**CS571 HW 7 - due Thursday of the last week of the lectures [31 points total]**

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**Part 1: [10pts]**

Modify interleave so that it can take two lists of different lengths. Hint: more conditions are needed.

Interleaving '(1 2 3 4) and '(a b) should produce '(1 a 2 b 3 4)

Interleaving '(1 2) and '(a b c d) should produce '(1 a 2 b c d)

**Part 2: [12pts]**

Create two global variables for Ptrans-CD and Atrans-CD.

Do setf’s for many different words with the Category property value being the slots in CDs. For the verbs, the Category value is either PTRANS or ATRANS.

* CDs are: (PTRANS

ACTOR ( A-filler )

TO ( T-filler ) )

(ATRANS

ACTOR ( A-filler )

OBJECT ( O-filler )

TO ( T-filler ))

In the main function with a PROG, you will ask the user to type in words one by one, starting with a verb. As you receive each word, fill the CD using the subst function.

Display the filled CD at the end.

**What to submit for each program:**

**Your program file**

**Test results for a variety of cases (at least 4) – a file.**

**PART 3: [9 pts]**

Describe (one short paragraph each) in your own words (not copying my notes or not copying the book or Wiki). Insert your answers here.

* What is a Bayesian Network?  
  *A Bayesian Network consists of a set of variables and their subsequent dependencies whose nodes are given a probability based on the chance of their cause and effect relationship occurring. For example, a Bayesian Network can be used to diagnose a car that is unable to start based on several inputs such as a dead battery, a faulty starter, the lack of fuel, or a malfunction in the ignition system. Bayesian Networks may also include a component of learning to improve the accuracy of its determined probabilities or other data obtained.*
* What is a First Order Markov Process?

*First Order Markov Process is a mathematical probability system where its transitions are as a function of it’s current state. Simply put, it can involve a sequence of events in which its predictability relies only on the current event.. For example, if this system is applied to the weather forecaset, you can apply a general probability on the weather for the next day based on the conditions of today. To predict the weather in 2 days, use tomorrow’s weather and apply the same probability analysis to that day.*

* What is a Neural Network?  
  *A neural network consists of an array of adaptive systems, or human-like (artificial) neuron networks, that use previous weighted knowledge and past experience in order to solve problems. Such systems can also make human-like errors echoing human error. Neural Networks specialize in processing information, performing approximate matching, and learning from examples and assigning weights to them based on it’s formula for determining its frequency and reliability. Such systems are in use today*