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| --- | --- |
| **Entity** | Specific object |
| **Attribute** | Property of an entity |
| **Data** | Measurement of an attribute |

|  |  |  |  |
| --- | --- | --- | --- |
| **PROPERTIES OF DATA** | | | |
| **#** | **Property** | **Operation** | **Type** |
| 1. | Distinctiveness | = and ≠ | Categorical  (Qualitative) |
| 2. | Order | < , ≤ , > , ≥ |  |
| 3. | Addition | + and - | Numerical  (Quantitative) |
| 4. | Multiplication | \* and / |  |

**Data** defines an entity

Computer can manage all types of data

**CLASSIFICATION OF SCALES OF MEASUREMENT**

|  |  |  |
| --- | --- | --- |
| Qualitative | **Nominal** | Binary  Ternary  Others |
|  | **Ordinal** | Alphabetical  Numerical  Literal |
| Quantitative | **Interval** | Discrete  Continuous |
|  | **Ratio** |  |

* **Nominal** = Distinctiveness
* **Ordinal** = Distinctiveness + Order
* **Interval** = Ordinal + Additive
* **Ratio** = Interval + Multiplicative

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **NOMINAL** | **ORDINAL** | **INTERVAL** | **RATIO** |
| *Input* | Value among a set of mutually exclusive codes that have no logical order | Each value can be compared literally or using relational operators | Continuous measurements of a roughly linear scale | Simply an interval with a clear definition of "zero" |
| *Naming* | Consistent naming convention |  |  |  |
| *Stats* | **Mode** summary statistics | **Mode**, **Median** summary statistics |  |  |
| *N/A Operations* | * + Arithmetic (+ - \* /)   + Logical (ax + b / c) |  |  |  |
| *A Operations* | * + Accessing   + Recoding | * + Relational ( < <= >= > ) | * + Relational   + Arithmetic ( + - \* / )   + Logical ( ax + b / c ) | * + Arithmetic ( + - \* / )   + Logical ( ax + b / c ) |
| *Visualization* | * + Line Charts   + Bar Charts   + Pie Charts |  | * + Histogram   + Frequency polygon |  |
| *Extras* | * + Can combine variables to generate a new one   + Creates a "category" of a set of data   + **Binary Scale** = only two possible values (Symmetric, Asymmetric) | * + Also called ordered nominal   + Can be ranked - percentile measures   + Calculations based on order are permitted   + Numerical can be transformed into ordinal with loss of info | * + Measured on a **numeric** scale   + Has a **zero poin**t on origin but does not imply a true absence of the measured characteristic   + Can be transformed to nominal/ordinal with loss of info | * + All ratio is interval but not vice-versa   + Difference between data value and ratio data pair is meaningful   + May be linear or non-linear   + Interval and ratio can be stored in same data type |
| *Examples* | * + Gender (M, F)   + Blood type (A, B, AB, O)   + Switch (On, Off) | * + Size (S, M, L, XL)   + Age (kid, teen, adolescent, adult, senior) | * + Weight   + Height   + Temperature | * + Temperature in Kelvin Earthquake intensity Population |