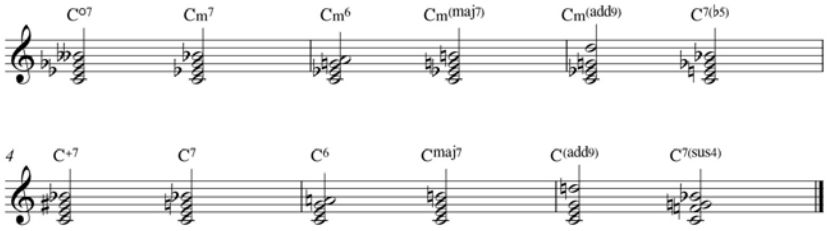
12. Classifying Extended Tetrachords (For Week 10)



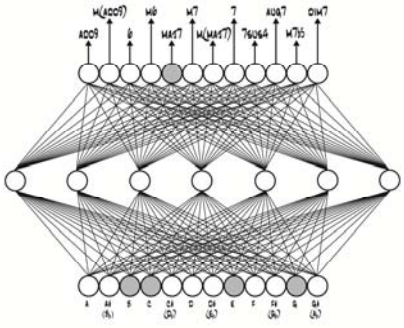
Musical notation for twelve different tetrachord types, each using C as the root note.

12.1 Issue

This exercise continues exploring network interpretation and banding. It uses a different classification task, classifying 12 different 'extended tetrachords' in any musical key.

12.2 Task

The task is to use the Rumelhart program to train a network to identify twelve different types of tetrachords as described in Chapter 8 of the supplementary reading for the activity. The image below illustrates the architecture that we will be concerned with; all output and hidden units are value units.



12.3 Materials

We will use the Rumelhart software package, and download the netfile ExtendedTetras.net from the course website. This netfile contains 144 different stimuli; each stimulus is an extended tetrachord represented in pitch-class format as described in the supplementary reading. Each stimulus maps onto one (but sometimes two) different output responses, where each output unit represents a particular type of tetrachord. There are also three Excel spreadsheets that may be useful: one defining stimuli, and two providing different kinds of analyses of an example network.

12.4 Procedure

Students will download the required netfile and train the Rumelhart program with it. To begin, use all value units and make sure that μ (thresholds) is modified throughout training. A learning rate of 0.01 should produce convergence 7000 or 8000 epochs of training.

After the network has converged, use the appropriate buttons to generate an Excel spreadsheet that holds the properties of a trained network. Also, use the software to generate jittered density plots. Does the network band? Does your network use 'intersection of bands' for coarse coding like the network described in the reading?