Data Handling

- **Mean of data sets**

    Mean or average of a data is given by the formula,

    Mean = $\dfrac{\text{Sum of all observations}}{\text{Number of observations}}$

    Note:

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  o Mean always lies between the highest and lowest observations of the data.
  o It is not necessary that mean is any one of the observations of the data.

    1. If the mean of n observations x1,x2,x3....xn is $\bar{x}$ then x1-$\bar{x}$ +x2-$\bar{x}$ +x3-$\bar{x}$ +...+xn-$\bar{x}$ =0.
    2. If the mean of n observations x1,x2,x3....xn is $\bar{x}$ then the mean of x1+p, x2+p, x3+p, ..., xn+p is ($\bar{x}$ + p).
    3. If the mean of n observations x1,x2,x3....xn is $\bar{x}$ then the mean of x1-p, x2-p, x3-p, ..., xn-p is ($\bar{x}$ − p).
    4. If the mean of n observations x1,x2,x3....xn is $\bar{x}$ then the mean of px1, px2, px3, ..., pxn is $p\bar{x}$.
    5. If the mean of n observations x1,x2,x3....xn is $\bar{x}$ then the mean of x1p, x2p, x3p, ..., xnp is $\bar{x}$ p.

    Example:
    The runs scored by a batsman in 6 matches are as follows:
    24, 126, 78, 43, 69, 86
    What is the average run scored by the batsman?
    Solution:
    Total number of runs scored = 24 + 126 + 78 + 43 + 69 + 86
      = 426
    Number of matches = 6
    ∴ Average runs scored = $\dfrac{426}{6} = 71$

- Range is the difference between the highest and lowest observations of the data.

    Example: The runs scored by a batsman in 6 matches are as follows.
    24, 126, 78, 43, 69, 86
    What is the range of the scores?
    Solution:
    Highest score of the batsman = 126
    Lowest score of the batsman = 24
    ∴ Range = Highest score – Lowest score = 126 – 24 = 102

- **Mode**
1. The mode of a set of observations is the observation that occurs most often.
2. Mode of a large data can be calculated by forming a tally marks table.

Example: What is the mode of data: 247, 346, 335, 247, 335, 346, 247, 335, 346, 351, 351, 346, 247, 247, 346, and 247?

Solution: A tally marks table for the given data is as follows.

Data	Tally marks	Frequency
247	IIII I	6
335	III	3
346	IIII	5
351	II	2

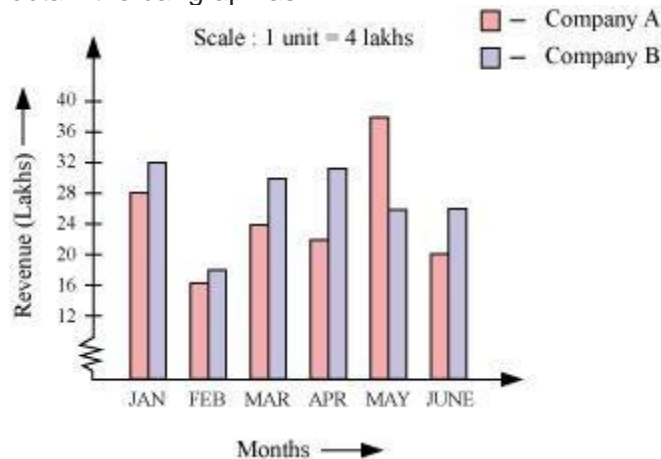Therefore, mode of the data is 247.

- **Bar graphs**
1. Bar graph is another way of representing the data using bars of uniform widths. The lengths of the bars depend upon the frequency and scale chosen.
2. Double bar graphs are also drawn as bar graphs. It is the collection of two sets of data on the same graph. It is helpful in comparing the two sets of data.

Example: The given data shows the revenue incurred (in lakhs) by two companies, A and B, in 6 months.

	January	February	March	April	May	June
A	28	16	24	22	38	20
B	32	18	30	31	26	26

Construct a double bar graph representing the given data. Find in which particular month is the revenue incurred by company A more than company B.
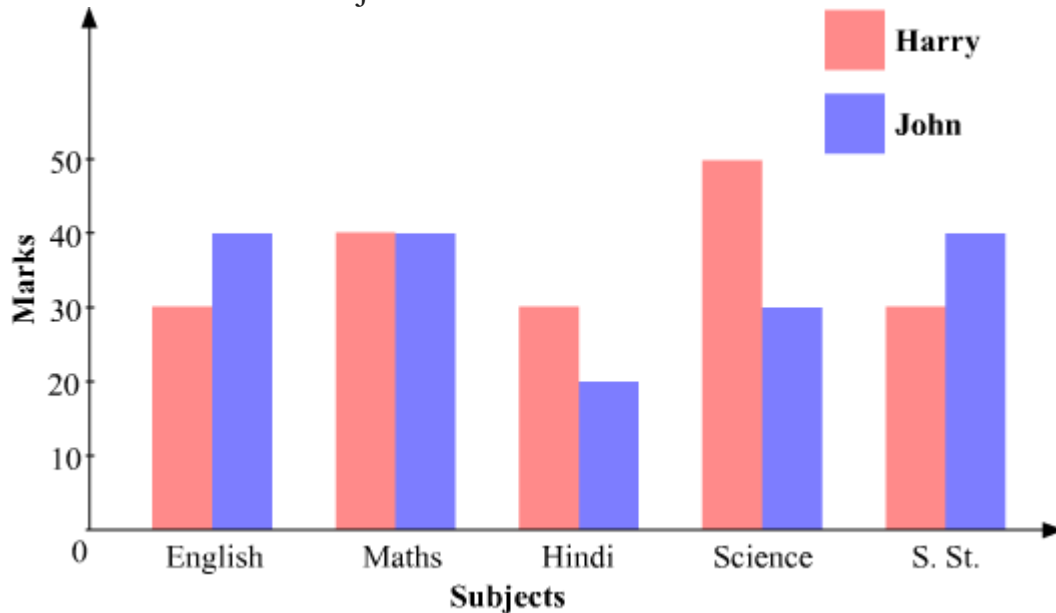
Solution: In the given data, the lowest value of observation is 16. Therefore, choosing the scale as 1 unit = 4 lakhs and drawing bars of corresponding lengths for each month, we obtain the bar graph as:

It can be seen that the height of the bar for the month of May is more for company A than for company B. Therefore, in the month of May, company A incurred more revenue than B.

- We can interpret the double bar graph by reading and analyzing it.

    Example: The given double bar graph represents the marks obtained by Harry and John in different subjects.

We can analyze the given double bar graph and answer the following questions.

1.
1. What is the differnce between the marks scored by Harry and John in Science?

    Answer: Marks scored by Harry in science = 50
    Marks scored by John in science = 30

    Difference = 50 – 30 = 20

2.
2. In which subject both the students got equal marks?

    Answer: Both the students got equal marks in Maths.

3.
3. Who is better in studies among Harry and John?

    Answer: Total marks obtained by Harry = 30 + 40 + 30 + 50 + 30 = 180

    Total marks obtained by John = 40 + 40 + 20 + 30 + 40 = 170

Total marks obtained by Harry is more than John. So, Harry is better in studies than John.

- **Certain events:** Events which are definite to happen.

    For example, the day after Saturday will be Sunday or the sun will rise from the east.

- **Impossible events:** Events which are impossible to happen.

    For example, March comes before February in a year, the apple goes up when dropped from the tree.

- **Matter of Chance:** Results of events which can not be known before they happen.

    In a cricket match, India will win or it will rain tomorrow.

- **Probability** is the measure or estimation of likelihood of happening of an event in a particular way.

- **The probability of occurrence of any event always lies between 0 and 1.**

    For example, a bag contains one green, one red, one blue, and one black ball. When a ball is drawn, it can be any of the four balls.

    The probability of drawing a red ball = $\frac{1}{4}$

    Here, $\frac{1}{4}$ is greater than 0 but less than 1.

- **The probability of such an event which has no possibility to occur is 0**.

    For example, there is no possibility of drawing a green pen from the box containing blue and black pens only. In this case, the probability of drawing a green pen is 0.

- **The probability of such an event which is sure to occur is 1.**

    For example, if there is a box containing only blue pens, then the probability of drawing a blue pen is 1 because the pen drawn will always be blue.