

# Statistics One

## Introduction

# Introduction

- Statistics, broadly defined, is a scientific discipline devoted to the study of data

# Introduction

- *Data*: a collection of numbers assigned as values to quantitative variables and/or characters assigned as values to qualitative variables

# Introduction

- Example: Academic records of children in elementary school

# Introduction

Student	Gender	Age (Months)	Math	History	Language
TR	M	80	95	91	73
CS	F	79	79	75	87
PP	M	84	75	82	84
DB	M	84	94	98	95
MM	F	82	93	78	78
AC	M	83	91	79	80
...					

# Introduction

- *Data*: the lowest level of abstraction from which information and then knowledge are derived
  - Data → Information → Knowledge

# Introduction

- *Statistician*: a person who is skilled in applying the tools of Statistics



# Introduction

- Types of Statisticians
  - Academic research
  - Medical research
  - Survey studies
  - Education
  - Market research
    - Analytics and Big Data



# Introduction

- *Statistic*: a quantity calculated from a sample of data
  - Average Age of students
  - Average Math grade
  - Standard deviation of Math grade

# Introduction

- *Sample*: a subset of the population
- *Population*: the entire collection of cases to which we want to generalize

# Introduction

- *Statistic*: a numerical measure that describes a characteristic of a sample
- *Parameter*: a numerical measure that describes a characteristic of a population

# Introduction

- *Descriptive statistics*: procedures used to summarize, organize, and simplify data
- *Inferential statistics*: procedures that allow for generalizations about population parameters based on sample statistics

# Introduction

- Research methods
  - Descriptive
  - Correlational
  - Experimental

# Introduction

- Descriptive
  - Organize and summarize the data



# Introduction

- Correlational
  - Examine relationships among variables
    - Is Math grade correlated with History grade?



# Introduction

- Experimental
  - Randomly assign students to different schedules
    - Year-round
    - Summer break
  - Is achievement affected by schedule?

# Introduction

- The International Year of Statistics, 2013!
  - For information:
    - [www.statistics2013.org](http://www.statistics2013.org)

# Introduction

- “Statistics is becoming more critical as academia, businesses, and governments come to rely on data-driven decisions, greatly expanding the demand for statisticians.”

END INTRODUCTION