

## “You Do It” Solution

### Lecture 2: Organising and Presenting Data

Prepared as a classroom-ready detailed solution set for ECOM5005

#### Exercise 1: Constructing a Stem-and-Leaf Display

##### Question

Sam got his friends to do a long jump and got these results:

2.3, 2.5, 2.5, 2.7, 2.8, 3.2, 3.6, 3.6, 4.5, 5.0

Construct a **stem-and-leaf plot** for the given data set.

##### Detailed Solution

###### Step 1: Decide what the stem and leaf represent.

Every long-jump result is recorded to **one decimal place**. A natural place-value split is therefore:

- the **stem** = the whole-number part (metres), and
- the **leaf** = the tenths digit.

For example, the observation 2.3 is written as 2 | 3.

**Key:** 2 | 3 = 2.3 metres

###### Step 2: Put the observations in ascending order.

The supplied observations are already in ascending order:

2.3, 2.5, 2.5, 2.7, 2.8, 3.2, 3.6, 3.6, 4.5, 5.0.

Ordering is essential because the leaves within each stem should also appear from smallest to largest.

###### Step 3: Separate each observation into its stem and leaf.

| Observation | Stem | Leaf |
|-------------|------|------|
| 2.3         | 2    | 3    |
| 2.5         | 2    | 5    |
| 2.5         | 2    | 5    |
| 2.7         | 2    | 7    |
| 2.8         | 2    | 8    |
| 3.2         | 3    | 2    |
| 3.6         | 3    | 6    |
| 3.6         | 3    | 6    |
| 4.5         | 4    | 5    |
| 5.0         | 5    | 0    |

###### Step 4: Group all leaves that share the same stem.

Repeated observations must be retained. For example, 2.5 appears twice, so there must be two leaves equal to 5 on stem 2. Likewise, 3.6 appears twice, so stem 3 must contain two leaves equal to 6.

## Exercise 1: Completed Display and Interpretation

### Completed Stem-and-Leaf Display

| Stem | Leaves    |
|------|-----------|
| 2    | 3 5 5 7 8 |
| 3    | 2 6 6     |
| 4    | 5         |
| 5    | 0         |

**Key:** 2 | 3 = 2.3 metres

#### How to read the display.

- Stem 2 has leaves 3, 5, 5, 7, 8, representing 2.3, 2.5, 2.5, 2.7, 2.8.
- Stem 3 has leaves 2, 6, 6, representing 3.2, 3.6, 3.6.
- Stem 4 has leaf 5, representing 4.5.
- Stem 5 has leaf 0, representing 5.0.

This reproduces all ten original observations exactly, so the stem-and-leaf display is internally consistent.

### What the Display Tells Us

A stem-and-leaf display preserves the individual observations while also showing the shape and concentration of the data. For this sample:

- **5 of the 10 jumps** are between 2.0 and 2.9 metres.
- **3 jumps** are between 3.0 and 3.9 metres.
- Only **2 jumps** are at least 4.0 metres: 4.5 and 5.0.
- The **minimum** is 2.3 metres and the **maximum** is 5.0 metres, so the range is

$$5.0 - 2.3 = 2.7 \text{ metres.}$$

- The repeated values 2.5 and 3.6 each occur twice. Hence, if we also describe the data numerically, the sample is **bimodal**, with modes 2.5 and 3.6 metres.

### Answer Summary

#### Final answer:

| Stem | Leaves    |
|------|-----------|
| 2    | 3 5 5 7 8 |
| 3    | 2 6 6     |
| 4    | 5         |
| 5    | 0         |

**Key:** 2 | 3 = 2.3 metres.

There are **10 leaves**, matching the 10 original observations. Repeated values have been retained and the leaves are ordered within each stem.

### Final Check

Do not drop repeated observations, keep leaves ordered within each stem, and always provide a key so the place value is unambiguous.