almost in direct proportion to the number of faces of the solids. This is because we have chosen techniques similar to those adopted by Wittram and Tamminen. Each face of the solids in the scene being examined is represented by the "Parallel Connected Stripes" (PCS) data structure. This coding scheme has offered us several advantages:

- Each face can be of unlimited topological complexity and, consequently, the constraints to be imposed on the input data are very low. Faces with nesting holes and cyclic overlaps involving at least three faces are permitted.
- Using the PCS data structure means that a display procedure based on the silhouette concept can be implemented. This concept makes it possible to retain only a small amount of information in main memory for each step of the algorithm. The difference operation between one or more faces and the faces that partially hide them (this step is very often neglected in the literature) is very efficient and, under certain conditions, can be realized simultaneously for a whole set of faces of the same priority.
- The algorithm can be forced to work in object space or in image space by simply modifying a single parameter of the data structure (the thickness of the stripes) and using different procedures to convert from PCS to vectorial or raster information. In the case of image space, the information embedded in the PCS data structure permits the implementation of a simple but effective antialiasing technique.

The PCS data structure

In 1984, the Parallel Connected Stripes data structure was defined as a coding scheme for the efficient representation of polygonal surfaces. PCS naturally belongs to the raster representation class, but the classical concept of a scanning line is replaced here by a scanning stripe. An example of the main characteristics of the PCS data structure is given in Figure 1, which shows the boundaries of two polygonal surfaces. Each boundary is coded by a Freeman chain, that is, by the absolute coordinates of the starting point of the chain and by a sequence of links describing the basic displacement along the nodes of a regular square grid of step size $h$, in eight possible directions.

Suppose that our polygons are cut along the horizontal lines of the grid into stripes (of thickness $h$) and the substripes belonging to each polygon are obtained from these stripes. The set of substripes obtained by this process is illustrated in Figure 2. A satisfactory description for every stripe of Figure 2 can be obtained by simply indicating the coordinate $Y$ of the stripe and the number of substripes belonging to it. The coordinate $Y$ of a stripe is indicated by the ordinate of its lower side. Each substripe has a trapezoidal form, which may be triangular at the maximum or minimum local points, and therefore can be described by its type (one of the three possible inclinations) and by the value of the abscissa of its west and east sides (Figure 3).