Business Statistics I
Introduction to Statistics

M&M Data Question	Answer and Definition
The (1) consists of all fun size packages of plain and peanut M&Ms in the world.	A **population** is the entire group of subjects (People, M&Ms, packages of M&Ms, etc.) that we are interested in knowing something about.
The true average weight of fun size packages of plain (or peanut) M&Ms is an example of a (2).	A **population parameter** (parameter) is a measure of some characteristic of the population.
The collection of M&M packages that were weighed and counted by Business Stats 281 students is a (3).	A **sample** is a subset of the population. A valid sample represents the population and is studied to learn more about the population.
The proportion of red M&Ms in the packages of fun size plain (or peanut) M&Ms evaluated by Business Stats 281 students is an example of a (4).	A **sample statistic** (statistic) is a measure of some characteristic of a sample.

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(5) on the M&M data involves analyzing the weights and distribution of colors of plain (or peanut) M&Ms by looking at summary numbers and graphs that describe these values.	**Descriptive Statistics** involves collecting, organizing, summarizing, and presenting important characteristics of a sample in the form of charts and tables.
(6) on the M&M data involves drawing conclusions about the weights and distribution of each color in fun size packages of plain (or peanut) M&Ms.	**Inferential statistics** refers to drawing conclusions about a population based on a valid sample, i.e., a sample that represents the population. Ex. we can infer what the average weight of a package of fun size M&Ms is by performing formal tests on sample data.
The fact that the data was collected at approximately one point in time tells us that the data is (7a) as opposed to (7b).	**Cross-sectional** data contain values of a characteristic of many subjects at approximately the same point in time or without regard to differences in time. **Time series** data contain values of a characteristic of a subject over time. The M&M data is cross-sectional because we collected the data at one point time and without regard to time. We are not going to compare the proportion of red M&Ms in January to the proportion in March. If in March we suspect that the proportion of red M&Ms has changed since this experiment, we could collect more data and compare. That would be time series data.

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The labels for the different measures in the first row of the table above (Type, Weight, Brown, Yellow, Red, etc.) are called (8).	A **variable** is any characteristic of a subject that can be measured. A variable may also be called a data item. Ex. *Red* assumes the count of red M&Ms, *Weight* assumes the weight of a package of fun size M&Ms, *Type* assumes the type of M&M (plain or peanut). *Age, gender, income, country of citizenship, capital expenditure, test grades, eye color,* and *vehicle type* are also examples of variables.
The weight of package contents is a (9a) measure, and type of M&M is a (9b) measure.	**Quantitative** (numeric) variables assume numbers that can be manipulated in mathematical operations. There are two types of quantitative variable: Discrete and Continuous. Ex. *Weight* **Qualitative** (categorical) variables assume labels or names that categorize distinguishing characteristics of a subject. Ex. *Type, Color* (note that Color as a variable is not in our dataset)

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The number of green M&Ms is a (10a) measure, and weight of package contents is a (10b) measure.	A **discrete** variable is a quantitative variable that assumes a countable number of values. Ex. The variables *Brown, Yellow, Red, Orange, Green,* and *Blue* each assume the counts of the respective color of M&Ms. A **continuous** variable is a quantitative variable that assumes uncountable values within an interval. Ex. *Weight*

Scales of Measurement

Qualitative Scales of Measurement	
Nominal	**Ordinal**
• Categorize/group **Ex.** Type of M&M; Color of M&M	• Categorize • Rank **Ex.** 1st, 2nd, 3rd place; Candy ranked by preference
Quantitative Scales of Measurement	
Interval	**Ratio**
• Categorize • Rank • Interpret meaning behind differences **Ex.** Temperature	• Categorize • Rank • Interpret meaning behind differences • Interpret meaning behind 0 **Ex.** Rain fall