

STEM AND LEAF PLOTS

In this course you are not really held accountable for being able to construct a stem and leaf plot, but I do think there are several homework exercises which ask you to interpret a finished stem and leaf plot.

So please briefly review the slides here to get a jump start on being able to do that. I would never recommend an "unordered" stem and leaf plot - I would always recommend an "ordered" stem and leaf plot (the stem and leaf plot on the right hand side in the final slide here) . Thanks Friends and Best Wishes !! :)

Example: Constructing a Stem-and-Leaf Plot

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

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

Solution: Constructing a Stem-and-Leaf Plot

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

- The data entries go from a low of 78 to a high of 159.
- Use the rightmost digit as the leaf.
 - For instance,
 $78 = 7 \mid 8$ and $159 = 15 \mid 9$
- List the stems, 7 to 15, to the left of a vertical line.
- For each data entry, list a leaf to the right of its stem.

Solution: Constructing a Stem-and-Leaf Plot

Number of Text Messages Sent	Number of Text Messages Sent
7 8 Key: 15 5 = 155	7 8 Key: 15 5 = 155
8	8 <i>Include a key to identify the values of the data.</i>
9	9
10 5 8 9 9 9	10 5 8 9 9 9
11 6 4 2 2 8 8 9 3 7 8 9 9 2	11 2 2 2 3 4 6 7 8 8 8 9 9 9
12 9 6 2 6 2 1 6 2 6 3 1 4 4 9 6	12 1 1 2 2 2 3 4 4 6 6 6 6 6 9 9
13 0 9 9 3 4 2 3	13 0 2 3 3 4 9 9
14 4 5 2 0 5 8 7	14 0 2 4 5 5 7 8
15 5 9	15 5 9
Unordered Stem-and-Leaf Plot	Ordered Stem-and-Leaf Plot

From the display, you can conclude that more than 50% of the cellular phone users sent between 110 and 130 text messages.

DOT PLOTS

In this course you are not really held accountable for being able to construct a dot plot, but I do think there are several homework exercises which ask you to interpret a finished dot plot.

So please briefly review the slides here to get a jump start on being able to do that. Thanks Friends and Best Wishes !! :)

Example: Constructing a Dot Plot

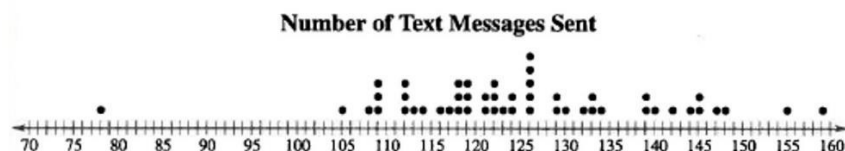
Use a dot plot organize the text messaging data.

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

- So that each data entry is included in the dot plot, the horizontal axis should include numbers between 70 and 160.
- To represent a data entry, plot a point above the entry's position on the axis.
- If an entry is repeated, plot another point above the previous point.

Solution: Constructing a Dot Plot

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



From the dot plot, you can see that most values cluster between 105 and 148 and the value that occurs the most is 126. You can also see that 78 is an unusual data value.

BOX AND WHISKERS PLOTS

Box and Whiskers Plots are a great graphical display for numerical data. Making a box and whiskers plot starts with finding something called the five number summary which involves the:

minimum data value

first quartile

second quartile which is also called the median and is also called the fiftieth percentile

third quartile

maximum data value

The property of the first quartile is that 25% of the observations are below it and 75% of the observations are above it

The property of the third quartile is that 75% of the observations are below it and 25% of the observations are above it

And you can guess now that the property of the second quartile is that 50% of the observations are below it and 50% of the observations are above it

Related to the box and whiskers plot and the five number summary are something called the inter quartile range and the so-called fences. Formulas for range, inter quartile range, the lower fence and the upper fence are on page one of the attachment here - most of these being in the right hand column near the middle of page 1 of 8. Thanks Friends and Best Wishes !! :)

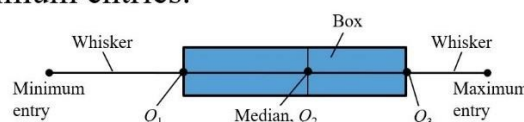
Box-and-Whisker Plot

Box-and-whisker plot

- Exploratory data analysis tool.
- Highlights important features of a data set.
- Requires (**five-number summary**):
 - Minimum entry
 - First quartile Q_1
 - Median Q_2
 - Third quartile Q_3
 - Maximum entry

Drawing a Box-and-Whisker Plot

1. Find the five-number summary of the data set.
2. Construct a horizontal scale that spans the range of the data.
3. Plot the five numbers above the horizontal scale.
4. Draw a box above the horizontal scale from Q_1 to Q_3 and draw a vertical line in the box at Q_2 .
5. Draw whiskers from the box to the minimum and maximum entries.

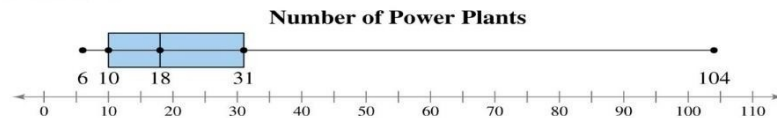


Example: Drawing a Box-and-Whisker Plot

Draw a box-and-whisker plot that represents the 15 data set.

Min = 6, $Q_1 = 10$, $Q_2 = 18$, $Q_3 = 31$, Max = 104,

Solution:



About half the scores are between 10 and 31. By looking at the length of the right whisker, you can conclude 104 is a possible outlier.

The 15 pieces of data used in the slide just above here came from the following:

The number of nuclear power plants in the top 15 nuclear power-producing countries in the world are listed.

7 18 11 6 59 17 18 54 104 20 31 8 10 15 19

(Of course if you were going to go after the five number summary by hand without using technology, then the first thing you would have to do is list these 15 numbers from smallest to largest from right to left) ;)