6.1 Methods for Displaying Quantitative Date

1.Frequency Distribution Tables: Frequency distribution defined as a way of summarizing data by showing the number of observations that belong to the different categories or classes.

Frequency Distribution Tables

To prepare a grouped frequency distribution, following steps are taken into constructing **frequency tables:**

1. Find the largest XL and smallest values XS.

2. Calculate the total range of the data (TR). The range is the difference between the highest value (X_L) and smallest values (X_S) of the given data:

$$\textbf{Total Range} = (\textbf{Highest Value} - \textbf{Lowest Value}) + 1$$

$$TR = (X_L - X_S) + 1$$

3. Select the number of classes desired. This is usually between 5 and 20 **Sturges formula** to find number of classes is given below:

$$K = 1 + 3.322 \log N$$

K = No. of class.

log N = Logarithm of total no. of observations.

4. Find the class width:

$$\text{Class Width} = \text{Total Range} / \text{Number of classes}$$

$$L = TR / K$$

The class all taken together should cover at least the distance from the lowest value in the data up to the highest value.

5. Your starting point is the lower limit of the first class:

$$\text{Lower Limit} = X_S$$

Continue to add the class width (L) to this lower limit to get the rest of the lower limits.

6. To find the upper limit of the first class, subtract one from the lower limit of the second class. Then continue to add the class width to this upper limit to find the rest of the upper limits.:

$$\text{Upper Limit} = \text{Lower Limit} + L - 1$$

7- Tally the data.

8- Find the frequencies

9-Find the midpoint:

$$\textit{Midpoint } (X) = \frac{\textit{Lower Class Limit} + \textit{Upper Class Limit}}{2}$$

Example1: Construct the frequency distribution for the following data:

62	58	58	52	48	53	54	63	69	63
57	56	46	48	53	56	57	59	58	53
52	56	57	52	52	53	54	58	61	63

Sol:

1.Largest value (XL) = 69, Lowest value (XS) =46

2.Total Range (TR) = (69- 46) +1= 24

3.K=1+3.322log(30) = 5.9~6(Rounded off)

4.Class width (L) = 24/6 = 4

Use 46 (minimum value) as first lower limit. Add the class width of 4 to get the lower limit of the next class.

Upper limit = 46 + 4 -1 = 50 -1= 49

Class Interval	Tally Bars	Frequency (Fi)	Midpoint (X)
46 – 49	|||	3	47.5
50 – 53	𝍸 |||	8	51.5
54 – 57	𝍸 |||	8	55.5
58 – 61	𝍸 |	6	59.5
62 – 65	||||	4	63.5
66 – 69	|	1	7.5
		$\sum$ = 40	

Example 2: Construct the frequency distribution for the following data for number of class equal to 6.

15	21	22	25	30	35	33	18	41
42	47	26	19	20	29	30	38	36
35	19	46	16	21	21	22	32	33
35	41	45						

Sol:

1- (X_L) = 47, (X_S) = 15

2- Total Range (TR) = (47- 15) +1= 33

3-K= 6 (given)

4-Class width (L) = 33/6 = 5.5 (rounded to 6)

5- Lower Limit = 15, Upper Limit = 15 + 6 = 21 -1= 20

Class Interval	Tally Bars	Frequency (Fi)	Midpoint (X)
15 – 20	𝍸 |	6	17.5
21 – 26	𝍸 ||	7	23.5
27 – 32	||||	4	29.5
33 – 38	𝍸 ||	7	35.5
39 – 44	|||	3	41.5
45 – 50	|||	3	47.5
		$\sum$ = 30	

H.W// Construct the frequency distribution for the following data??

89	110	66	49	73	53	90	78	70	101
85	45	63	74	67	99	129	122	76	97
84	65	56	70	79	87	118	54	82	68