MATHEMATICS FOR COMPUTER SCIENCE ENGINEERS

Data Visualization and Interpretation

Mamatha H R

Department of Computer Science and Engineering
mamathahr@pes.edu

PES UNIVERSITY
CELEBRATING 50 YEARS

MATHEMATICS FOR COMPUTER SCIENCE ENGINEERS

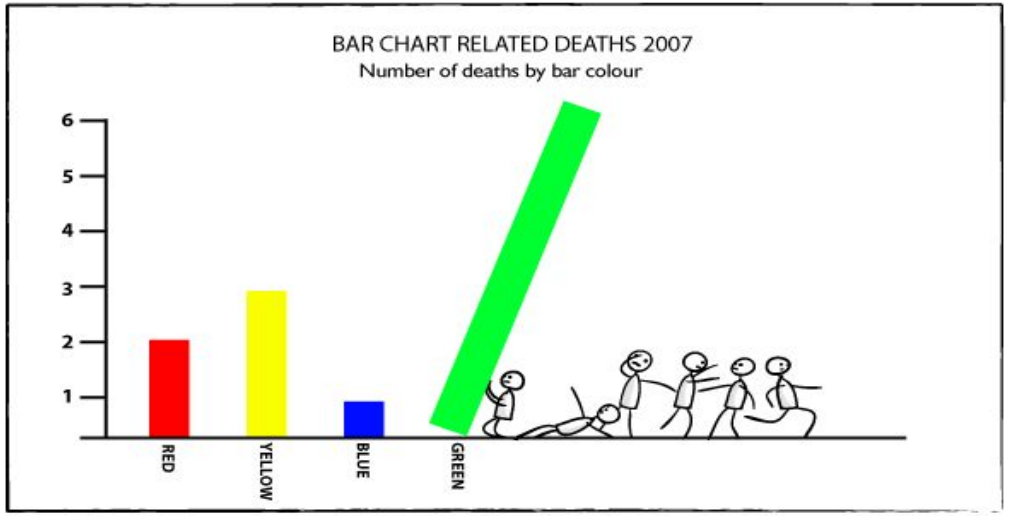
Data Visualization and Interpretation - Bar Charts

Mamatha H R
Department of Computer Science and Engineering

Data Visualization: Bar Charts

- Often known as the “King of Charts”, Bar Charts are one of the most commonly used charts in the field of Data Science.

- The advantage of bar plots (or “bar charts”, “column charts”) over other chart types is that the human eye has evolved a refined ability to compare the **length of objects**, as opposed to **angle or area.**

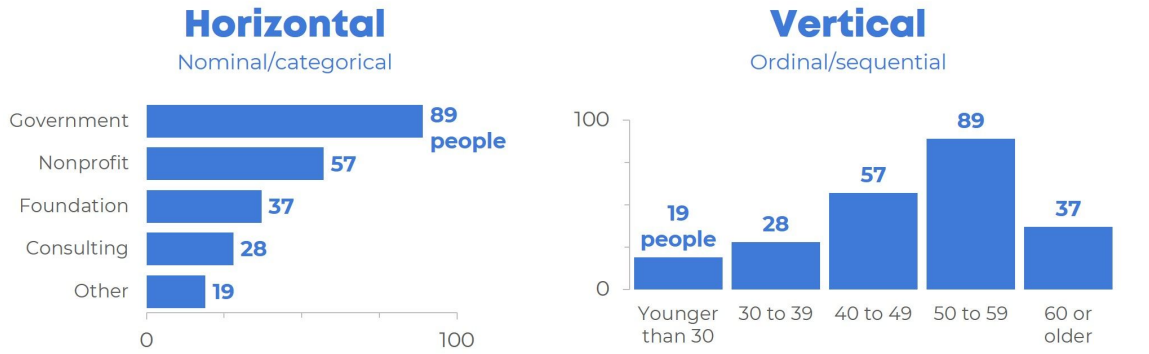


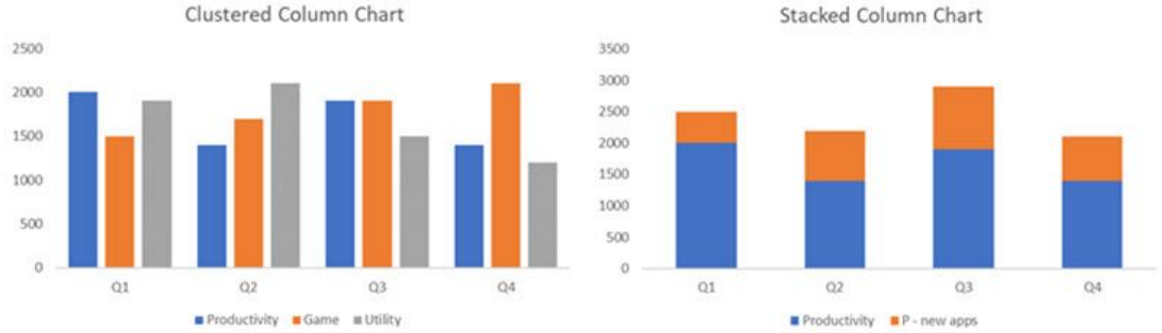
Data Visualization: Bar Charts

- Summarizes categorical data.
- Horizontal axis represents categories, while vertical axis represents either counts (“frequencies”) or percentages (“relative frequencies”).
- Used to illustrate the differences in percentages (or counts) between categories.
- The graph represents categories on one axis and a discrete value in the other. The goal is to show the relationship between the two axes
- Bar charts can also show big changes in data over time

MATHEMATICS FOR COMPUTER SCIENCE ENGINEERS

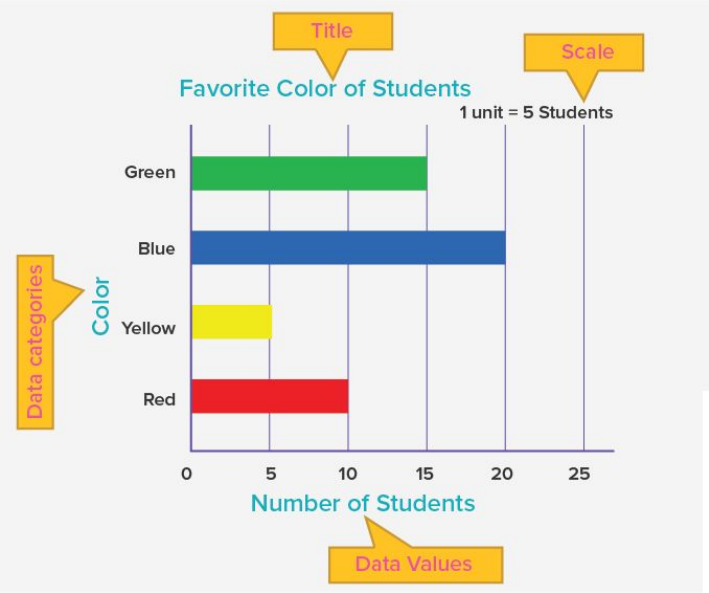
Data Visualization: Types of Bar Graphs





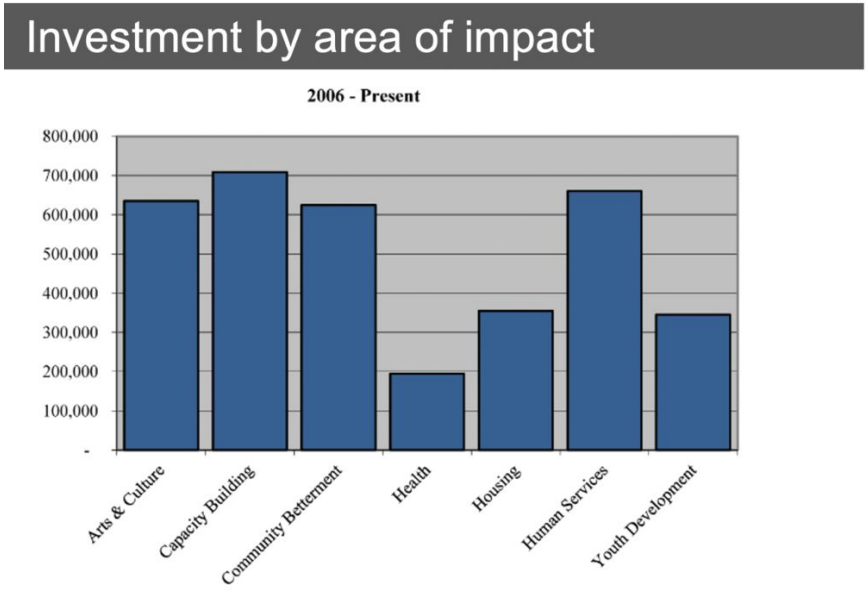
Data Visualization: Types of Bar Graphs - Horizontal

- **Horizontal Bar Graphs:** The classes are displayed on the y-axis, and the values(scores) of those classes are displayed on the x-axis. Useful only when comparing one set of data.



Data Visualization: Types of Bar Graphs - Vertical

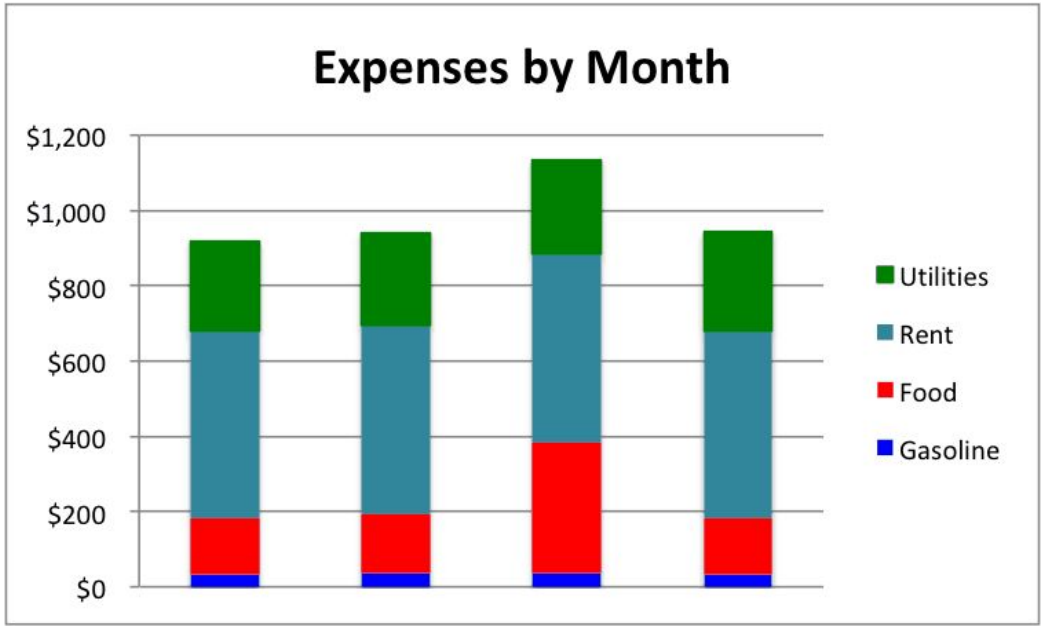
- **Vertical Bar Graphs :** The **classes** are displayed on the **x-axis**, and the **values(scores)** of those classes are displayed on the **y-axis**. Useful only when comparing one set of data.



Data Visualization: Types of Bar Graphs - Stacked

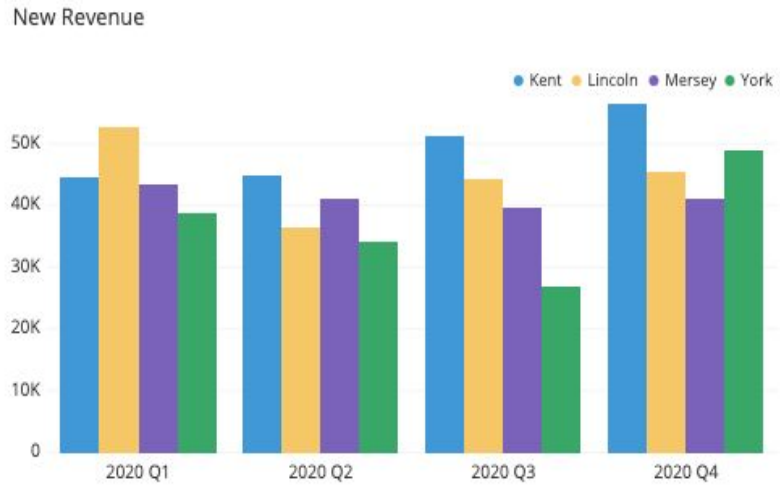
- **Stacked Bar Graphs :** Each bar has multiple datasets to be compared, each set of values belonging to the class of different datasets are stacked over one other.

- Useful when comparing multiple datasets but having same set of classes



Data Visualization: Types of Bar Graphs - Grouped

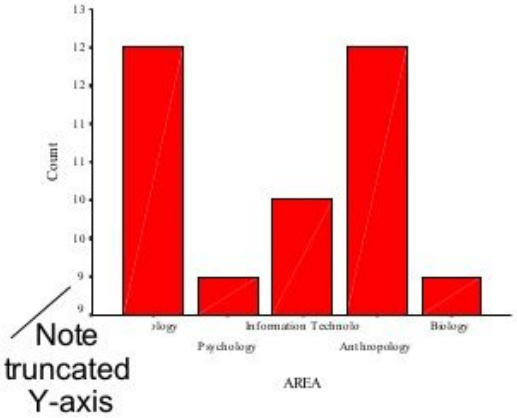
- **Grouped Bar Graphs :** Grouped bar charts are Bar charts in which multiple sets of data items are compared, with a single color used to denote a specific series across all sets.
- A grouped or clustered bar graph is used to represent discrete values for more than one item that share the same category.
- Grouped bar charts are a way of showing information about different sub-groups of the main categories.
- But care needs to be taken to ensure that the chart does not contain too much information making it complicated to read and interpret.

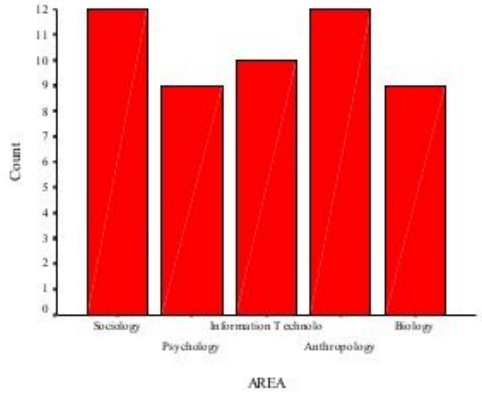


Data Visualization: Bar Charts

Bar chart (Bar graph)

- Allows comparison of heights of bars
- X-axis: Collapse if too many categories
- Y-axis: Count/Frequency or % - truncation exaggerates differences
- Can add data labels (data values for each bar)



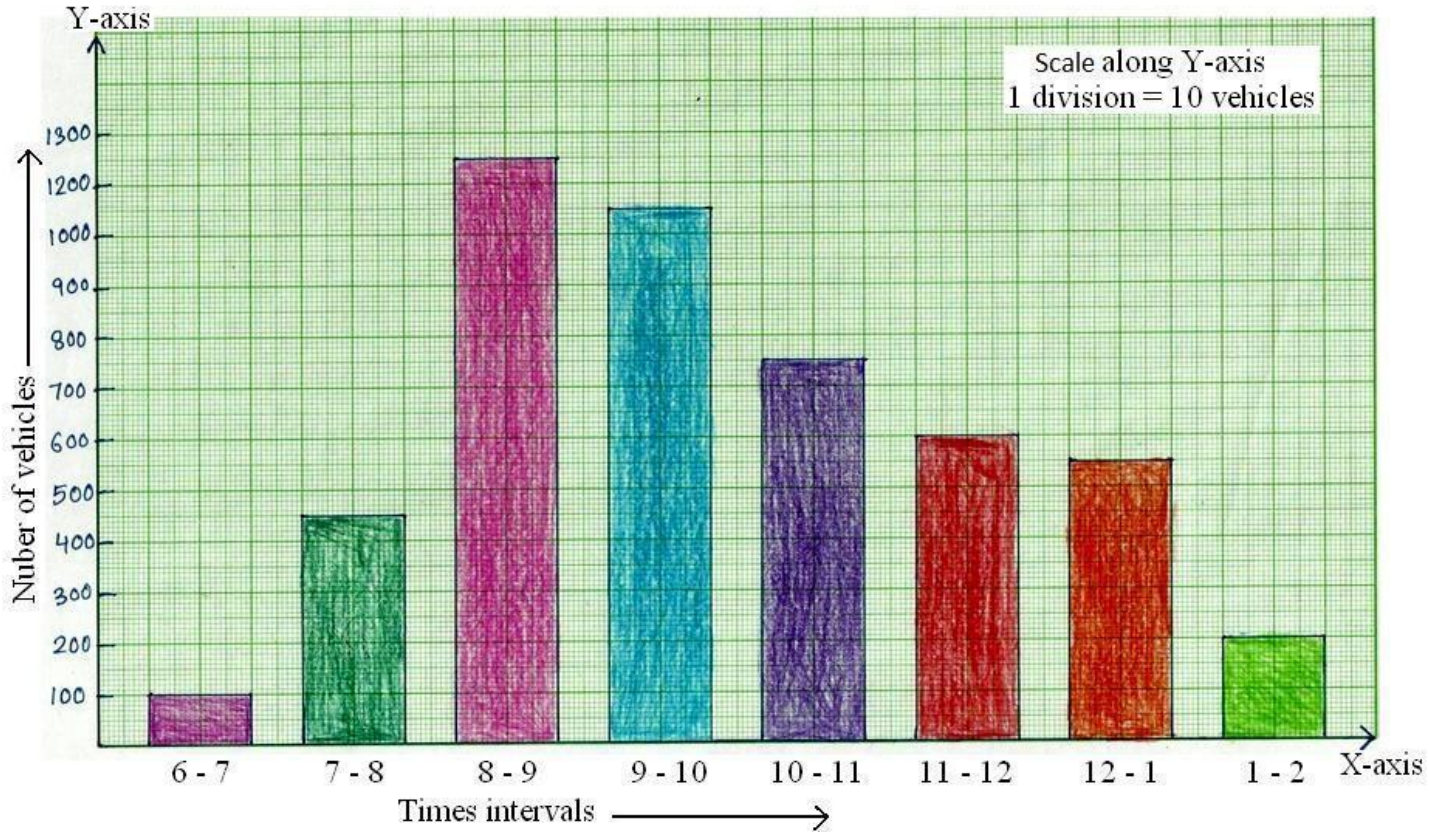


Data Visualization: Bar Charts Examples

The vehicular traffic at a busy road crossing in a particular place was recorded on a particular day from 6am to 2 pm and the data was rounded off to the nearest tens. Construct a Bar Chart.

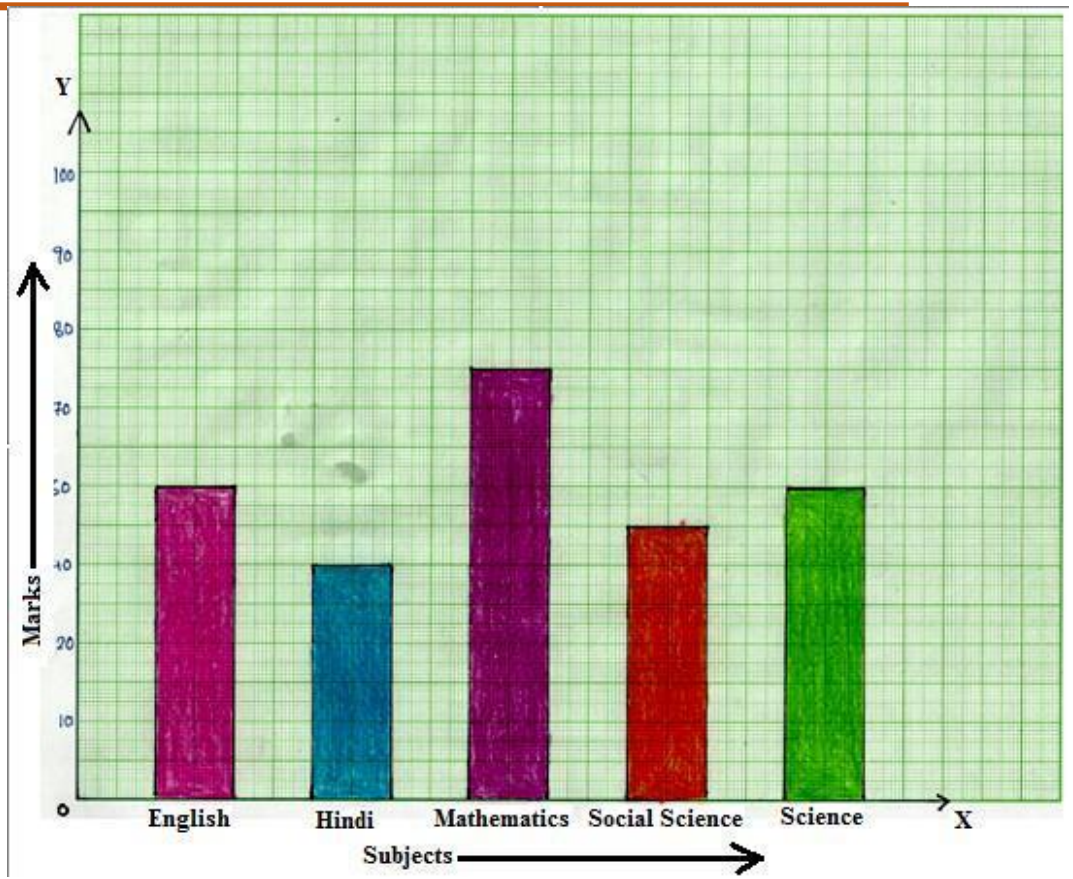
Time in Hours	6 - 7	7 - 8	8 - 9	9 - 10	10 - 11	11 - 12	12 - 1	1 - 2
Number of Vehicles	100	450	1250	1050	750	600	550	200

Data Visualization: Bar Charts Examples



Data Visualization: Bar Charts Examples

Look at the graph given



Data Visualization: Bar Charts Examples

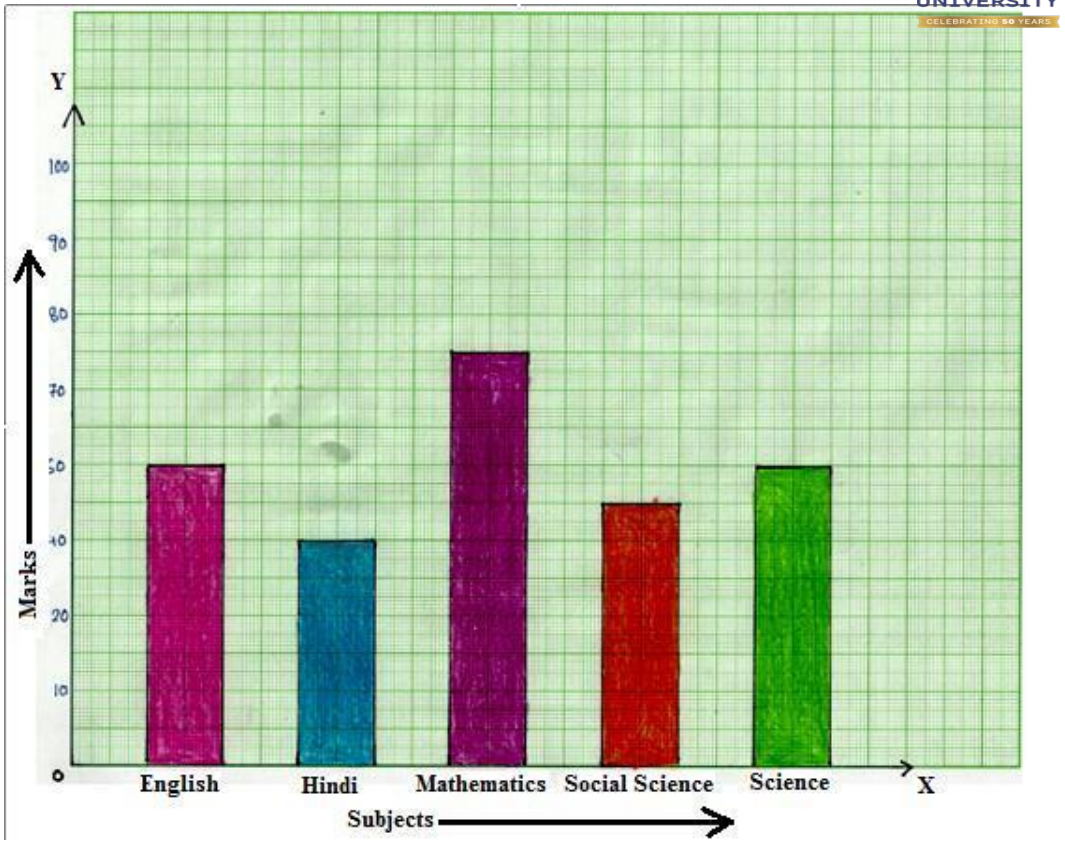
Read it carefully and answer the following questions.

(i) What information does the bar graph give?

(ii) In which subject is the student very good

(iii) In which subject is he poor?

(iv) What are the average of his marks?



Data Visualization: Bar Charts Examples

(i) It shows the marks obtained by a student in five subjects

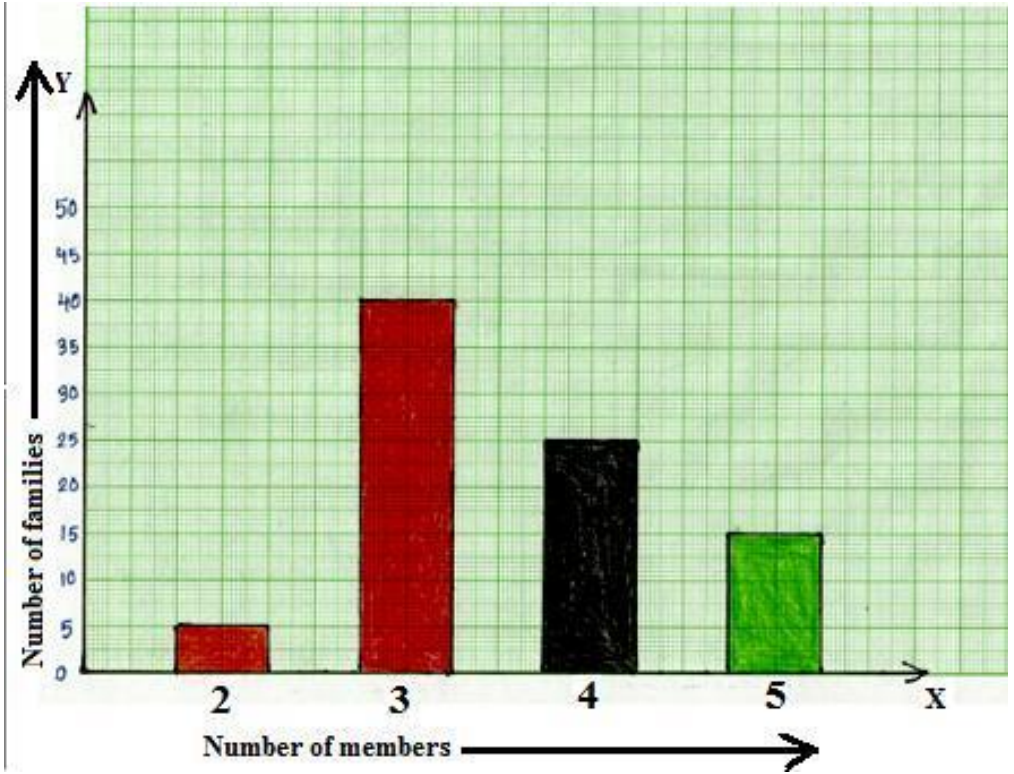
(ii) Mathematics

(iii) Hindi

(iv) 56

Data Visualization: Bar Charts Examples

In a survey of 85 families of a colony, the number of members in each family was recorded, and the data has been represented by the following bar graph.



Data Visualization: Bar Charts Examples

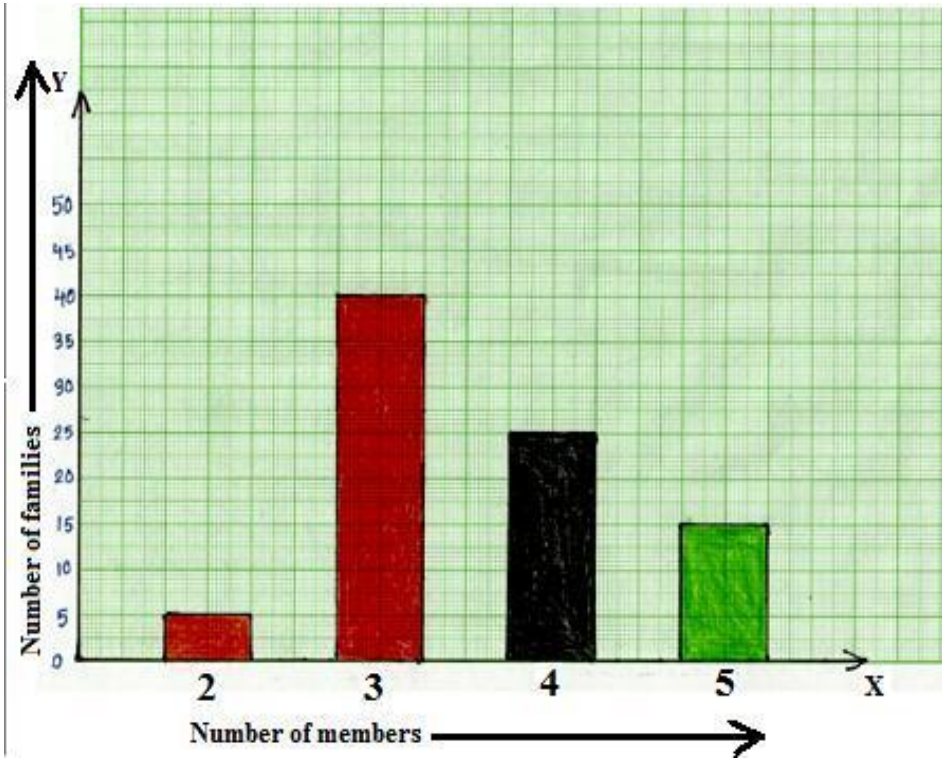
Read the bar graph carefully and answer the following questions:

(i) What information does the bar graph give?

(ii) How many families have 3 members?

(iii) How many people live alone?

(iv) Which type of family is the most common? How many members are there in each family of this kind?



Data Visualization: Bar Charts Examples

(i)It gives the number of families containing 2, 3, 4, 5 members each.

(ii) 40

(iii) none

(iv) Family having 3 members, 3 members.

MATHEMATICS FOR COMPUTER SCIENCE ENGINEERS

Data Visualization:Bar Chart

Determine the discrete range

- Examine your data to find the bar with the largest value. This will help you determine the range of the vertical axis and the size of each increment.

Determine the number of bars

Examine your data to find how many bars your chart will contain. Use this number to draw and label the horizontal axis

Source: www.slideshare.net

Slide Courtesy: Dr.Uma

Data Visualization:Bar Chart

Determine the order of the bars	Bars may be arranged in any order. (A bar chart arranged from highest to lowest incidence is called a Pareto chart)
Draw the bars	If you are preparing a grouped bar graph, remember to present the information in the same order in each grouping

Source: www.slideshare.net

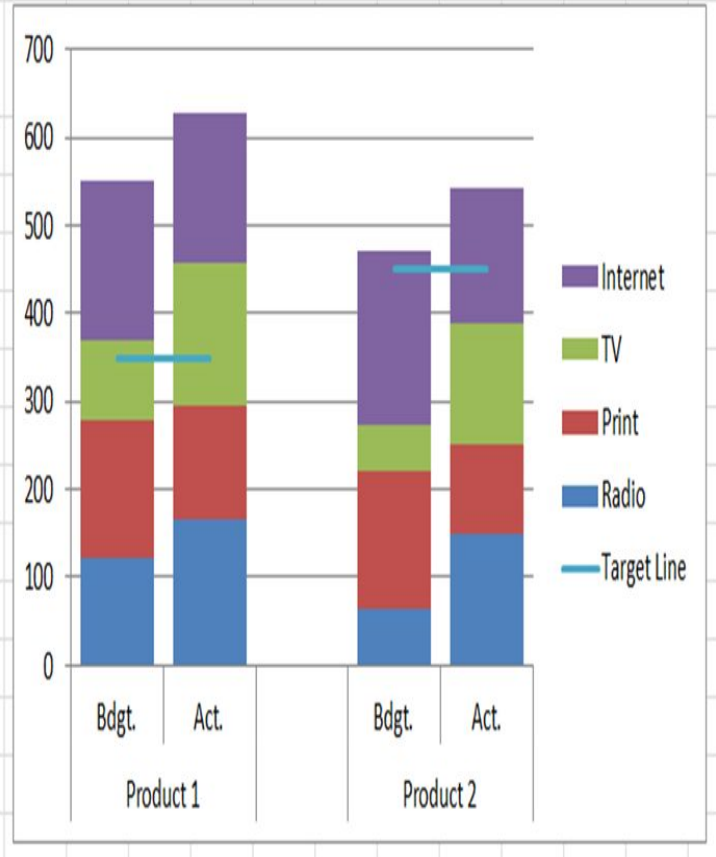
Slide Courtesy: Dr.Uma

MATHEMATICS FOR COMPUTER SCIENCE ENGINEERS

Data Visualization:Bar Chart

Bar chart statistics

- **Mean** — the average height of all the bars.
- **Maximum** — the maximum value (tallest bar) in the series.
- **Minimum** — the minimum value (shortest bar) in the series.
- **Sample Size** — the number of values (bars) in the series.
- **Range** — the maximum value minus the minimum value.
- **Standard Deviation** — Indicates how widely data is spread around the mean.



Source: www.slideshare.net

Slide Courtesy: Dr.Uma

Data Visualization:Bar Chart

Difference between Bar and Histogram

Bar

Type of Data

In bar graphs are usually used to display "**categorical data**", that is data that fits into categories.

Histogram

Type of Data

Used to present "**continuous data**", that is data that represents measured quantity where, at least in theory, the numbers can take on any value in a certain range.

Slide Courtesy: Dr.Uma

THANK YOU

Mamatha H R

Department of Computer Science

mamathahr@pes.edu