AMS 102.7 Homework #3

DUE: 2/23/2012

1) Consider the following study:

I am interested in investigating how diet and exercise can affect weight loss. There are 2 types of diets I want to investigate as well as 2 exercise routines. The 2 diets are Raw Food and Weight Watchers and the 2 exercise routines are Swimming and Jogging. I obtain a sample of 12 individuals. Below are the subjects in my sample.

ID	Name	ID	Name
1	Jake	5	Molly
2	Alice	6	Mark
3	Anna	7	Cynthia
4	Samuel	8	Sally

a) Is this an experiment or observational study?
b) Create a design-layout table and in each cell, include the IDs assigned to that treatment assuming a balanced design. Use **Row 6** of the attached Random Number Table to carry out this randomization process.

a) **This is an experiment** as I am actively imposing the treatment of specific diet and exercise on the subject. This gives me better control over the results of the experiment

b) Row 6: 7 ~~79~~ 2 1 ~~0~~ 6 ~~9071100~~ 84

Balanced design → **Same number of units in each cell**

7,2 in cell 1 1,6 in cell 2 8,4 in cell 3 → **implies** → **3,5** in cell 4

	Swimming	Jogging
Raw Food	***7*** *Cynthia* ***2*** *Alice*	***1*** *Jake* ***6*** *Mark*
South Beach	***8*** *Sally* ***4*** *Samuel*	***3*** *Anna* ***5*** *Molly*

2) Consider the following study:

I am interested in investigating how the length of an individual's commute to work influences their job satisfaction. I carefully select a sample of 100 individuals and measure their average commute time and interview them. From the interview I have an expert assign either a Low, Moderate or High job satisfaction score.

a) What is my explanatory variable? My response variable?
b) Is this a retrospective or prospective study?
c) Identify at least 2 potential confounding variables with this study.
d) I statistically analyze my results and determine that longer commutes to work **cause** lower job satisfaction. Why is this not a valid claim?

a) Explanatory Variable is **commute to work**
Response Variable is **job satisfaction**

b) **This is a prospective study,** since it is a study of current events and thus the researcher can actively measure the variables.

c) Some confounding variables could be:

Salary, Length of Employment, Type of Work, Position in Hierarchy, Boss, etc.

d) **This is not a valid claim since this is an observational study. In observational studies we cannot claim CAUSATION since we do not have enough control over the subjects to focus the research entirely on the relationship of interest. There are too many confounding variables that we cannot account for, so we can only claim CORRELATION in an observational study.**