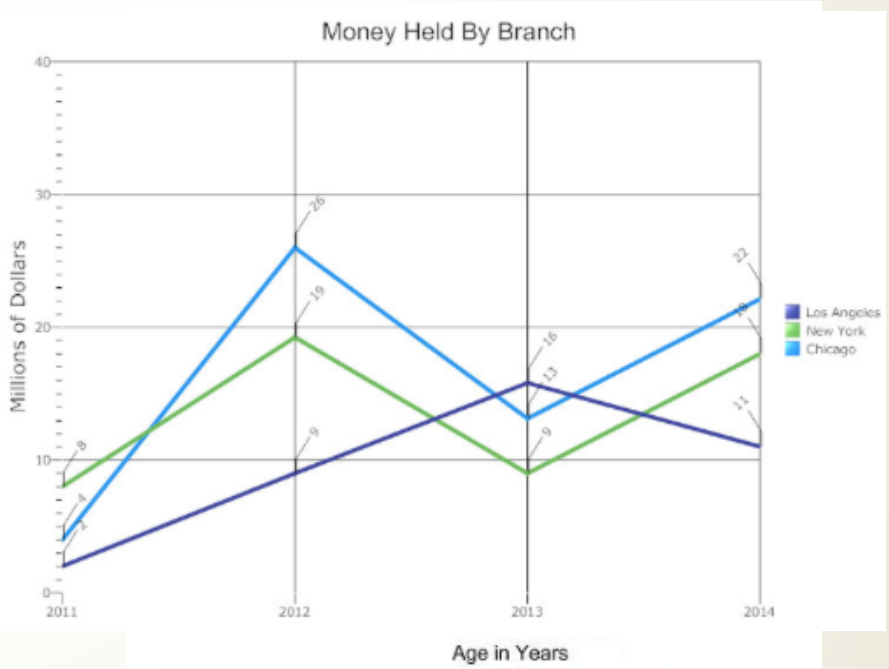


Examples of commonly used graphs:

- Scatterplots



- Line graphs



Frequency Distribution

- A frequency distribution is a table that gives each number and the frequency that it occurs.

Example 1:

Below are the prices of a car stereo for sale. Create a frequency distribution for the data.

$540 $550 $550 $550 $550 $600 $600 $600 $675 $700 $700 $700 $700 $700 $700 $700 $750 $775 $775 $800 $870 $900 $900 $990 $990 $990 $990 $990 $990 $1000 $1200 $1200 $1200

Price, *p* ($)	Frequency, *f*
540	1
550	4
600	3
675	1
700	7
750	1
775	2
800	1
870	1
900	2
990	6
1000	1
1200	3
Total	**33**

Example 1:

- How many car stereos are selling for less than $800? 19
- How many car stereos are selling for more than $870? 12
- How many car stereos are selling between $675 and 900 (inclusive)? 15

Price, *p* ($)	Frequency, *f*
540	1
550	4
600	3
675	1
700	7
750	1
775	2
800	1
870	1
900	2
990	6
1000	1
1200	3
Total	**33**

Example 2:

- Find the mean of the car stereo prices from example 1.

$$\frac{26{,}425}{33}$$

$$800.76$$

Price, *p* ($)	Frequency, *f*	*Product (pf)*
540	1	540
550	4	2200
600	3	1800
675	1	675
700	7	4900
750	1	750
775	2	1550
800	1	800
870	1	870
900	2	1800
990	6	5940
1000	1	1000
1200	3	3600
Total	**33**	**26,425**

Stem-And-Leaf Plot

- A stem-and-leaf plot is a table that displays the frequency of data differently than a frequency distribution.

stem	leaf
0	1, 1, 2, 2, 3, 4, 4, 4, 4, 5, 8
1	0, 0, 0, 1, 1, 3, 7, 9
2	5, 5, 7, 7, 8, 8, 9, 9
3	0, 1, 1, 1, 2, 2, 2, 4, 5
4	0, 4, 8, 9
5	2, 6, 7, 7, 8
6	3, 6

Key: 6|3 = 63 years old

stem	leaf
0	5 7
1	1 3 5 9
2	0 4
3	5
4	0 3

Key: 1|7 means 1.7

stem	leaf
5	6
6	7, 7, 9
7	2, 4, 7, 7, 8
8	1, 2, 2, 3, 4, 8
9	0, 2, 3, 4

Key: 5|6 = 56%

Example 3:

Rod was doing Internet research on the number of gasoline price changes per year in gas stations in his county. He organized his data in a stem-and-leaf plot. What are the mean and median of this distribution?

1	1 1 2 3 7 9
2	0 3 6 6
3	8 8 9 9 9 9 9
4	0
5	2 2 4 5 5 5 6 7
6	3 4 4
7	2

5 | 2 = 52

Example 3:

1	~~1~~ ~~1~~ ~~2~~ ~~3~~ ~~7~~ ~~9~~
2	~~0~~ ~~3~~ ~~6~~ ~~6~~
3	~~8~~ ~~8~~ ~~9~~ ~~9~~ 9 9 ~~9~~
4	~~0~~
5	~~2~~ ~~2~~ ~~4~~ ~~5~~ ~~5~~ ~~5~~ ~~6~~ ~~7~~
6	~~3~~ ~~4~~ ~~4~~
7	~~2~~

5 | 2 = 52

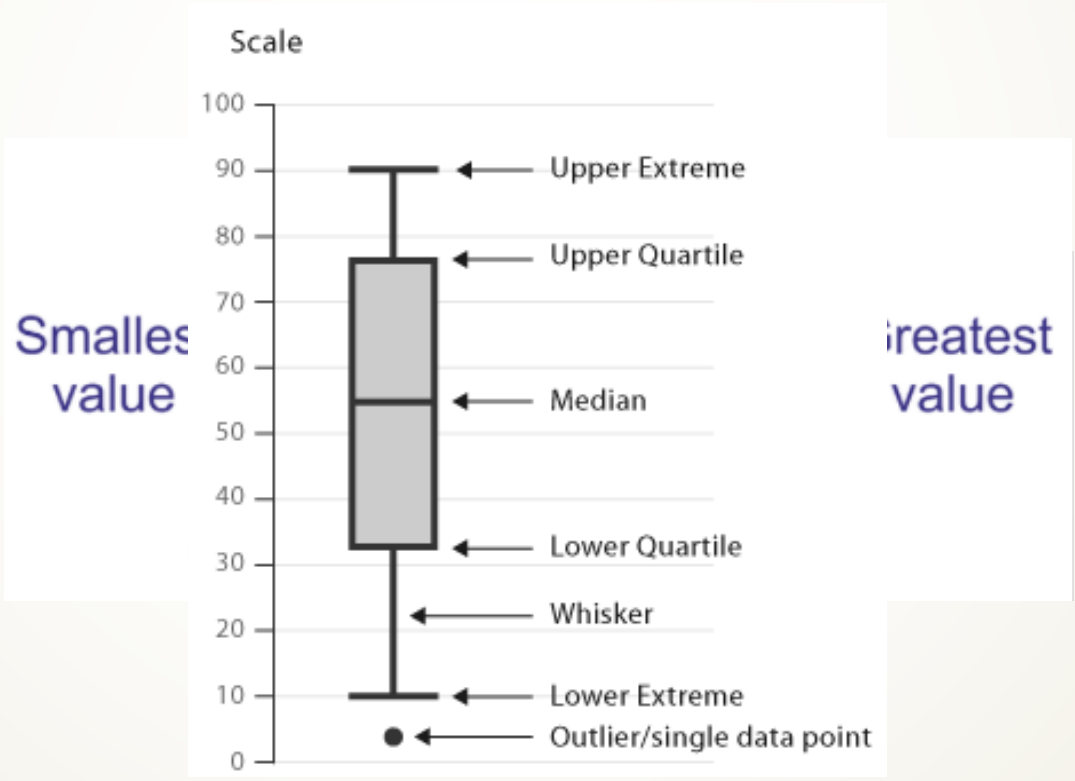
- **Mean**:

$$\frac{11+11+12+13+\ \ldots+72}{30} = 39.6$$

- **Median**: 39

Box-and-Whisker Plots

- Box-and-whisker plots (aka box plots) quickly show the range of the data along with the median and the upper and lower quartiles.



Example 4:

Use the data Rod collected to make a box-and-whisker plot.

1	~~1~~ ~~1~~ ~~2~~ ~~3~~ ~~7~~ ~~9~~
2	~~0~~ **3** ~~6~~ ~~6~~
3	~~8~~ ~~8~~ ~~9~~ ~~9~~ ~~9~~ ~~9~~ ~~9~~
4	~~0~~
5	~~2~~ ~~2~~ ~~4~~ ~~5~~ **5** ~~5~~ ~~6~~ ~~7~~
6	~~3~~ ~~4~~ ~~4~~
7	~~2~~

5 | 2 = 52

- First, we need to find the *median*.

  Median = 39

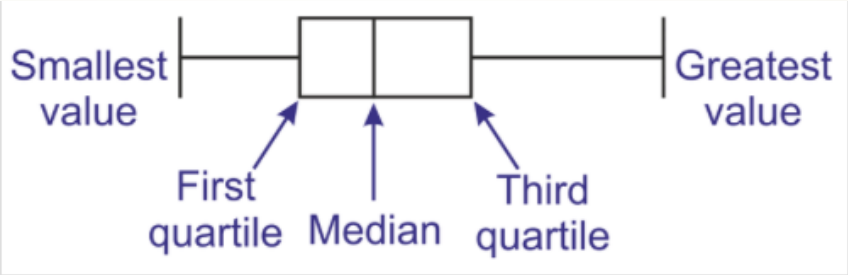
- Now, we need to find Q_1 and Q_3.

  $Q_1 = 23$ $Q_3 = 55$

- We also need to note the highest and lowest numbers.

  Low = 11 High = 72

Example 4:



Low = 11 Q_1 = 23 Median = 39 Q_3 = 55 High = 72