WHAT IS STATISTICS?????

Examples????

Look at the following:

Toss a coin 10 times

www.random.org/coins

Drawing cards from a deck of cards:

First card is an Ace, shuffle draw a card again – again an ace. Shuffle one more time and draw a card
and the third card is also an Ace. Do it a fourth time and the fourth card is also a queen!

IS THIS NORMAL?

Basic Principle in Statistics: Observe an event and under the assumption that things are as they are supposed to be, compute the probability of the event. If it is low, assume something is wrong!
Statistics is the science of collecting data, organizing it and then making inferences from it. As a result,

Statistics can be broken down into two sections:

1) **Descriptive Statistics** - Collection, organization, summarization and presentation of data.

   e.g. pie charts, bar charts, mean, median and mode

2) **Inferential Statistics** - Drawing conclusion about an underlying data set when only part of the set has been observed.

Examples????
Let us also look at another related issue:

**ESTIMATION:**

% of students in class who are excited about taking this class:

Average age of student in the class.
Basic Process:

- Formulate a research question or a hypothesis
- Collect the data
- Statistical Analysis
- Draw a conclusion

1.3 Elements of Statistics

**Population** - The collection of all possible subjects of interest for a given problem.

Examples
Sample - Any subset of the population. Mention the difference between a sample and a census.

Variable: This is a characteristic or a property of the population that we are interested in.

Note that variables can be numerical or nonnumerical.
Random Sample - A sample of size $n$ is said to be random when every subset of the population of size $n$ has an equal chance of being selected.

Inference is a generalization made about the population based on the sample

Reliability A measure of reliability is a statement (usually quantified) about the level of uncertainty associated with an inference.

LET US LOOK AT EXAMPLE 1.2 ON PAGE 8.
1.4 – Types of Data

Quantitative – consists of measurements that are recorded on a naturally occurring numerical scale

Examples: Lifetime, height, age etc

Qualitative – here we record a quality or a characteristics

Examples – quality of potato chips, pizza preference, voting preference etc.

e.g - pg 12 , 1.4
1.5: Collecting Data:

Published source
designed experiment
survey
observationally

Random Sample

Exercises:

1.12 - 1.20, 1.21, 1.22