COSC451 2010 Assignment 4 (10%)

There are two options for this assignment.

Option 1: an implementation of cross-situational word-learning

In this task, you should implement a model of the mechanism whereby an infant learns word meanings using **cross-situational learning**. You should assume that the infant already has a vocabulary of n 'phonological' word representations, and a set of n semantic concepts, which she can evoke from objects/actions in her environment. (Phonological words and semantic representations can be encoded however you like, provided there's no inbuilt mapping between them to begin with.) You should model the infant's environment as a **language**, and a set of **situations**.

- A language is a deterministic mapping between phonological words and semantic concepts. (This is what the child has to learn.)
- A situation is a pair: firstly, a sequence of semantic concepts, and secondly, a sequence of utterances. The semantic concepts reflect objects and/or actions which the infant chooses to observe in the situation. (In each situation, the child can evoke a subset of her total set of semantic concepts.) The utterances are sequences of phonological words which the child can hear being spoken by mature speakers of the language. In a given situation S, the words which feature in an utterance are more likely than chance to refer to semantic concepts in S.

Your word-learning system should learn the language by discovering the (noisy) mapping between words and semantic concepts in the set of situations you create. (N.B. You might find it useful to experiment with the notion of a phonological buffer, to allow each semantic concept to be associated with several phonological words, to speed up the learning process.)

For this task, you should also produce a report, introducing the cross-situational learning technique, describing how to run your code, and explaining how the code works.

Option 2: Essay

Write an essay with the following title:

> On this course, it has been proposed that the logical form (LF) of a transitive sentence can be interpreted as a rehearsed sensorimotor sequence. Summarise the arguments made for this proposal, and evaluate them.

This essay will draw mainly on Chapter 5 of the textbook, and on the associated lecture (Lecture 13).
The essay should be around 3000 words (about 8 pages in a 12-point font).

Submission and marking

You should submit the assignment by email to me (`alik@cs.otago.ac.nz`) by 5pm on **Wednesday of Week 7** (i.e. on **Wednesday 25 August**). 10% of available marks will be deducted for each day late. For the code assignment, I'll give marks for code that performs the required tasks, and for a report which clearly introduces the tasks, and explains how the code works. For the essay assignment, I'll give marks for an essay which is well structured, and clearly presents and evaluates the relevant arguments. Again, you are welcome to criticise the arguments when you're evaluating them: you won't lose any marks for that!