WEEK 5 – EXAMPLE EXERCISES

1) Fill the table with the data type, and most appropriate measures of centrality and spread.

Variable	Type	Centrality	Spread
Date of birth	Interval	Median	Range / IQR
Price of hotel room	Ratio	Median / Mean	Variance / SD / range / IQR
Nationality	Nominal	Mode	— (number of different categories)
Temperature (°C)	Interval	Median / Mean	Variance / SD / range / IQR
Likert Scale	Ordinal	Median / Mode	range

2) For the following data set calculate its Mode, Median, Mean, range, IQR, Variance and Standard deviation.

$$\{3.0, 3.2, 3.0, 4.9, 3.1\}$$

- Mode : the most frequently occurring value

  Mode = 3.0

- Median : put in order, choose middle value

  3.0, 3.0, 3.1, 3.2, 4.9

  Median = 3.1

- Mean : $\bar{x} = \frac{1}{N}\sum x_i$

$$\bar{x} = \frac{3.0 + 3.2 + 3.0 + 4.9 + 3.1}{5}$$

$$\bar{x} = 3.44$$

- Range : Max − Min

  $= 4.9 - 3.0$

  $= 1.9$

- $IQR = Q3 - Q1$

$Q1 =$ the $\frac{1}{4}(N+1)$th term

$= \frac{1}{4}(5+1)$th term

$= 1.5$th term.

The 1st term is 3.0, and the 2nd term is 3.0, so the 1.5th term is $\frac{1}{2}(3.0+3.0) = 3.0$.

$Q1 = 3.0$

$Q3 =$ the $\frac{3}{4}(N+1)$th term

$= \frac{3}{4}(5+1)$th term

$= 4.5$th term

The 4th term is 3.2 and the 5th term is 4.9, so the 4.5th term is $\frac{1}{2}(3.2+4.9) = 4.05$.

$Q3 = 4.05$

$\therefore IQR = Q3 - Q1$

$= 4.05 - 3.0$

$= 1.05$

- Variance : the average squared distance from the mean

$$Var(x) = \frac{1}{N}\sum (x_i - \bar{x})^2$$

$$= \frac{1}{5}\left((3.0-3.44)^2 + (3.2-3.44)^2 + (3.0-3.44)^2 + (4.4-3.44)^2 + (3.1-3.44)^2\right)$$

$$= 0.5384$$

- Standard Deviation : $\sqrt{Var}$

$$Sd = \sqrt{0.5384}$$

$$= 0.73376$$
