Think of a number   i.e   1 2 → Units.
                                    ↓
                                   Tens

A stem and leaf diagram breaks the numbers up
into   tens and units

Stem   Leaf
0   8   = 8
1   9   = 19
2   3   = 23
3   4   = 34.

Tens   Units
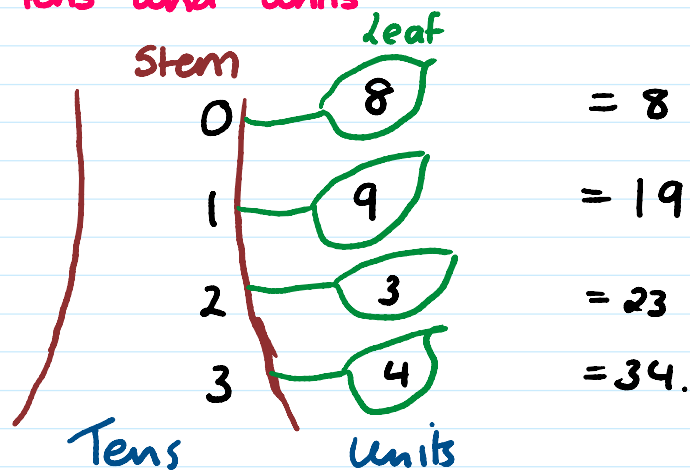
The leaf parts (units) must be put into the table in
order
The smallest value starting at the bar

Example   3   2   1   5   7   9

Stem Bar Leaf

0 | 1 , 2, 3, 5, 7, 9

key 0 | 1 = 1
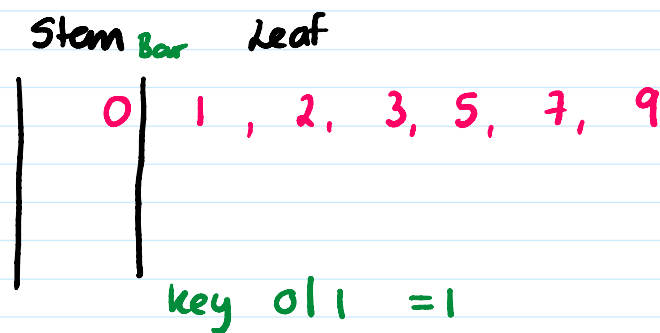
You must include a key in the diagram

Each leaf represents a frequency
Count the leaves to find the number of data values

Recall: the median is the middle value.

ODD number in the data set - middle value

EVEN number in the data set - $\dfrac{\text{Add the two middle values}}{2}$

Mean - Add All the values ÷ the number of values

Mode - Most common data value.

CIW → Pg 265 Q1 Q2 Pg 266

T&T2h 13.4
Stem & lea...

T&T2h 13.4
Stem & lea...

Statistics 3 – Presenting Data

Chapter **13**

261 Section 13.4 **Stem and leaf plots**

Example 1

Use a stem and leaf plot to show the following ages of the 21 musicians in an orchestra:

25	35	28	47	52	33	50	28	33	35	48
55	29	50	39	41	32	29	56	26	35	

(i) What is the mode of the data?

(ii) What is the median age?

Example 2

The Science teacher decided to give her class a test on a particular topic. The class performed poorly. One week later she gave the class a similar test after a thorough revision of the topic.

The results are shown in the back-to-back stem and leaf plot below.

Leaf	Stem	Leaf
9 8 6 6 0	3	
9 7 7 3 1 1 1	4	3 6 6 8
9 8 8 5 3 3 0	5	1 7 9 9
9 8 7 5 3	6	3 8 9
	7	0 5 5 5 8 9
	8	2 6 7 7
0	9	0 0 1 3

Key: $3|6 = 63$

Key: $8|2 = 82$

(i) What does the diagram show about the performance of the class in the two tests?

(ii) Find the median mark in each test.

(iii) Write down the range of the marks in each test.

(iv) Do the median marks and the ranges support your conclusion in (i) above?

(v) Identify any outliers in the test results.

Example 3

The stem and leaf diagram on the right shows the marks, out of 50, obtained in a maths test.

Find (i)   the median mark
    (ii) the lower quartile
   (iii) the upper quartile
   (iv) the interquartile range.

Marks obtained

1	2 8
2	1 4 7 7 8
3	1 4 5 7
4	1 2 8
5	0

Key: $2|1 = 21$

H/w

Exercise 13.4

1. The stem and leaf diagram below shows the ages, in years, of 25 people who wished to enter a 10 km walking competition.

1	4 4 6 9
2	1 3 7 7 7 8
3	3 6 6 7 9
4	0 2 3 3 8 8
5	1 3 4 7

Key: $1|6$ means 16 years old

  (i)   How many people were less than 20 years old?
  (ii) Write down the modal age.
 (iii) How many people were between 35 and 45 years old?
 (iv) What was the median age?

H/w

2. The stem and leaf diagram on the right shows the marks obtained by a group of students in a Spanish test.

stem	leaf
5	1 4 6
6	2 3 3 6

2. The stem and leaf diagram on the right shows the marks obtained by a group of students in a Spanish test.

stem	leaf
5	1 4 6
6	2 3 3 6
7	2 3 5 7 8
8	0 0 2 4 6 6
9	3 4

Key: 7|3 means 73 marks

(i) How many students took this test?

(ii) How many students got between 70 and 79 marks?

(iii) What is the range of the marks obtained?

(iv) Find the median mark.

3. The number of points scored per match by the Dragons basketball team are shown below:

85	67	56	69	99	97	59	65	84	97
49	72	89	78	66	81	92	88	53	73

Copy and complete the stem and leaf plot

4	9
5	3 6
6	
7	
8	
9	

(i) Write down the range of the scores.

(ii) Find the median score.

(iii) Find Q_1, the lower quartile.

(iv) Find Q_3, the upper quartile.

(v) Write down the interquartile range.

4. Twenty four pupils were asked how many CDs they had in their collection.
The results are shown below:

| 23 | 2 | 18 | 14 | 7 | 4 | 25 | 21 | 32 | 26 | 31 | 6 |
| 17 | 6 | 18 | 19 | 31 | 21 | 12 | 1 | 0 | 8 | 14 | 15 |

(i)   Draw a stem and leaf diagram to represent this information.

(ii)   How many pupils had more than 20 CDs?

(iii)   What is the median number of CDs in the collections?

(iv)   What is the mean number of CDs in the collections?
Give your answer to the nearest whole number.

5. The stem and leaf plot below shows the marks achieved by 19 students in a test.

```
stem │ leaf
   2 │ 2
   3 │ 4  6
   4 │ 2  7  9
   5 │ 3  4  5  8  9
   6 │ 0  2  6  7
   7 │ 2  6
   8 │ 1  4        Key: 4|2 = 42 marks
```

(i)   Write down the range of the marks.   (ii)   Find the value of the lower quartile.

(iii)   What is the upper quartile?   (iv)   What is the interquartile range?

6. These are the speeds, in km/hr, of vehicles crossing a city-centre bridge one afternoon:

15	17	12	16	24	29	36	25	38	42	17
53	44	49	53	29	21	11	38	14	29	

  (i) Draw a stem and leaf diagram to show these speeds.

 (ii) What is the lower quartile?

(iii) Find the upper quartile.

(iv) What is the interquartile range?

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7. The results for examinations in Maths and History for a class of students are shown in the back-to-back stem and leaf diagram below:

```
         Maths      |   History
      7   5 | 2 |
      8   0 | 3 | 6
      5   5 | 4 | 0   5   7   8
9  5  4  3  2 | 5 | 1   5   8
      9   7  5 | 6 | 2   4   4   5   7
      3   1 | 7 | 2   4   5   6
      6   3 | 8 | 3   5
          1 | 9 |
```

Key: 1|7 = 71 marks   Key: 3|6 = 36 marks

  (i) How many students took the examinations?

 (ii) What is the range of marks in Maths?

(iii) What is the median mark in History?

(iv) What is the interquartile range of the marks in Maths?

8. The back-to-back stem and leaf plot below shows the pulse rates of a class at the beginning and end of a PE lesson.

Pulse rates (beats per minute)

Before PE		After PE
8 7	4	
7 4 2 1 0 0	5	3 5
8 8 6 5 5 3 1	6	0 3 6 8 9
7 5 5 1 0	7	1 4 4 7 9 9
6 2 1	8	3 3 6 6 7 8 9 9
5 0	9	0 3 5 8

Key: 1|8 = 81 bpm   Key: 8|3 = 83 bpm

(i) Write down the range of the pulse rates before and after the PE lesson.

(ii) Find the median of the pulse rates before and after the PE lesson.

(iii) Use your answers to (i) and (ii) to write a brief statement about the pulse rates of the class before and after the PE lesson.

9. Two different brands of batteries were tested in the same toy to determine which lasted longer. The back-to-back stem and leaf plot below shows the two sets of data, recorded to the nearest hour.

Dynamo		Energy Plus
4 1	1	3 3 7 7 8 8 9
8 8 6 3	2	5 6 8 9 9 9
8 7 6 6 5 4 4	3	2 4 6 7 7 8 8 9
7 5 4 3 2 2	4	0 1
3 2 2 0	5	

Key: 8|2 = 28 hours   Key: 4|1 = 41 hours

(i) How many batteries of each brand were tested?

(ii) Find the median length for each brand.

(iii) By comparing the medians and ranges for the two brands, which brand do you think is better? Explain your answer.

10. The data below shows the average male life expectancy (in years) of the main countrie in Africa in the year 2000.

Algeria	68	Madagascar	57	South Africa	62
Angola	45	Mauritius	68	Sudan	54
Ethiopia	48	Nigeria	51	Tunisia	68
Ghana	56	Rwanda	41	Uganda	40
Kenya	52	Sierra Leone	36		

(i) Put this data into a stem and leaf plot with the data in order.

The data for the female life expectancy in the same African countries is given on the right.

(ii) Compare the life expectancies of males and females in these African countries using the median and range for each set of data.

Female life expectancy (years)

3	9
4	2 3 8
5	2 4 6 6
6	0 0 8
7	0 1 5

Key: $5|2 = 52$

11. Martina and Jack took part in several tests and their results are shown below.

	Martina			Jack		
	2 1	1	x			
6 5 z		2	3 7 8			
6 2 1		3	2 y 7			
7 4		4	0 1 3			

Key: $1|3 = 31$ Key: $4|0 = 40$

(i) In how many tests did they each participate?
(ii) In how many tests did Martina obtain marks below 30?
(iii) If the range of Jack's marks is 31, find the value of x.
(iv) If the median mark for Jack is 34, find the value of y.
(v) If the lower quartile mark for Martina is 23, find the value of z.

Answers

Exercise 13.4

1. (i) 4 (ii) 27 yrs (iii) 8 (iv) 36 yrs
2. (i) 20 (ii) 5 (iii) 43 (iv) 76
3. (i) 50 (ii) $75\frac{1}{2}$ (iii) $65\frac{1}{2}$

   (iv) $88\frac{1}{2}$ (v) 23
4. (ii) 8 (iii) 16 (iv) 15
5. (i) 62 (ii) 47 (iii) 67 (iv) 20
6. (ii) 16.5 km/hr (iii) 40 km/hr (iv) 23.5 km/hr
7. (i) 19 (ii) 66 (iii) 64 (iv) 26

Answers

8. (i) Before – 48, After – 45
   (ii) Before – 66, After – 79
   (iii) The pulse rates were consistently higher after PE
9. (i) 23
   (ii) Dynamo – 37 hours, Energy Plus – 29 hours
   (iii) Dynamo better as it has a much higher median though is less predictable (much larger range)
10. (ii) Male median – 53 yrs
    Female median – 56 yrs
    Male range – 32 yrs
    Female range – 36 yrs
11. (i) 10 (ii) 5 (iii) 2 (iv) 6 (v) 3