

STAT 495, Fall 2008

Homework Assignment #1

1. Variation is the fundamental concept underlying statistics. Give three examples of where variation either affects the job you do or your everyday life.
2. Everyday we encounter measurements that could be operationally defined. Come up with an operational definition for each of these common measurements. Each definition should allow anyone to make the same measurement in the same manner.
 - a) A person's height.
 - b) A person's weight.
 - c) A person's neck circumference
3. For each of the following examples briefly describe the enumerative and/or analytic purposes of the study. Be specific. If the study has enumerative purposes, describe the universe, frame, and sample. Additionally, explain what is being described and what inferences are being made. If the study has analytic purposes, explain what sort of predictions are being made and/or actions on the system being taken?
 - a) A bottling company fills bottles with a popular soft drink. The bottles are labeled 16 fluid ounces. Truth-in-labeling laws are such that bottles should contain at least 16 fluid ounces. The bottling company periodically pulls bottles off the line and measures the actual fluid contents. Based on these data they will adjust the filling process or leave it alone.
 - b) A company that manufactures jet engines tests its engines for efficiency. Engines are expensive so the company builds only enough to meet current customer orders. An aircraft manufacturer wishes to see the efficiency data in order to help them decide whether to place an order for engines with the company.
 - c) A roller bearing manufacturer buys rollers from a supplier. For each lot of rollers, a sample is selected. Each roller in the sample is subjected to a nondestructive evaluation of strength and then to a destructive strength test. The destructive test has been shown over time to be a consistent and reliable way of evaluating the suitability of the ball bearings. Based on the destructive test data, a lot is either used in production or returned to the supplier. In the future, the manufacturer would like to use the nondestructive evaluation measurements to determine whether rollers should be used in production.
4. There are many definitions of quality. What definitions have you come in contact with in your work, in workshops, in short courses, in other training or through reading?
5. Is there a process that you are familiar with that might form the basis of a project for this course? The process, or accompanying data, can NOT be proprietary in nature.