

# FIRST LECTURE SUMMARY

## DEFINITIONS

**POPULATION** - HUGE, FIXED

**SAMPLE** - SMALL, RANDOM

**VARIABLES** HAVE TWO TYPES OF **SCALE**:

**NOMINAL** (QUALITATIVE)

**NUMERICAL** (QUANTITATIVE), OF TWO KINDS:

**DISCRETE** (FEW VALUES)

**CONTINUOUS** (MANY VALUES)

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## COLLECTING DATA

**CENSUS** - FULL POPULATION

RANDOM **SAMPLING** - BY **SURVEY**  
**OBSERVATION**  
(MAY BE DESTRUCTIVE) **EXPERIMENT**  
**COMPUTER SIMULATION**

## TYPES OF SAMPLING:

**SIMPLE** - THE ONLY ONE USED BY US

**SYSTEMATIC** - 100<sup>th</sup> 200<sup>th</sup> 300<sup>th</sup> 400<sup>th</sup>,...

**STRATIFIED** - NONHOMOGENEOUS STRATA

**CLUSTER** - HOMOGENEOUS CLUSTERS

**CONVENIENCE** - CLEARLY **BIASED**

WE IGNORE THAT FACT THAT SOME PEOPLE (THE VERY RICH, POOR?) MAY NOT RESPOND TO OUR QUESTIONNAIRE, THUS ALSO INTRODUCING **BIAS** - AND HOW TO GO ABOUT CORRECTING IT.

DURING THIS COURSE, WE LIVE IN A **PERFECT WORLD!**

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## DATA REDUCTION TECHNIQUES:

**FREQUENCY TABLES** ARE USED TO TALLY RAW-DATA **OBSERVATIONS** INTO **CLASSES**  
**CLASS** LIMITS

FREQUENCIES

BOUNDARIES

MARKS (MIDPOINT VALUES)

RELATIVE FREQUENCIES

CUMULATIVE FREQUENCIES

CUMULATIVE RELATIVE FREQUENCIES

TWO LEVELS OF **APPROXIMATION** ARE INVOLVED - EXACT VALUES ROUNDED OFF TO INTEGERS (**ROW DATA**), THEN **TALLIED**

### **THREE GRAPHS** RELATED TO **FREQUENCY TABLES:**

**HISTOGRAM** (CLASS BOUNDARIES -  
FREQUENCY)

**FREQUENCY POLYGON** (CLASS MARKS -  
FREQUENCY)

**OGIVE** (UPPER CLASS BOUNDARIES -  
RELATIVE CUMULATIVE FREQUENCY)

BASED ON THE LAST GRAPH, BE ABLE TO ESTABLISH A SPECIFIC **PERCENTILE** (**QUARTILE, MODE**), AT LEAST GRAPHICALLY

THIS APPROACH MEANINGFUL FOR **CONTINUOUS** (MANY-VALUED) TYPE OF VARIABLE ONLY

WITH **DISCRETE**-TYPE DATA (# OF CHILDREN) LIMITS, BOUNDARIES AND OGIVE WOULD BE MEANINGLESS

## HISTOGRAM SHAPES:

APPROXIMATELY SYMMETRIC, SKEWED,  
BIMODAL, UNIFORM.

## OTHER DISPLAYS

**BAR GRAPH** - QUALITATIVE DATA  
USUALLY WITH GAPS, ORDER ARBITRARY -  
WHEN ARRANGED FROM THE LARGES TO  
SMALLEST FREQUENCY - **PARETO CHART**

**STEM-AND-LEAF** - 'PRIMITIVE' HISTOGRAM