Start-Tech Academy

Frequency distribution

A **frequency distribution for qualitative** data lists all categories and the number of elements that belong to each of the categories.

EXAMPLE

Branch/ Specialization	Number of students
Computer Science	100
Mechanical Engineering	80
Electrical Engineering	130
Biotechnology	60
Mathematics	50
Total	**420**

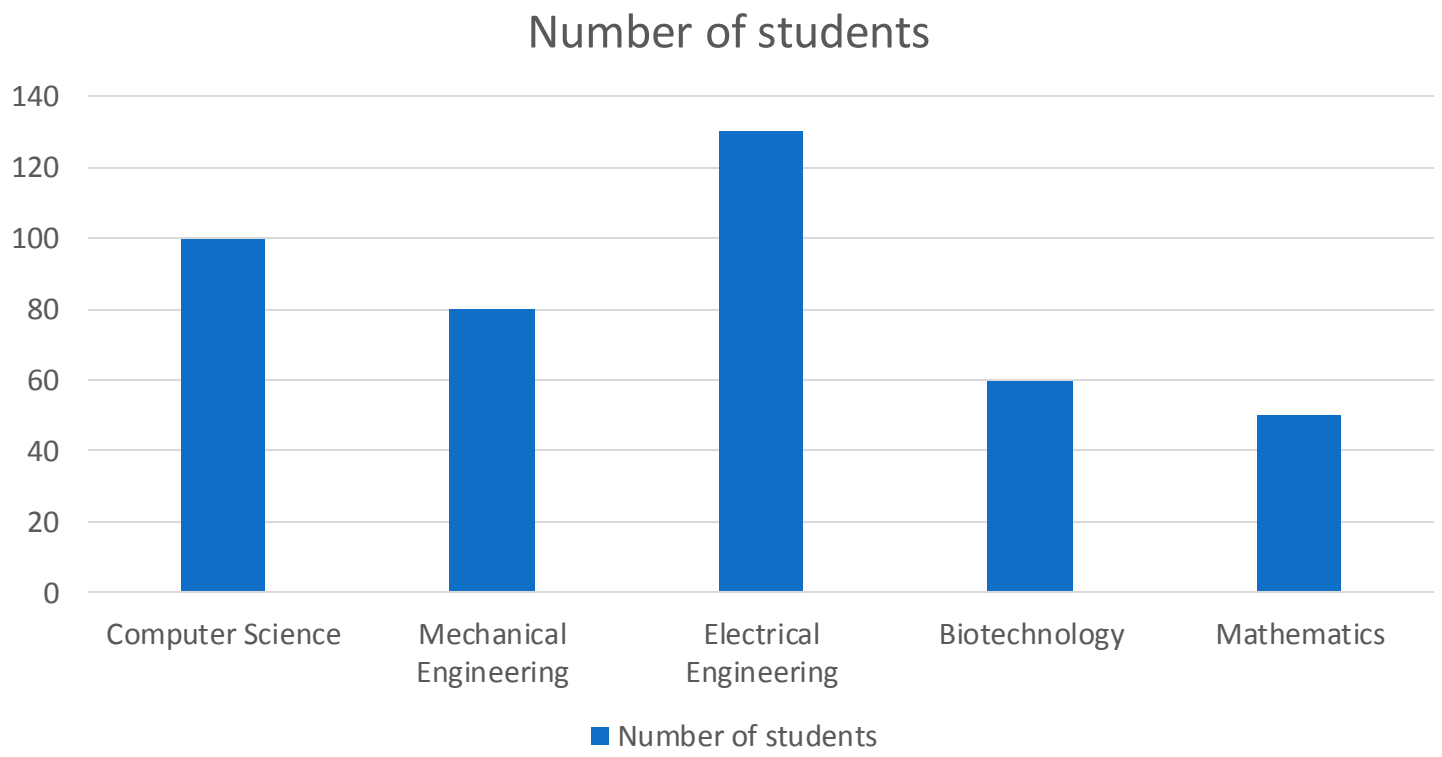
$$\text{Relative frequency of a category} = \frac{\text{Frequency of that category}}{\text{Sum of all frequencies}}$$

Therefore, relative frequency of Biotechnology is equal to 60/420 = 0.142 ~ 14.2%

BAR GRAPH

A **BAR graph** is a graph made of bars whose heights represent the frequencies of respective categories is called a bar graph

TYPES



Frequency distribution

A **frequency distribution for quantitative** data lists all the classes and the number of values that belong to each class. Data presented in the form of a frequency distribution are called **grouped data**.

EXAMPLE

Science Marks	Number of students
0-35	5
36-55	21
56-70	12
71-85	18
86-100	9
Total	**65**

Frequency distribution

A **frequency distribution for quantitative** data lists all the classes and the number of values that belong to each class.
Data presented in the form of a frequency distribution are called **grouped data**.

Process

1. Select the number of classes, usually between 5 and 20.
2. Calculate the class width.
Class width ≈ (maximum data value) - (minimum data value) / number of classes
Round this result to get a convenient number.
3. Choose the value for the first lower class limit by using either the minimum value or a convenient value below the minimum.
4. Using the first lower class limit and the class width, list the other lower class limits.
5. List the lower class limits in a vertical column and then determine and enter the upper class limits.
6. Take each individual data value and put a tally mark in the appropriate class.
Add the tally marks to find the total frequency for each class.

Frequency distribution

A **frequency distribution for quantitative** data lists all the classes and the number of values that belong to each class. Data presented in the form of a frequency distribution are called **grouped data**.

EXAMPLE

For the list of numbers below, create the frequency distribution

10	14	26	25	30	34	14	33	33
13	21	25	29	28	7	31	31	30
25	33	31	13	28	33			

1. Select the number of classes, we will select **5**.
2. Calculate the class width

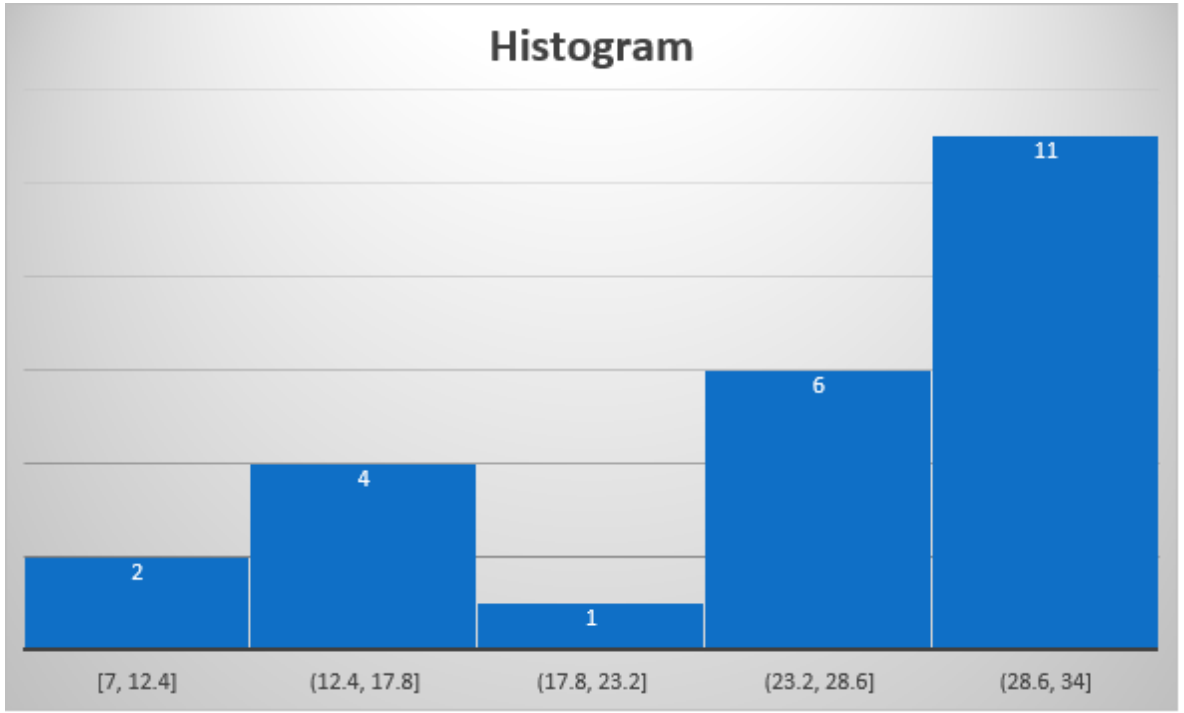
Class width ≈ (34) - (7) / 5 = 27/5 = 5.4 -> **5**

Groups	Tally	Frequency
7 – 12	||	2
13 – 18	||||	4
19 – 24	|	1
25 – 30	||||\ ||||	9
31 – 36	||||\ |||	8

Histograms

Histogram is a graph consisting of bars of equal width drawn adjacent to each other.
The **horizontal scale** represents classes of quantitative data values and the **vertical scale** represents frequencies.

Example



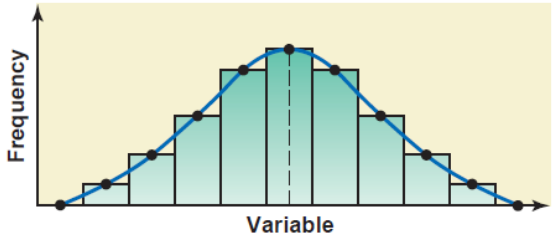
The heights of the bars correspond to the frequency values.

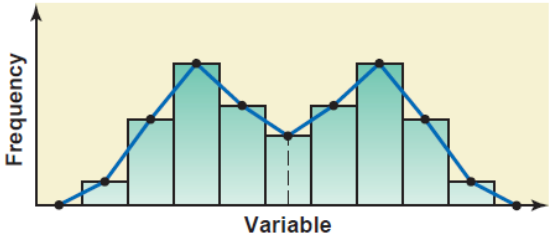
Histogram Shapes

Histogram is a graph consisting of bars of equal width drawn adjacent to each other.
The **horizontal scale** represents classes of quantitative data values and the **vertical scale** represents frequencies.

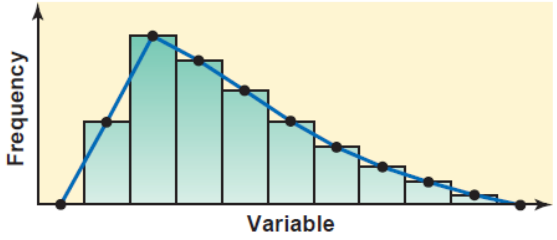
Example

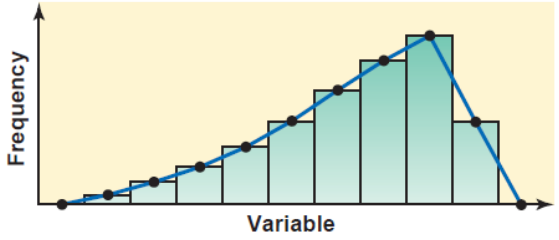
1. Symmetric



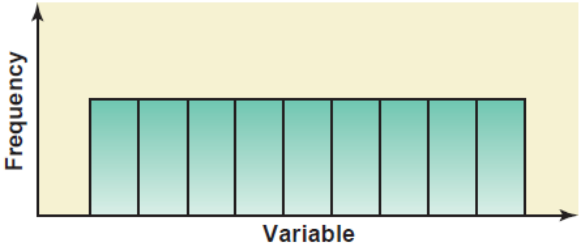


2. Skewed (Not symmetric)





3. Uniform or rectangular

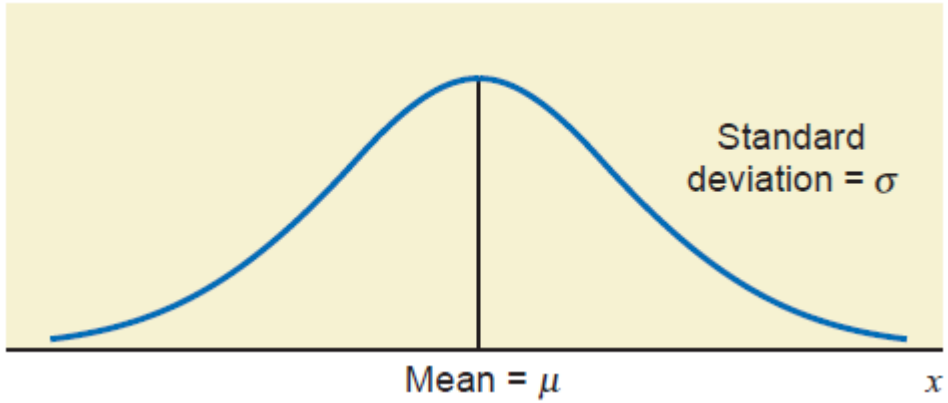


Normal Distribution

If a continuous random variable has a distribution with a graph that is symmetric and bell-shaped, and it can be described by the equation given below, we say that it has a normal distribution

$$y = \frac{e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}}{\sigma\sqrt{2\pi}}$$

Properties



1. The total area under the curve is 1.0.
2. The curve is symmetric about the mean.
3. The two tails of the curve extend indefinitely.