

# MTH302 (Fall 2012)

## SOLUTION for Assignment # 2 (Due date 16-01-2013)

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### Question # 1 (Marks: 10)

a) Consider 48 customers entered in a super store in a week. Find the Stem and Leaf Display for the following data:

|    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|
| 23 | 20 | 31 | 22 | 42 | 25 | 20 | 24 | 28 | 33 | 31 | 21 |
| 23 | 37 | 25 | 27 | 40 | 21 | 22 | 20 | 20 | 20 | 23 | 31 |
| 32 | 18 | 19 | 22 | 27 | 22 | 26 | 22 | 23 | 23 | 21 | 41 |
| 24 | 20 | 22 | 18 | 21 | 34 | 23 | 32 | 20 | 25 | 38 | 23 |

### Example

### STEM and LEAF

Consider Figure 1. It shows the number of touchdown (TD) passes thrown by each of the 31 teams in the National Football League in the 2000 season.

37, 33, 33, 32, 29, 28, 28, 23, 22, 22, 22, 21,  
21, 21, 20, 20, 19, 19, 18, 18, 18, 18, 16, 15,  
14, 14, 14, 12, 12, 9, 6

Figure 1: Number of touchdown passes.

A stem and leaf display of the data is shown in the Table 1 below. The left portion of the table contains the stems. They are the numbers 3, 2, 1, and 0, arranged as a column to the left of the bars. (As in 34, 3 is stem and 4 is leaf. In 16, 1 is stem and 6 is leaf)

Stem and leaf display showing the number of passing touchdowns.

|   |  |               |
|---|--|---------------|
| 3 |  | 2337          |
| 2 |  | 001112223889  |
| 1 |  | 2244456888899 |
| 0 |  | 69            |

Same like this all leaves will be collected in table

Table 1

### SOLUTION:

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

b) Also find the mean, median and mode of the above data.

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### MEAN

$$\text{mean} = x = (\Sigma x) / n$$

$$\Sigma x = 1225$$

$$= (18+18+19+20+20+20+20+20+20+20+21+21+21+21+22+22+22+22+22+22+23+23+23+23+23+23+23+24+24+25+25+25+26+27+27+28+31+31+31+32+32+33+34+37+38+40+41+42)$$

$$\text{Mean} = 1225/48$$

$$\text{Mean} = 25.5$$

### Median

Total 48 number median will between of 24<sup>th</sup> and 25<sup>th</sup> value  
23 is 24<sup>th</sup> number and again 23 is 25<sup>th</sup> number

$$\text{Median} = 23$$

### MODE:

**20 and 23** as both numbers are appearing in the data seven seven times.

### Question # 2 (Marks: 10)

The weights and heights of 10 animals are recorded as follows:

| Weight(X <sup>2</sup> ) | Length(Y) |
|-------------------------|-----------|
| 4                       | 6         |
| 6                       | 7         |
| 8                       | 9         |
| 8                       | 7         |
| 10                      | 10        |
| 12                      | 10        |
| 16                      | 14        |
| 16                      | 18        |
| 18                      | 18        |
| 20                      | 20        |

Find out the coefficient of correlation and also determine that whether the correlation is positive, negative or there is no correlation between the measured variables.

### SOLUTION

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| x                | y                | x <sup>2</sup>      | y <sup>2</sup>      | xy                 |
|------------------|------------------|---------------------|---------------------|--------------------|
| 4                | 6                | 16                  | 36                  | 24                 |
| 6                | 7                | 36                  | 49                  | 42                 |
| 8                | 9                | 64                  | 81                  | 72                 |
| 8                | 7                | 64                  | 49                  | 56                 |
| 10               | 10               | 100                 | 100                 | 100                |
| 12               | 10               | 144                 | 100                 | 120                |
| 16               | 14               | 256                 | 196                 | 224                |
| 16               | 18               | 256                 | 324                 | 288                |
| 18               | 18               | 324                 | 324                 | 324                |
| 20               | 20               | 400                 | 400                 | 400                |
| $\Sigma x = 118$ | $\Sigma y = 119$ | $\Sigma x^2 = 1660$ | $\Sigma y^2 = 1659$ | $\Sigma xy = 1650$ |

### Coefficient of correlation

(formula)

$$r = \frac{\Sigma XY - (\Sigma X)(\Sigma Y)/n}{\sqrt{[\Sigma X^2 - (\Sigma X)^2/n][\Sigma Y^2 - (\Sigma Y)^2/n]}}$$

$$\begin{aligned}\Sigma xy - (\Sigma x * \Sigma y)/n &= 1650 - (118 * 119)/10 \\ &= 1650 - 1404.2 \\ &= 245.8\end{aligned}$$

$$\begin{aligned}\Sigma x^2 - (\Sigma x)^2/n &= 1660 - (118)^2/10 \\ &= 1660 - 1392.4 \\ &= 267.6\end{aligned}$$

$$\begin{aligned}\Sigma y^2 - (\Sigma y)^2/n &= 1659 - (119)^2/10 \\ &= 1659 - 1416.1 \\ &= 242.9\end{aligned}$$

$$r = \frac{245.8}{\sqrt{267.6 * 242.9}}$$

$$r = \frac{245.8}{\sqrt{65000.04}}$$

$$r = 245.8/254.95$$

$$r = 0.96$$

It's a positive correlation