In class we discussed the problem of syntactic category acquisition and how syntactic category learning can be modelled by means of agglomerative hierarchical clustering that groups words together on the basis of their distributional information. We also discussed about categorization and how conceptual knowledge is organized. The aim of this tutorial is to (a) understand the agglomerative clustering algorithm and the three different linkage criteria and (b) to examine how concepts are organized in adult speakers.

1 Learning Syntactic Categories: Clustering

You are given a data set of five words characterised by a single feature and the corresponding distance matrix:

<table>
<thead>
<tr>
<th>Word</th>
<th>neat</th>
<th>empty</th>
<th>occupy</th>
<th>finish</th>
<th>race</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feature</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

| neat   | 0    | 1    | 3    | 4    | 5 |
| empty  | 1    | 0    | 2    | 3    | 4 |
| occupy | 3    | 2    | 0    | 1    | 2 |
| finish | 4    | 3    | 1    | 0    | 1 |
| race   | 5    | 4    | 2    | 1    | 0 |

Run the agglomerative clustering using the single-link, complete-link and average cluster distance measures and draw the dendrogram trees.

2 Semantic Categories

For each of the following category names discuss whether it is basic-level, superordinate or subordinate. Use the relevant criteria from your reading. If you are not sure about your answer, explain why. Discuss any problems you have in applying the criteria given in your reading.

(a) Convertible
(b) Fork
(c) Vertebrate
(d) Puppy
(e) Sandal
(f) Vegetable
(g) Swim
3 Concepts

In this exercise, you will be presented with some words and asked to write down whatever the words make you think of. Do not censor or inhibit your thoughts; just write down whatever comes to mind. This technique is called free association and is used in psychology to assess the contents of the unconscious mind. We will be using free association to explore the structure of your long-term memory.

To begin, take out a piece of paper and a pen. Number three lists from one to ten. At the top of the first list write the word ocean. Now take a minute to write down the first ten words that come to mind. When you are finished, write down the word fish at the top of the second list and again take a minute to jot down the first ten words that pass through your mind. Finally, write down toothbrush at the top of the third list, and do the same. You may have noticed that the words ocean and fish are semantically related, and that toothbrush is somewhat unrelated to either.

(a) Did your first two lists contain any of the same words?

(b) Did you find it easier to think of words that had to do with fish? If so, that was probably due to priming.

(c) Was it more difficult to jot down words you associated with toothbrush? Why?

(d) Turn the page over and sketch out a semantic network for each of the words. Represent each word as a node and draw connections between it and related nodes. Group related words by placing them close together. What is the structure of these networks? Is there any hierarchical organization? Did certain nodes cluster together? How were the nodes in a cluster related?

(e) Compare one of your networks to that of a classmate. In what ways are they the same? In what ways are they different? Do you think different networks reflect different thinking styles or personality traits?