FOAM - Week 06

- **Problem 3**: Covid 19

- Objective: Observe and analyze the dynamics of covid spreading (infectious disease)
- Why do we need such a study?
    - To minimize deaths
    - Policy making – shutdown, stimulus, joblessness
    - Many more reasons …

- Obtaining the data - https://ourworldindata.org/coronavirus
- Download the CSV file.
- Extracting relevant data
    - Open the CSV file in excel and save as .xlsx file
    - Filter for US and India data and copy to respective sheets.

    - Columns we are interested: Location, Date, Total Cases, New Cases
    - Commands used for extracting the data
    - Copy: Ctrl + C
    - Pate: Ctrl + V
    - Select All: Ctrl + A
    - Delete: Select a specific column -> Ctrl + Shift + Right Arrow -> Delete

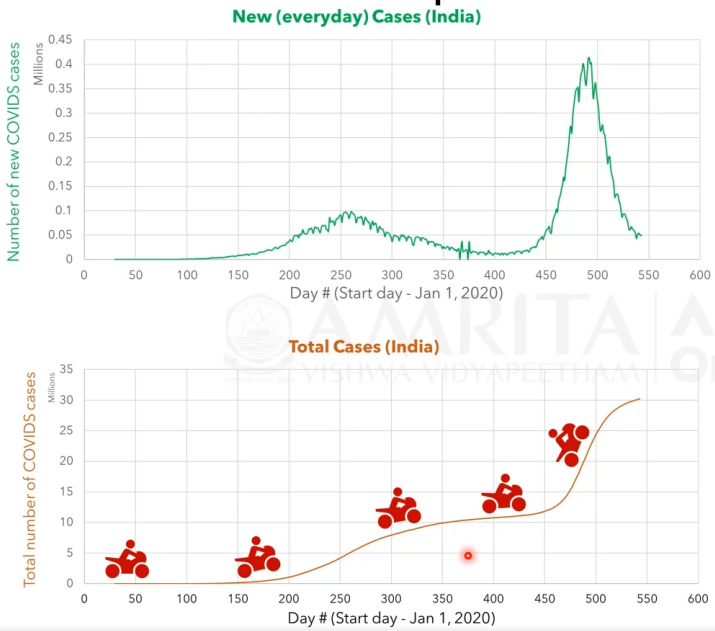
    - Convert the Date column to Day # (reasons will be become clear later)
    - Make sure the format for Day # is set to number with 0 decimal places

    - Plot Day # and New (everyday) cases on one chart.
    - Plot Day # and Total cases on another chart. Challenge your formatting skills!

- Analysis – Everyday case for India
- Analysis – Total cases for India

- Slope of the Curve
    - We describe the slope of the total case curve

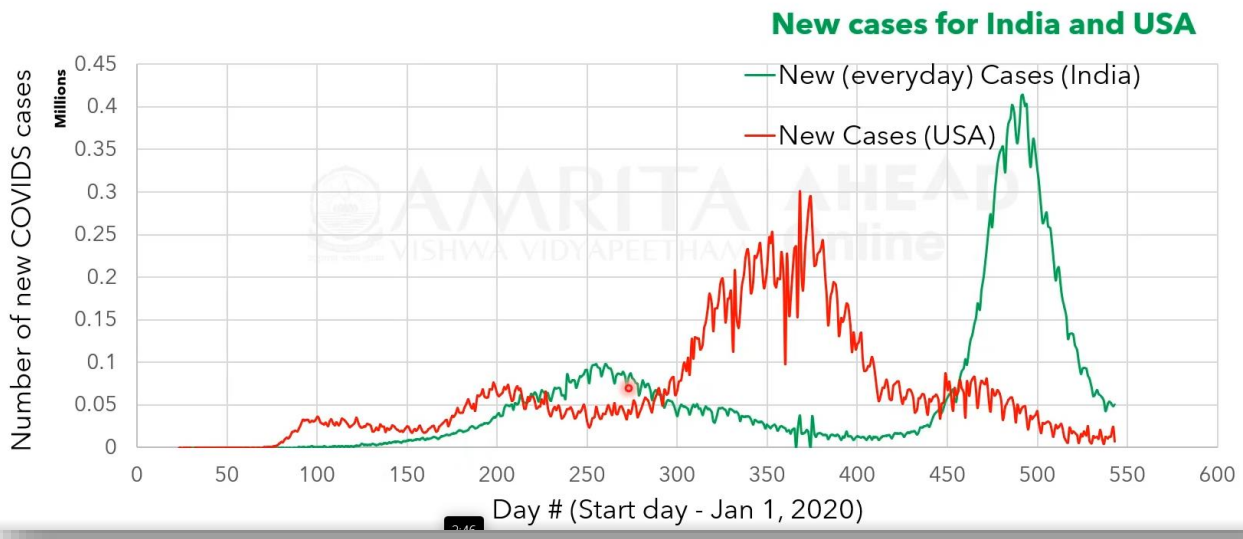
Slope and Derivative

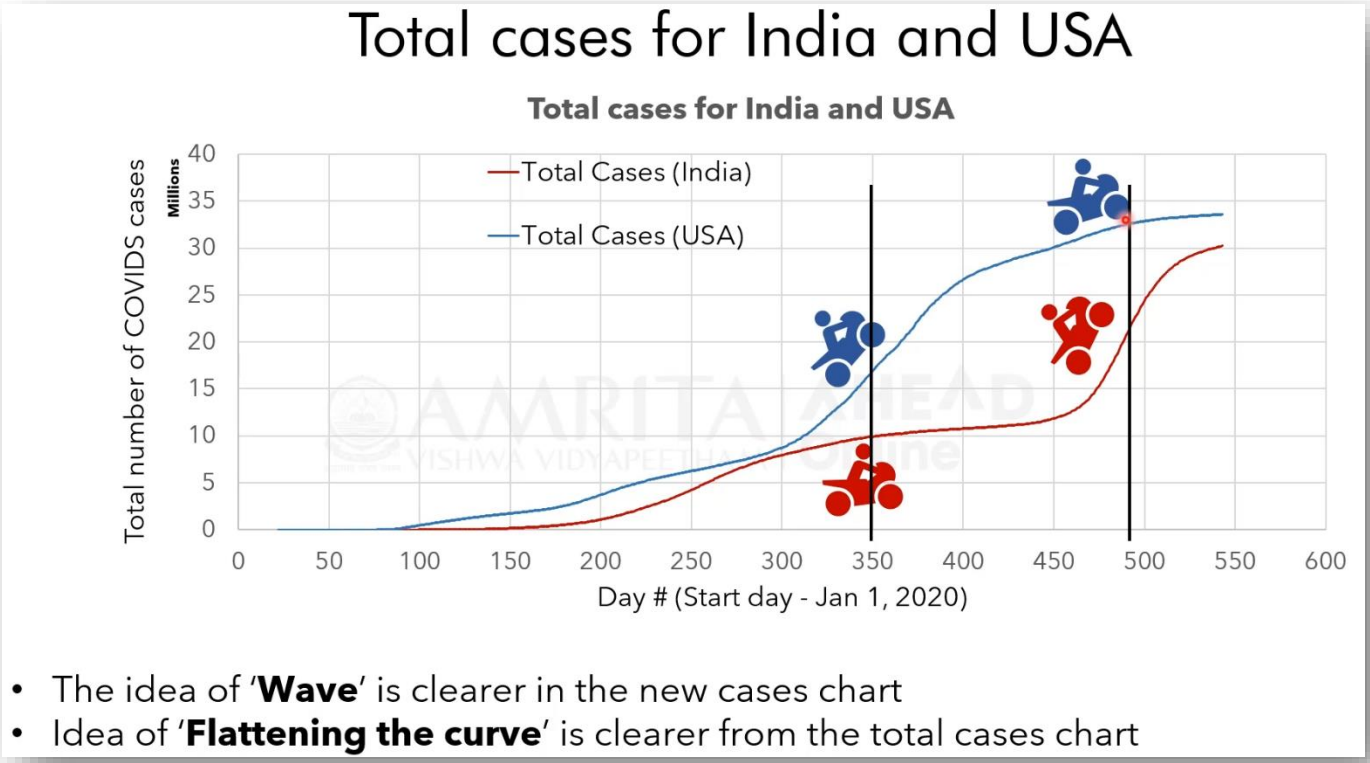


- Slope of the total case curve on a day gives an estimate of the number of new cases on that day
- Steeper the curve, the more number of new cases on that day
- Slope of a curve is connected to the concept of **derivative**, that we will be learning in calculus.

6.4 – Data Description

New (everyday) cases for India and USA



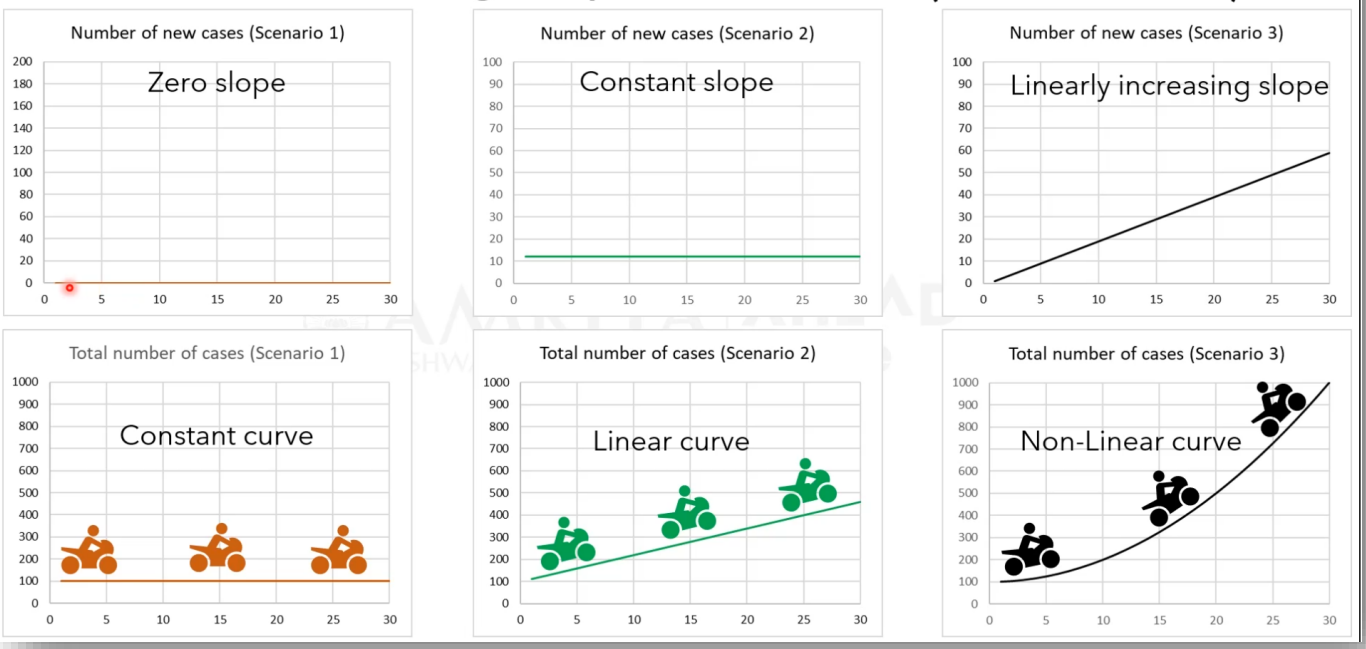


6.5 Data Description

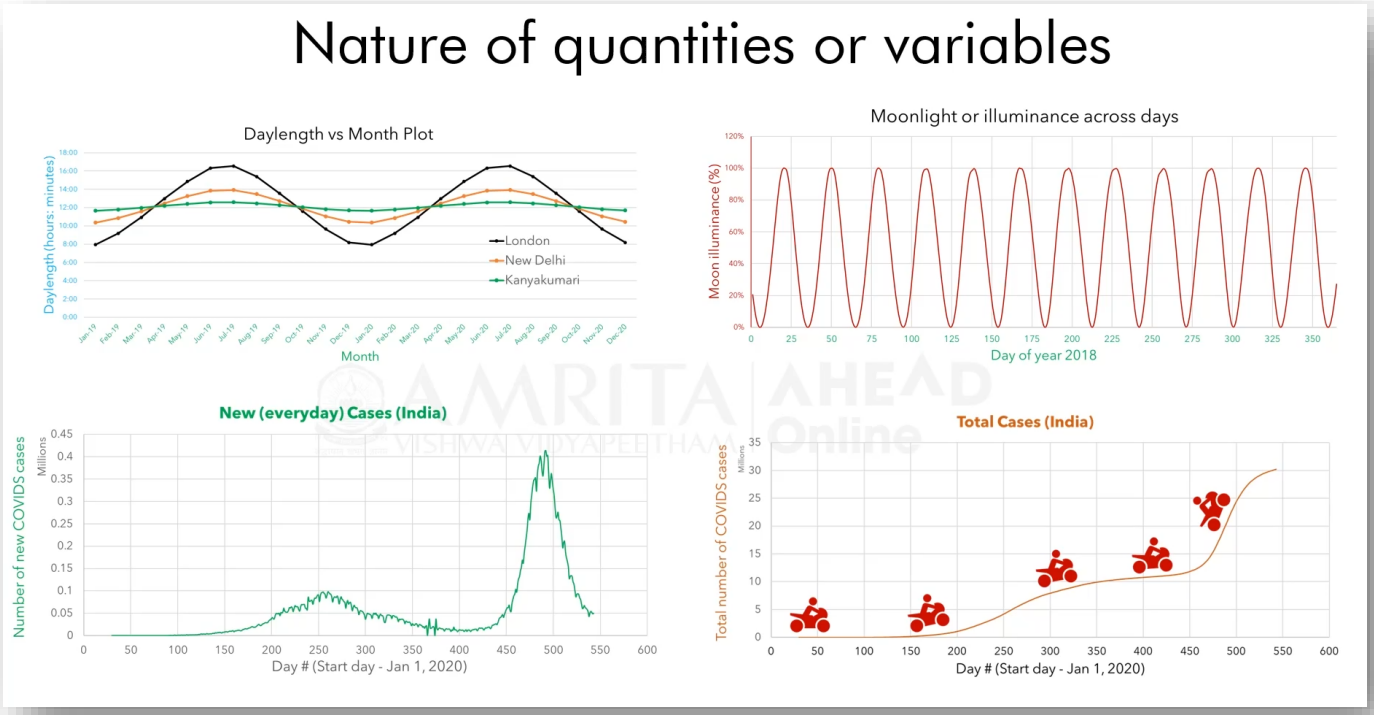
- **Obtaining New and Total Cases from one another**
  - Total cases can be obtained from new cases by adding up (alluding to integration)
  - New cases can be obtained from total cases (allude to differentiation)

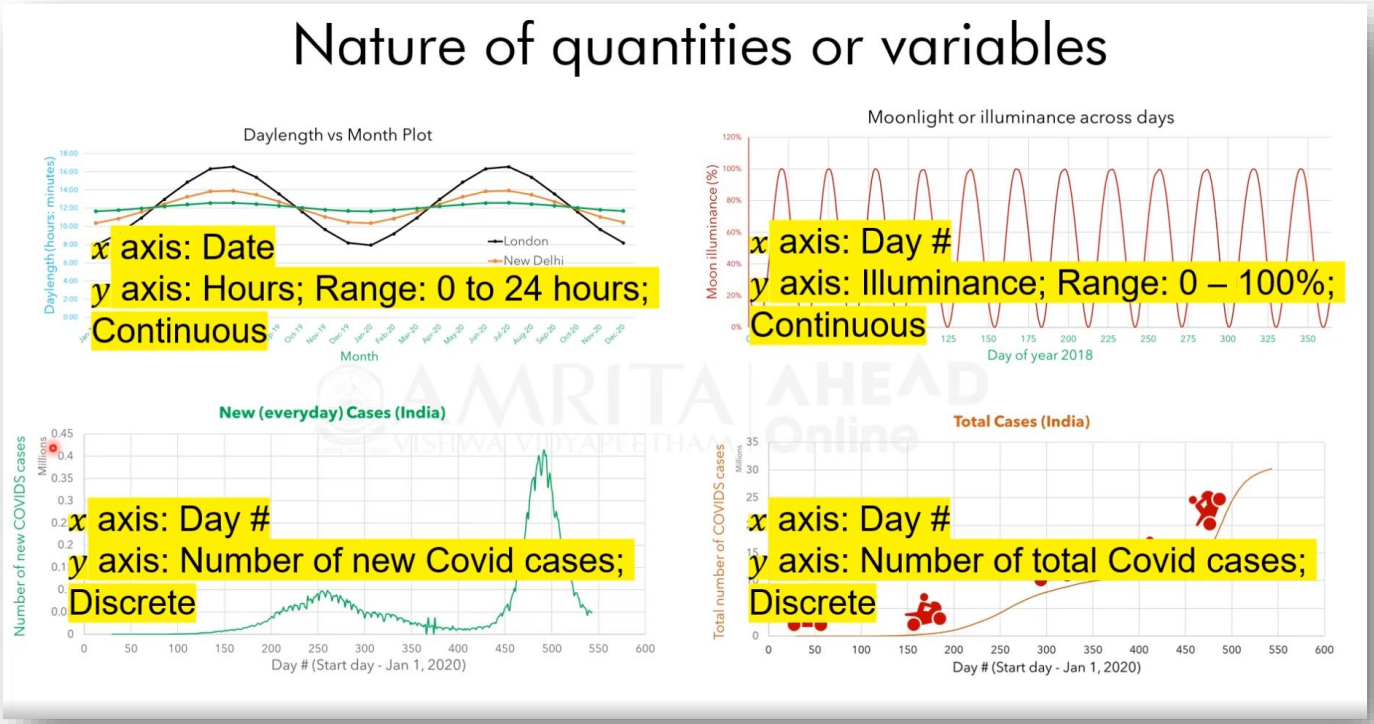
- **Understanding slopes of curves (or functions)**
  - **Scenario 1:**
    - Number of cases at start: 100
    - Number of new cases everyday: 0
    - Total number of cases for 1-30 days?
  - **Scenario 2:**
    - Number of cases at start: 100
    - Number of new cases everyday: 12
    - Total number of cases for 1-30 days?
  - **Scenario 3:**
    - Number of cases at start: 100
    - Number of new cases everyday:
      - Day 1: 1, Day 2:3, day 3:5 …, Day 30:59
    - Total number of cases for 1-30 days?

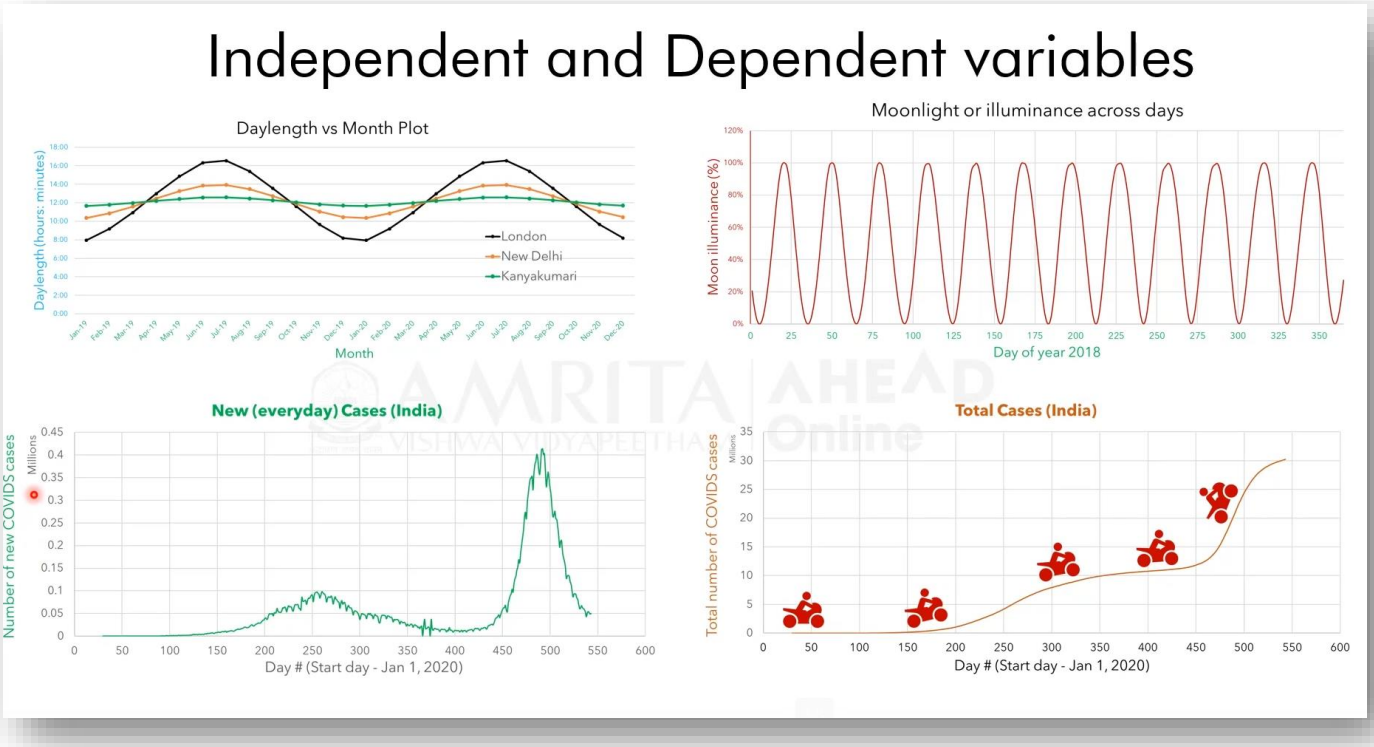
Understanding slopes of curves (or functions)

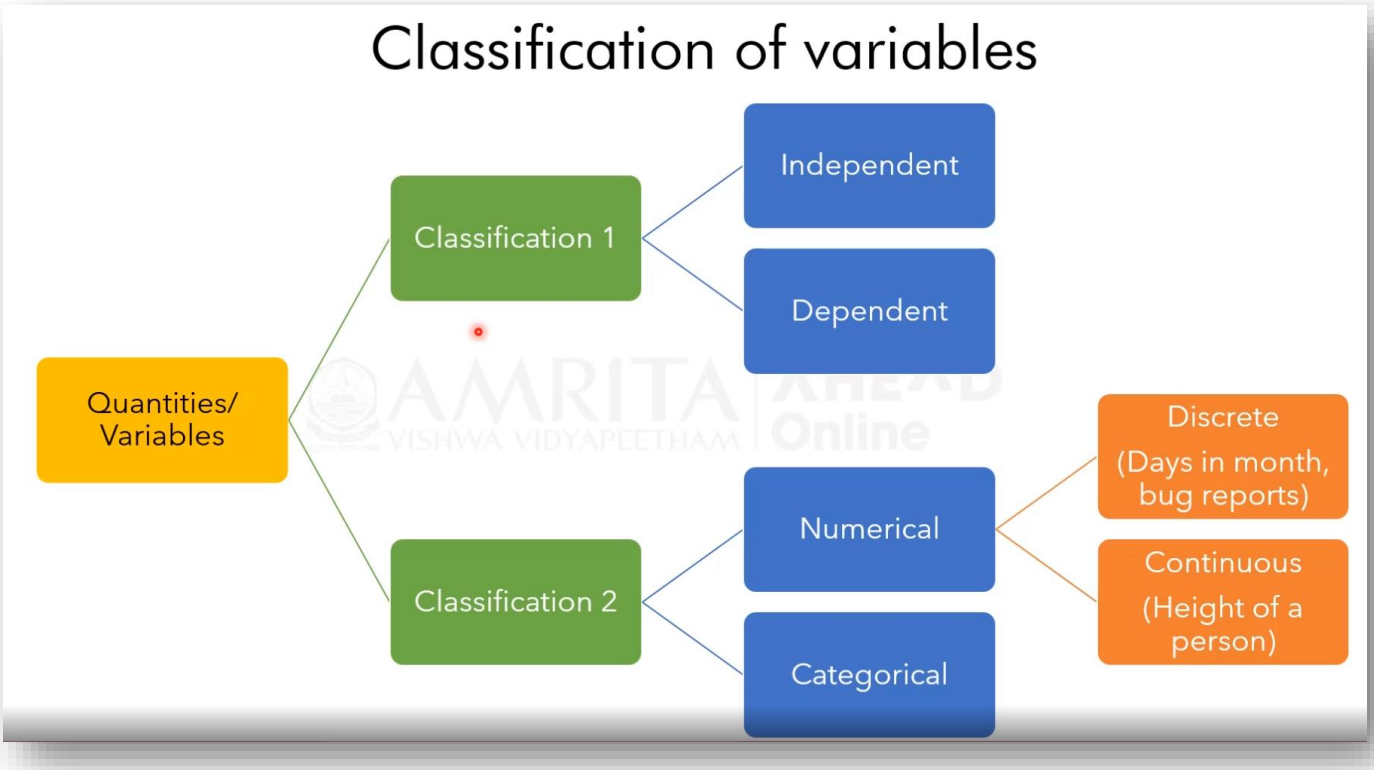


6.6 Data Description









Closure – Observation of phenomena, Data recording, Visualization, Terminologies, Nature of quantities/variables