

Data Collection : (trend)
(on average)

Lesson 1:

Measures of Central Tendency

of a Distribution \bar{x} . average / mean

mdr median → the middle data point of sorted distribution

mo . mode - the most frequent data point.

Definition:

a distribution is a set of data points.
(a group)

marks
listed = { 38, 70, 43, 50, 90 }

DATA COLLECTION - 4152

LESSON 1: MEASURES OF CENTRAL TENDENCY AND STEM-AND-LEAF GRAPHS OF A DISTRIBUTION

Example 1: The two charts below present the grades students received on the 4151 exam. The two distributions are not ordered. Non-ordered distributions are harder to interpret/describe. Non-ordered distributions are harder to compare.

MTH 4151 final exam marks (%) Class A	77	61	61	75	66	60	70	60	70	62
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MTH 4151 final exam marks (%) Class B	66	72	40	88	90	38	75	65	70	70	66
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Class A: 60, 60

Tips for ordering
 → start w smallest
 → check marks.
 → count number of values (n) should be the same as before.

Example 2: The distributions are now ordered from lowest to highest. An ordered distribution allows you to visualize the central tendency.

$10 = n$ $M_o = 60\% / 61\% / 70\%$

MTH 4151 final exam marks (%) <u>Class A</u>	60	60	61	61	62	66	70	70	75	77	- more clustered	
	$\bar{x}_A = 66.2\%$ $Range_A = 77 - 60 = 17\%$											
MTH 4151 final exam marks (%) <u>Class B</u>	38	40	65	66	66	70	70	72	75	88	90	- more dispersed (spread out)
	$M_o = 66\%$ $\bar{x}_B = 67.3\%$ $Range_B = 90 - 38 = 52\%$ max											
	min 70% $= 52\%$ $- larger$											

Average / mean : $\bar{x} = \frac{\sum_{i=1}^n x_i}{n} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$

$\bar{x} = \frac{\text{sum of values}}{\text{number of values}}$ \rightarrow measure of central tendency.

$Range = max - min$ \rightarrow measure of dispersion

\hookrightarrow the less dispersed the better
the consistent (accurate mean)

Identifying Median: Median's position = $\frac{n + 1}{2}$

MTH 4151 final exam marks (%) Class A	60	60	61	61	62	66	70	70	75	77
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$n = 10$
 $\frac{10 + 1}{2} = 5.5$ position
 median = $\frac{5^{th} + 6^{th}}{2}$

$Md_A = 64\%$

MTH 4151 final exam marks (%) Class B	38	40	65	66	66	70	70	72	75	88	90
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$n = 11$
 $\frac{11 + 1}{2} = 6^{th}$ position

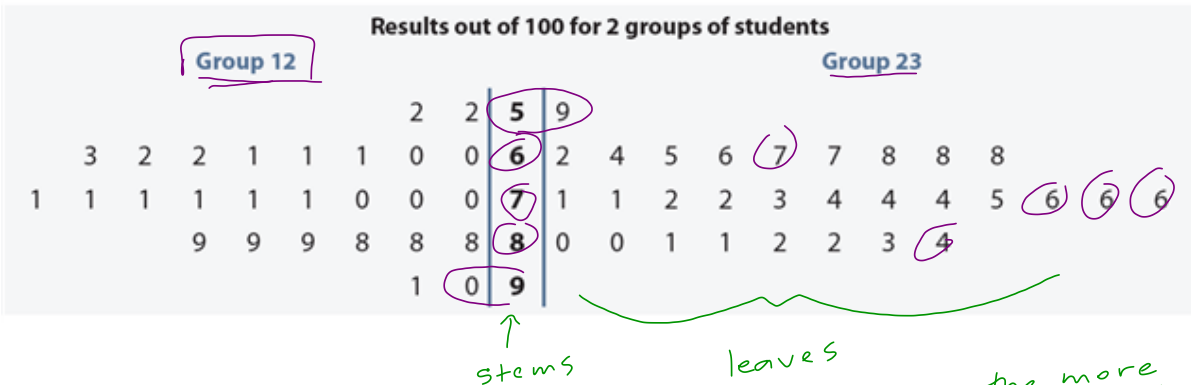
$Md_B = 70\%$

Do Q1 / Q2

2 Distributions Represented in a Stem-and-Leaf Plot

→ allows you to visualize/identify outliers - far from centre / not following trend
 → helpful for comparison
 → allows you to visualize dispersion

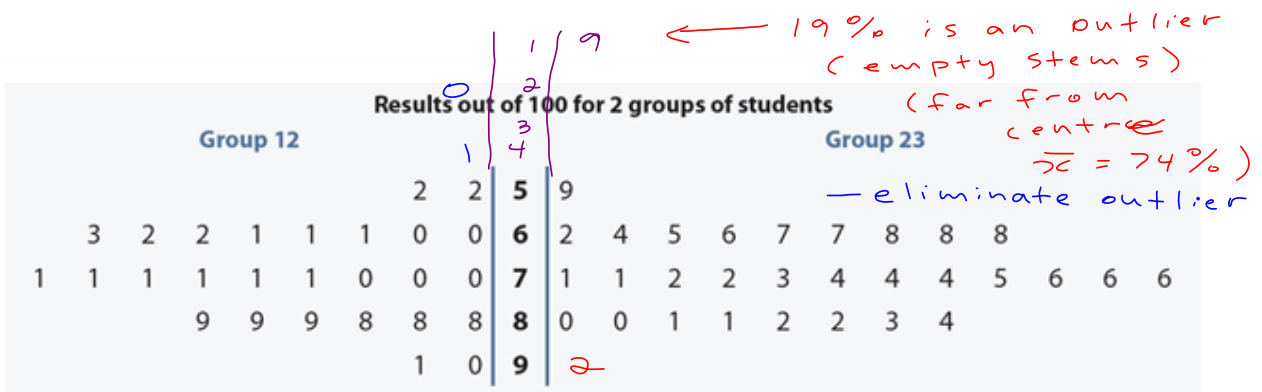
Denise teaches history. Below are the results (out of 100) obtained by the students of two of her groups on their last examination. Denise thinks that the results of group 23 are more homogeneous. However, once she represents the data in a Stem-and-Leaf Plot, she is no longer so certain.



Which group obtained the most homogeneous results?
 Explain your answer with mathematical arguments.

the more leaves
 the more clustered

the more dispersed,
 the more stems



mean = 71% ?

mean = 74% ?

nota bene → the # of leaves correspond to the # of data point.

MTH 4151 final exam marks (%) Class B	38 ✓	40 ✓	65 ✓	66 ✓	66 ✓	70	70	72	75	88	90	100
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D is listed

marks (%) on exam

3		8			
4		0			
5					
6		9	6	6	
7		0	0	2	5
8		0			
9		0			
10		0			

Do now
Pg 8-9
#2-5

Homwk
P 11 #6-7
P 14-15 #1-#5
P 16 #6-#8

Step i draw vertical line and put all digits except for last on left side.

Step ii on right side put one digit for each data point
Step iii Put title