**Measures of Central Tendency**

* **Parameter** – a characteristic/measure obtained from all data values from a population
* **Statistic** – a characteristic/measure obtained by using sample data
* **Arithmetic mean/average**
  + Sample mean – **X-bar = ∑X/n**
  + Population mean – **μ = ∑X/N**
  + For grouped frequency distribution – **X-bar = ∑(f ⋅ Xm)/n**
  + Properties:
    - Mean is calculated using all values in the data set
    - Mean varies less than median & mode when different samples are taken from the same population
    - The mean for a data set is unique
    - The mean cannot be calculated for an open-ended freq. dist.
    - The mean is highly affected by outliers
* **Median** – midpoint of a data array (ordered data set)
  + Location in the data array is **(n + 1)/2**
  + When there is an even # of values in data set, median is the average of the 2 middle values
  + Properties:
    - The median can be calculated for an open-ended freq. dist.
    - The median is less affected by outliers
* **Mode** – value(s) that occurs the most
  + A data set can have one, more than one, or no mode
  + For grouped freq. dist. – **modal class** is the class with the highest frequency
  + Properties:
    - The mode can be calculated for categorical or nominal data
    - The mode is not unique
* Symmetric distribution: mean = median = mode
* Right-skewed distribution: mean > median > mode
* Left-skewed distribution: mean < median < mode