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## Generating the workpiece model in CAD

Generating the workpiece geometry on a CAD-system is a prerequisite for processing a workpiece on a CNC-machine. The CAD-program assists the designer with creating and modifying the workpiece, as well as with routines like drawing, hatching, dimensioning or inscribing. Appropriate CAD databases can be used to directly access standard parts, like screws or fittings, or self-created repetitive elements.

These repetitive elements, e.g. cupboard sides, can be filed in the database as a program of variants, so that it can be adapted for different uses with the input of parameters that change dimensions and form.

The description of the workpiece geometry inside the computer depends on the efficiency of the CAD-system. In principle, we distinguish three different presentation models:

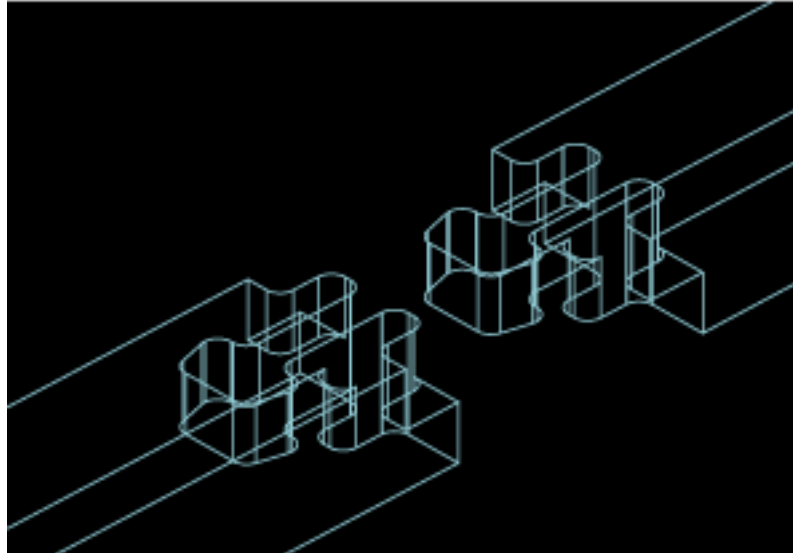


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1. Wire frame. This is the simplest computer presentation, which describes the two or three-dimensional workpiece only by means of its contours, like lines and arcs.

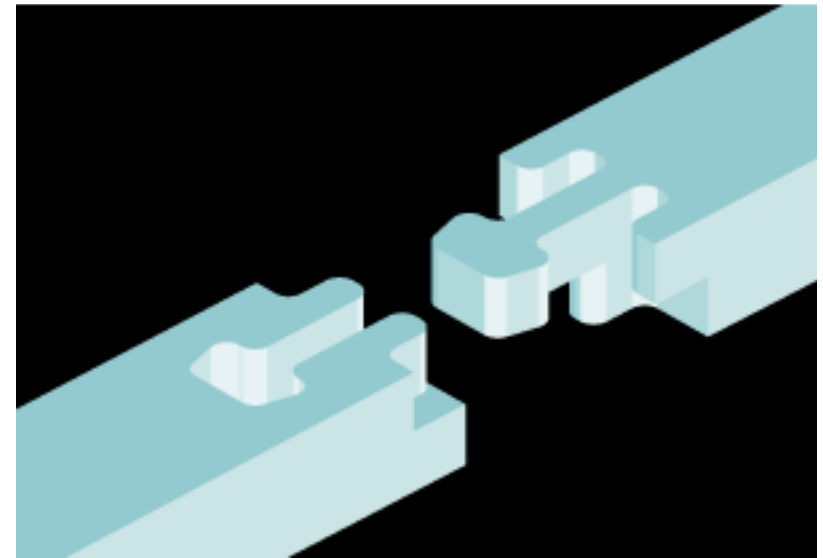
3D wire frame of the wood joint G\_001



3D solid model of the wood joint G\_001

2. The surface model. The workpiece is described by individual surfaces that are not connected with each other.

3. The solid model. Complex objects are presented by combining individual solid parts, like sphere, cuboid, cylinder, or torso. These complex objects are generated by means of Boolean functions. In addition, it is possible to generate volumes with surfaces.





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Today's trend goes towards CAD-systems with a volume-oriented presentation. This enables us to illustrate all generated objects as realistic as possible on the screen. Solid models also offer other advantages, like the problemless penetration and sectioning of geometric objects, the fading out of hidden lines, as well as the automatic generation of sections. The data of the solid model can also be used for further geometric applications, which go beyond generating a drawing. For these applications wire frames and surface models lack important information in the computer presentation of the data.

