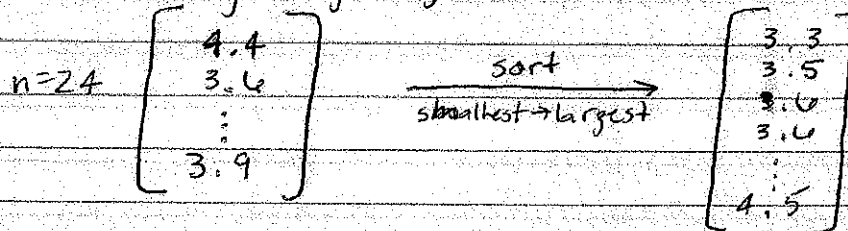


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1.3 Descriptive Methods

1.3.1 Graphical Descriptive Methods

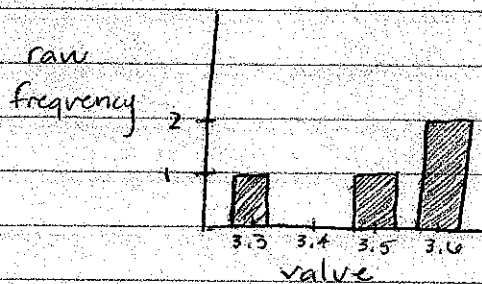
butterfly wing length (cm)



- Raw Frequency Distribution

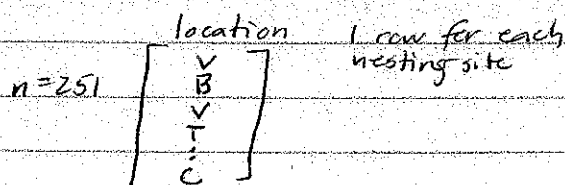
<u>value</u>	<u>count (raw frequency)</u>
3.3	1
3.4	0
3.5	1
3.6	2
\vdots	\vdots
4.5	1
	<u>$n=24$</u>

- Raw Frequency Histogram



* histograms must have quantitative variables, bar graphs are drawn for qualitative data, histograms are a special case of bar graphs

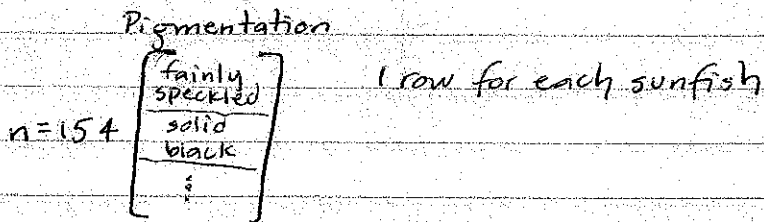
• One secret to good statistical work: visualize the raw data. ex:



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- More Graphical Examples

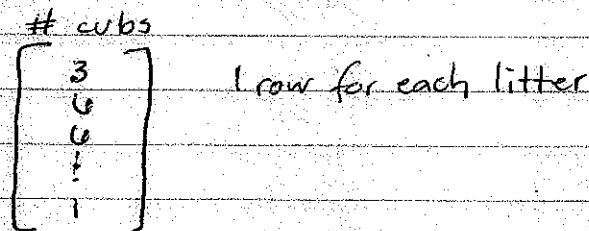
• Sunfish Pigmentation



Data: qualitative, ^{ordinal} ~~nominal~~

Histogram? NO ; Bar Graph? Yes

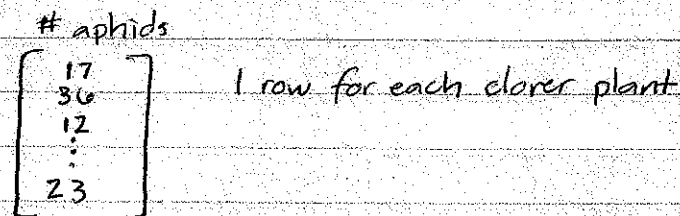
• Fox Litter Size



Data: quantitative, discrete, ratio

Histogram? Yes

• Aphids on Clover Plants

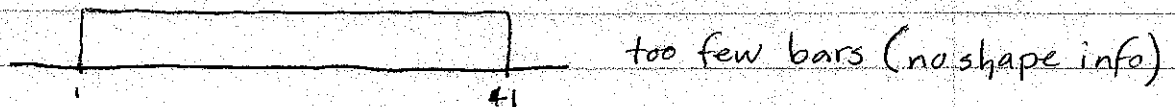


Data: quantitative, discrete, ratio

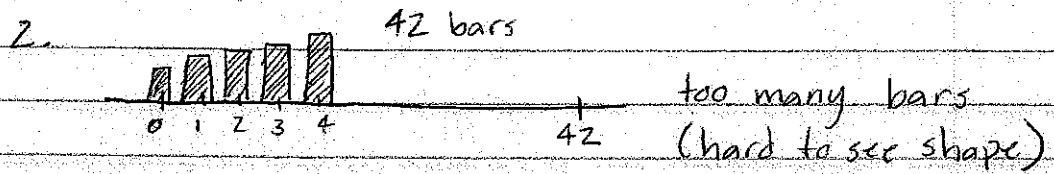
Histogram? Yes

How do we draw a histogram for this data?

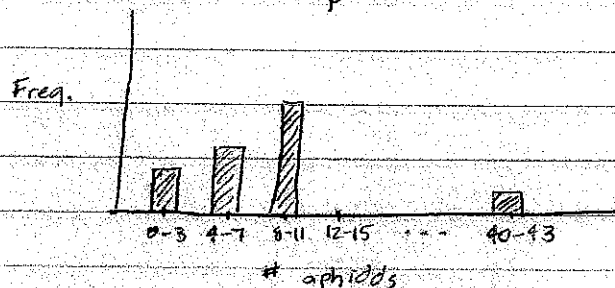
1.



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Solution: Group numbers



1.3.2 Numerical Descriptive Methods

- 3 measures of center: mean, median, mode

wing length (cm) Y

$$n=24 \begin{bmatrix} 4.4 \\ 3.6 \\ \vdots \\ 3.9 \end{bmatrix} = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_{24} \end{bmatrix}$$

Mean: $(\bar{y}) = \frac{95}{24} = 3.96 \text{ cm}$

$$\text{mean } \bar{y} = \frac{y_1 + y_2 + \dots + y_n}{n}$$

$$= \frac{1}{n} (y_1 + y_2 + \dots + y_n)$$

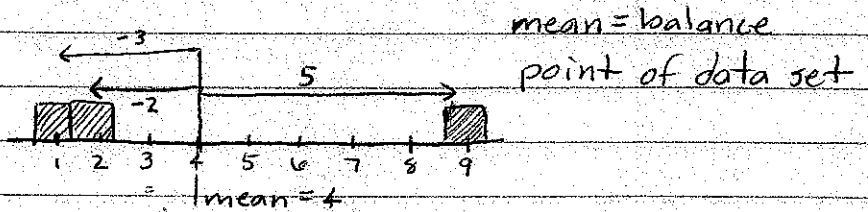
capital sigma

$$= \frac{1}{n} \sum_{i=1}^n y_i$$

index of summation

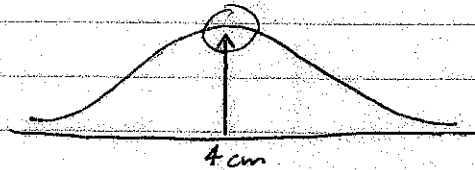
$$\begin{bmatrix} 1 \\ 2 \\ 9 \end{bmatrix} n=3$$

mean $\bar{y} = 4$



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- Mode: point of highest frequency

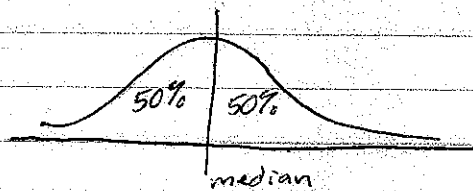


- Median: middle of data, sorted from smallest to largest

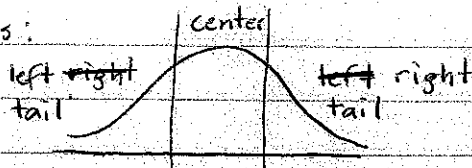
ex:

$$\begin{bmatrix} 1 \\ 2 \\ 9 \end{bmatrix} = 2$$

$$\begin{bmatrix} 1 \\ 2 \\ 3 \\ 9 \end{bmatrix} = \frac{2+3}{2} = 2.5 = \tilde{y}$$



Histograms:



Types:

long left hand tail

symmetrical

long right hand tail

