Lesson 06: What is the advantage of using a stem-and-leaf display over a histogram? disadvantage?

Q: The following represents the ages of the 50 richest people in the world in 2009

89, 89, 87, 86, 86, 85, 83, 83, 82, 81,

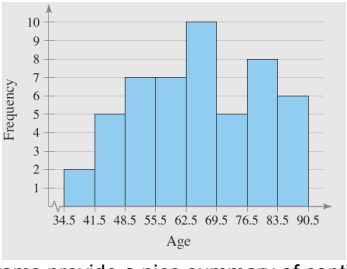
80, 78, 78, 77, 76, 73, 73, 73, 72, 69,

69, 68, 67, 66, 66, 65, 65, 64, 63, 61,

61, 60, 59, 58, 57, 56, 54, 54, 53, 53,

51, 51,49, 47, 46, 44, 43, 42, 36, 35

Make a histogram to display the data.



Histograms provide a nice summary of continuous numerical data but they don't highlight the values themselves.

What story does this histogram tell?

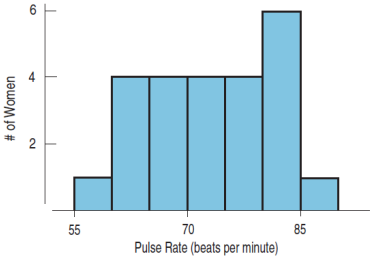


FIGURE 4.3
The pulse rates of 24 women at a health clinic

2. Stem-and-leaf plot - for Quantitative data

must highlight meaning

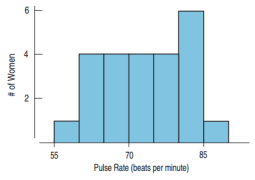
8	8
8	000044
7	6666
7	2222
6	8888
6	0444
5	6

Pulse Rate
(8|8 means 88 beats/min)

Does this display reveal anything extra about the pulse rates of 24 women at a health clinic?

How do you think the nurse took these pulses? Counting beats for a full minute or counting for only 15 seconds and multiplying by 4?

Histogram vs stem-and-leaf sideways



8	8
8	000044
7	6666
7	2222
6	8888
6	0444
5	6

Pulse Rate
(8|8 means 88 beats/min)

Turn it!

Advantages	Disadvantages
Easy to make by hand for small data sets	Histogram is a better display for large data sets
Leaves show individual values - might allow us to see more into the data than general trends	If the numerical data is not well behaved, setting up stems can become difficult
Outliers, data clusters, and gaps are easily visible	
Min, max, range, mode, median becomes obvious in this display	

Let's make a stem-and-leaf plot

The following are the numbers of text messages sent last week by the cellular phone users on one floor of a college dormitory. Display the data in a stem-and-leaf plot. What can you conclude?

155 159 144 129 105 145 126 116 130 114 122 112 112 142

126 118 118 108 122 121 109 140 126 119 113 117 118 109

109 119 139 139 122 78 133 126 123 145 121 134 124 119

132 133 124 129 112 126 148 147

Does order matter?

Number of Text Messages Sent

7	8	Key: 15|5 = 155
8		
9		
10	5 8 9 9 9	
11	6 4 2 2 8 8 9 3 7 8 9 9 2	
12	9 6 2 6 2 1 6 2 6 3 1 4 4 9 6	
13	0 9 9 3 4 2 3	
14	4 5 2 0 5 8 7	
15	5 9	

Unordered Stem-and-Leaf Plot

Number of Text Messages Sent

7	8	Key: 15|5 = 155
8		
9		
10	5 8 9 9 9	
11	2 2 2 3 4 6 7 8 8 8 9 9 9	
12	1 1 2 2 2 3 4 4 6 6 6 6 6 9 9	
13	0 2 3 3 4 9 9	
14	0 2 4 5 5 7 8	
15	5 9	

Ordered Stem-and-Leaf Plot

Stem-and-leaf plot with 2 rows for each stem

Number of Text Messages Sent

7	Key: 15|5 = 155
7	8
8	
8	
9	
9	
10	
10	5 8 9 9 9
11	4 2 2 3 2
11	6 8 8 9 7 8 9 9
12	2 2 1 2 3 1 4 4
12	9 6 6 6 6 9 6
13	0 3 4 2 3
13	9 9
14	4 2 0
14	5 5 8 7
15	
15	5 9

Unordered Stem-and-Leaf Plot

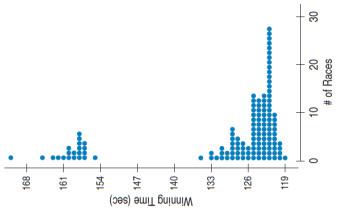
Number of Text Messages Sent

7	Key: 15|5 = 155
7	8
8	
8	
9	
9	
10	
10	5 8 9 9 9
11	2 2 2 3 4
11	6 7 8 8 8 9 9 9
12	1 1 2 2 2 3 4 4
12	6 6 6 6 6 9 9
13	0 2 3 3 4
13	9 9
14	0 2 4
14	5 5 7 8
15	
15	5 9

Ordered Stem-and-Leaf Plot

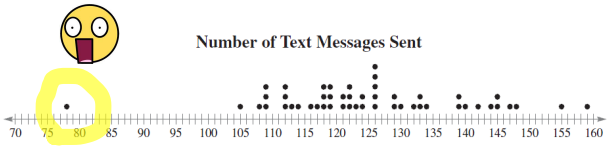
And

the dotplot is basically a stem-and-leaf plot where each leaf is replaced with a dot



A dotplot of Kentucky Derby winning times plots each race as its own dot, showing the bimodal distribution.

Create a dotplot of the text message data



Dot Plots

Advantages	Disadvantages
Easy to make and interpret	Time consuming with large data sets
Clusters, gaps, outliers are easy to see	Fractions of units are hard to display
	Become cluttered if too many points

Think before you draw!