Homework 3 assignment for ECE597/697SI
Posted: 10/29/2013
Due: 11/05/2013

Note: In all written assignments, please show as much of your work as you can. Even if you get a wrong answer, you can get partial credit if you show your work. If you make a mistake, it will also help the grader show you where you made a mistake. For this specific homework it is important that you clearly identify the sources you obtained the information for your answers from (using appropriate sources on the web is okay!)

Problem 1 (25 Points): Kansas City - Weather
For this problem focus on Kansas City, Missouri and NOT Kansas City, KC!

In this problem, we will start focusing on the city that your final projects will be concerned about. In your final project, the goal is to define the requirements for a CASA-type network in Kansas City. To prepare for this task you have to gather some background information. Answering the following question will help you gather that information.
Note: Use this link as a starting point http://www.ncdc.noaa.gov/stormevents/

a. How many severe thunderstorms occurred in Kansas City in the past 10 years?
b. How many hail storms occurred in Kansas City in the past 10 years?
c. How many tornadoes occurred in Kansas City in the past 10 years? How many people were injured by these tornados? How many were killed?
d. How many flash flood events occurred in Kansas City in the past 10 years?
e. Have there been any reports on severe winter weather in Kansas City in the past 10 years?

Problem 2 (25 Points): Data Flow Diagram
In this problem, we focus on Data Flow Diagrams (DFD). Your task in this assignment is to create a DFD for an online bookstore. As a starting point for this assignment the context diagram for this DFD is given below. Similar to the examples given in the lecture slides (slides 12 and 13 in the “System Modeling for Requirements Engineering” lecture) you should:

a. Create a level 1 DFD that shows internal system functionality and
b. Create a level 2 DFD that represents a detailed model of the online bookstore.
Problem 3 (25 Points): Model
Modeling is one of the major components in the requirements engineering process in systems engineering.

a. Explain how modeling can be used to derive lower level from higher level requirements in the requirements engineering process.
b. Name three representation methods for Requirements Engineering and briefly explain their characteristics.
c. Name three different Viewpoint Methods and explain their major characteristics.
d. Create a customer viewpoint VORD for the online bookstore you specified in problem 5. To create this VORD diagram follow the example shown on slide 37 of the “System Modeling for Requirements Engineering” lecture.

Problem 4 (25 Points): Simulations
a. Name 4 different subsystems of the CASA system that could be analyzed through simulations.
b. Explain how you would carry out a simulation for two of these subsystems. Explain, in detail, how the outcome of such a simulation would support the requirements engineering process for the system.
c. Give two other examples of simulations and how they can be used in the requirements engineering process. These examples should be from systems different than the CASA system.
d. Explain the meaning of trace-based simulations by giving an example for such a simulation.
e. Explain the difference between simulation and emulation by using an example that involves studying the behavior of a computer network protocol based on the latency of a link.