

VU-3D

football is reached. Further planes are then taken while reducing the figure back to a small polygon at the other end of the rugby football. The object is then complete. An object which is part of the whole scene may be terminated on any Z plane (apart from the first) using the Close command or another object may be started on any Z plane by invoking the Open command again. Holes or hollow objects may also be devised by using the Open command and drawing one figure entirely inside another. For example, a mug may be constructed by drawing a polygon similar to a circle on the first Z plane, using N to proceed to the next Z plane, invoking Open again and drawing a smaller polygon inside the first on the second Z plane. The rim of the mug is then extended by proceeding to a further Z plane where the object is closed.

Two or more objects may be placed very close to each other to form a composite object, for example, a cup with a handle may be devised out of two objects.

Close
To complete a particular object press F until you obtain the figure in question. Press C for Close to close or complete that object. You may continue to develop other objects in the scene so long as they are not closed as you move through further Z planes.

Quit
Press Q to close any existing objects and to return to the main menu.

DISPLAY

Having created an object or set of objects through the CREATE function or having returned a data file from a cassette, the user may display the object in three-dimensional perspective through a variety of displays. There are 3 main types of three-dimensional representation. These are: 1) a full wire line diagram; 2)

hidden line diagram; 3) shaded solid diagram. Each of these displays are in full, three-dimensional perspective. The user may observe the object from any position in space, both inside and outside the objects, from any angle and any distance. To understand the geometry of observing such an object or set of objects, the user may think of himself as sitting on the surface of a sphere with the object or objects near the centre of the sphere. The commands of Display allow the user to move around the surface of this observing sphere and to move out to larger spheres or move in to smaller spheres.

On entering Display, a three-dimensional wire line perspective of the object is displayed. The orientation and distance of observation of the object should be chosen by the user through the Near, Far and Arrow commands before asking for a hidden line or shaded picture, since the latter may take a significant time in computation.

Far

Press F for zoom away or backwards from the display and observe the object at a greater distance. Pressing Caps. Shift at the same time as F will move the observation point back slowly for precision.

Near

Press N to zoom in or observe the object or objects at a closer distance. If you continue to press N, the observation point may actually move inside the object.

Arrow Keys

Use the ← to move left, for change the longitude of observation to the west. Press → to move to the right, (or change the longitude of observation to the east). Press ↑ to move upwards or increase the latitude to the north of the observation point. Press ↓ to move down or increase the latitude of the observation point to the south. If you press the Caps. Shift key at the same time as arrow keys, the rotation of the observed object will

be slowed down to position the observation point with greater precision.

Magnify

Press M to Magnify the scene. Note that this is different from pressing N for Near, since the picture in the former case will be magnified but without increasing the perspective effect.

Reduce

Press R to Reduce the scene. Note that this is different from pressing F for Far, since the picture in the former case will be reduced but without decreasing the perspective effect.

Quit

Press Q to exit from DISPLAY back to the main menu.

PICTURE

Once you have defined, in DISPLAY, the vantage point or observation point of the object and its magnification, press P for PICTURE to produce in colours of your choice a hidden line diagram or solid diagram with shading. The commands under PICTURE are Shade, Hidden line, Print, Colour, Keep and Quit.

Hidden line

This command produces a hidden line diagram of the existing picture shown on the screen. The edges which divide the faces making up the object are shown as lines but only those edges, which the observer from the present vantage point can see, are drawn. The edges on the back side of the object are not drawn. The execution of this command may take a significant time if the display is a complicated one with many faces.

Shade

Another way of viewing the three-dimensional object or objects is to shade in those faces of the object which the observer can see.

Those faces which are on the other side of the object away from the observer are eliminated in this algorithm.