

Section 2.2

Organizing Quantitative Data: The Popular Displays

Histogram = Constructed by drawing rectangles for each class of data. The height of each rectangle is the frequency or relative frequency of the class. The width of each rectangle is the same and the rectangles touch each other

Frequency Distribution = lists data values (either individually or by groups of intervals) along with their corresponding frequencies (or counts). Can be displayed in a bar chart

Lower Class Limits (LCL) = the smallest numbers that can belong to the different classes

Upper Class Limits = the largest numbers that can belong to the different classes

Open Ended Distributions = the first class has no lower class limit or the last class has no upper class limit

Gap = The difference between the lower class limit of one class and the upper class limit of the class right below it

$\frac{1}{2}$ Gap = Multiply the Gap by 0.5

Upper Class Boundary (UCB) =
 $UCL + \frac{1}{2} \text{ GAP}$

Lower Class Boundary (LCB) =
 $LCL - \frac{1}{2} \text{ GAP}$

Class Midpoints

$$\frac{LCL + Next \quad LCL}{2}$$

Class Width = the difference between two consecutive lower class limits (or boundaries) or two consecutive upper class limits (or boundaries)

Constructing Frequency Distribution

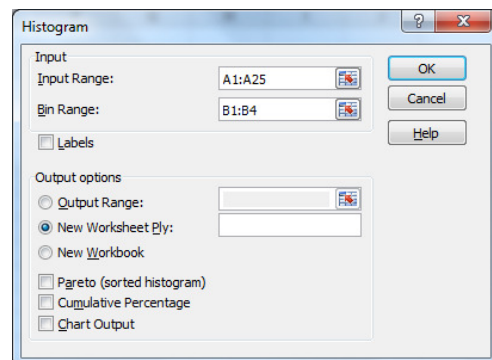
1. Decide on number of classes: n (between 5-20),
2. Calculate class width (highest value minus lowest value then divide by n). Round up to a convenient number
3. Choose the LCL for the beginning class using lowest data value or convenient number.
4. Keep adding class width over and over to get other LCL's of other classes
5. Figure UCL from these (usually a gap of 1 or .1 or .01 or etc... is assumed) ex: if you have one decimal place in your data, then use 0.1 (since it has one decimal)
6. Go through data and put tally marks in the appropriate class and then add them all at the end.

Relative Frequency Distribution
= replace the frequency with the following formula: $\frac{\text{class frequency}}{\text{sum of all frequencies}}$

Cumulative Frequency Distribution = for a class, this is the sum of the frequencies for that class and all previous classes.

Creating Histogram (Excel)

1. Put data into column A (lets say it is in A1:A25)
2. Put UCLs (bins) into column B (lets say it is in B1: B5)
3. Click Data Tab -> "Data Analysis"
4. Choose Histogram -> Choose appropriate settings (see next slide) and click "OK" button



Creating Histogram (TI-83/84)

1. Put data into L1 (STAT Button -> EDIT)
2. "2nd" button, "y=" button, "enter" on Plot1
3. Choose "On", "third graph type", L1, 1
4. "Window" button:
Xmin = LCL of first class
Xmax = LCL of class beyond the last class
Xscl = Class Width
Ymin = 0
Ymax = Your Guess
5. "Graph" button and use "Trace" button to determine frequency.

Stem-and-Leaf Plot = Use the digits to the left of the rightmost digit to form the stem. Each rightmost digit forms a leaf (example: 147 would have 14 as stem and 7 as leaf)

Construction of a Stem-and-Leaf Plot

1. Stems are the digits to the left of the rightmost digit, leaves are the rightmost digit
2. Write stems in a vertical column in increasing order with a vertical line to the right (don't repeat duplicates)
3. Write each leaf to the right of this vertical line (from smallest to largest, these can repeat)

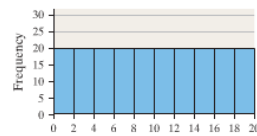
Note

- If the data is bunched up, can split each stem into two or more (can repeat). This is referred to as split stem

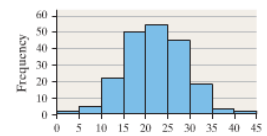
Dot Plot

- Place each observation horizontally in increasing order and place a dot above the observation each time it is observed

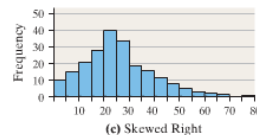
Shape of a Distribution



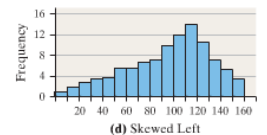
(a) Uniform (symmetric)



(b) Bell-shaped (symmetric)



(c) Skewed Right



(d) Skewed Left