ppModeler

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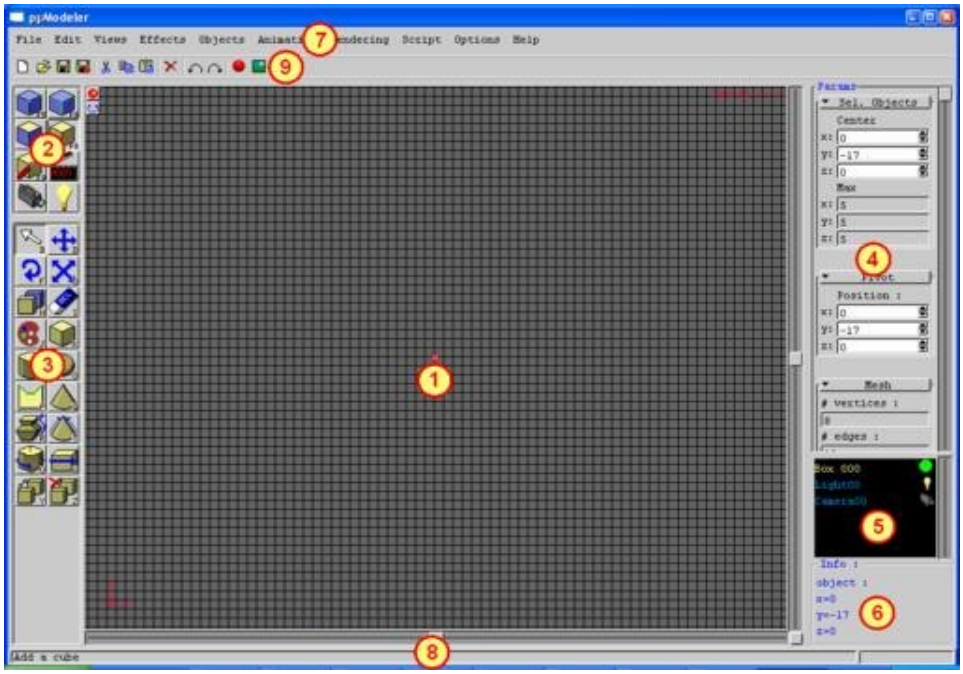
1 General principles



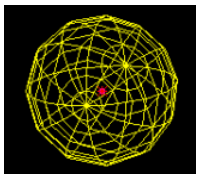
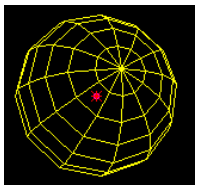
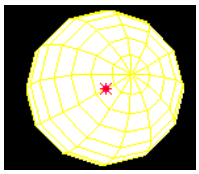
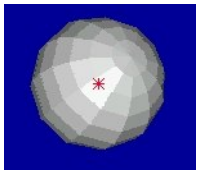
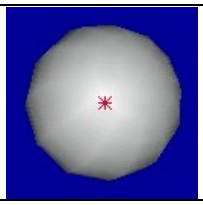
The ppModeler window is divided into 9 parts:

1. The view(s): the working area(s). Right click opens a popup menu.
2. The toolboxes: Sets what can be selected (objects, faces, edges, vertices, bones, lights, cameras) and modified.
3. The tools: the different tools from the selected toolbox. The selected one shows the current action. The state bar (8) displays a short description of the tool function when the mouse is over one button. A right click displays a help tips.
4. The control panel: Gives numeric informations on the current selection, and allows entering values to modify it.
5. The content panel: Lists all objects, cameras, lights. Right click opens a popup menu. Its content depends on the toolbox
6. The information box: Displays dynamic info, like rotation angles, positions, according to the current action.
7. the menu bar
8. the state bar
9. the tool bar

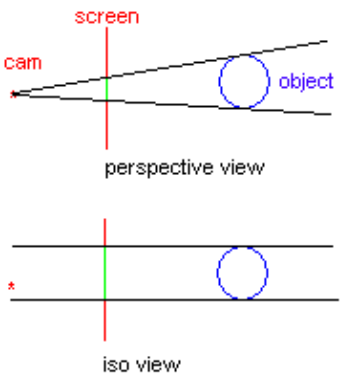
The working areas are the view, so let's start by an overview of their use.

1.1 Working in the views

A view can display a scene in 8 modes:

• wire frame, parallel (or isometric) projection, backside visible • wire frame, perspective projection, backside visible 	• wire frame, parallel (or isometric) projection, backside not visible • wire frame, perspective projection, backside not visible 
• wire filled, parallel (or isometric) projection • wire filled, perspective projection 	
• flat shaded, perspective projection 	• gouraud shaded, perspective projection 

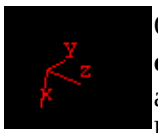
The difference between the isometric projection and perspective projection is explained in the following picture:



In perspective projection, the on screen size of an object is related to the distance between the view point and the object. Far objects are smaller than near objects. This is a simplify model of a camera. But, it is useful to view the object with a size not related to its distances from the view point. That the purpose of the isometric projection. Most of the time, when modelling object, the isometric projection is used.

There are three ways of changing the drawing mode:

- Pressing the 'O' key when a view has the keyboard focus,
- Clicking on the small button on the top left of a view,
- Right clicking on a view and choose the drawing mode in the popup menu.



On the bottom of the views area, the world coordinates are drawn. ppModeler uses a **left hand coordinate system**. That means, when the x axis points to the right and the y axis to the top, the z axis points into the screen. These axes are drawn in two colours, according to which view has the keyboard focus.

Some symbols are drawn to represent lights, cameras and object handles.

A white star is a light; a white arrow is a camera. The box is the camera origin. The arrow shows to the camera direction. The default camera is set so that the y axis is vertical from

the camera point of view.

There are two little buttons at the top left of each views:

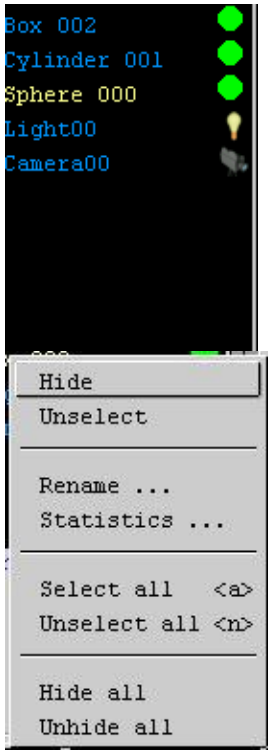
Opens the view configuration window (same as pressing the 'O' key).

opens the view toolbox (a set of tools to change the view).

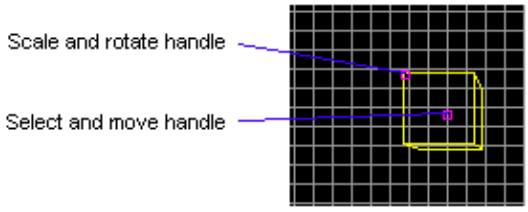
At the top right of each view, a text sum up the drawing mode. This text has three parts : the drawing mode, the projection mode ('||' for isometric, '/\' for perspective) and if the projection mode is isometric, the zoom factor.

1.2 Selecting objects

Objects can be selected by placing the tool in the selecting mode or using the content panel. In the content panel, a selected object is displayed in yellow, an unselected one in blue.



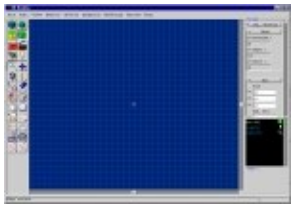
A left click on a name unselects all objects and selects the pointed object. A left click while the "Shift" key is pressed toggles the selection of the corresponding object. A right click opens a drop down menu that's allow some operation on the clicked object, like hide/unhide, change object's name, display properties... A green circle on the right of the object's name is for visible objects, a red one for invisible objects. The "A" key selects all the objects. The "N" key unselects all the objects

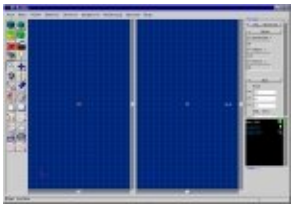


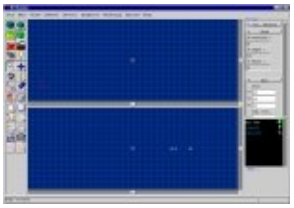
Each object has a selection handle in its centre (light blue square). The selected objects have a selection handle (purple square), placed in the barycentre of the selected objects, and an action handle. The selection handle is used to move the objects and the action handle is used to rotate and scale the selected objects.

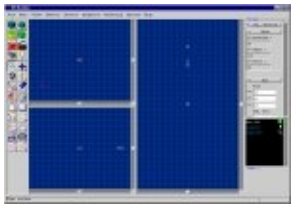
1.2.1 Configurations

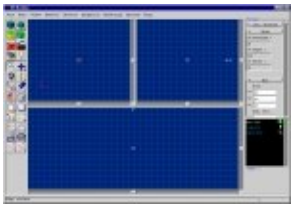
The number of views can be changed from the **view menu**, and can vary from 1 to 4. The different layouts are:

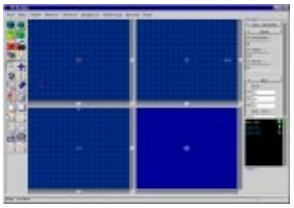

One view


Two vertical views


Two horizontal views


Three vertical views


Three horizontal views


Four views

One view parameters can be change by pressing the 'O' key. When pressed, the following popup window is raised:

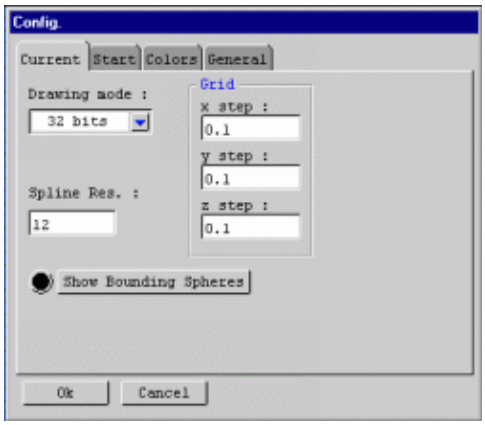
Light at user: if set, when the drawing mode is flat or textured, the scene is lighted by one virtual light placed at the viewer position. Otherwise, the scene is lighted by the scene lights.

Zoom: Set the zoom mode. This parameter is not active in flat and textured draw mode. It is not active either in wire hidden mode, with perspective view turn on. Predefined zoom factors can be selected in the zoom combo box.

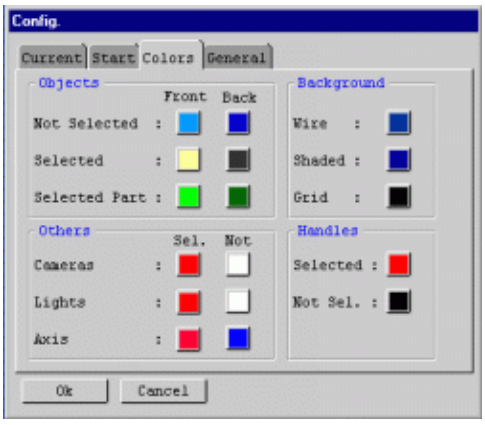
The 'back. Image' button open a file selection window. When you select an image in this window, the view will be displayed with this image in the background. The text fields group bellow allows to place the loaded image into the view, by moving (Dx, Dy), sizing (Sx, Sy), rotating it (Angle). This image will only be visible in wire drawing modes.

Configuring a view

The parameters shared by all views can be changed in the configuration window ('Option−>cfg...' menu).



Configuring the grid

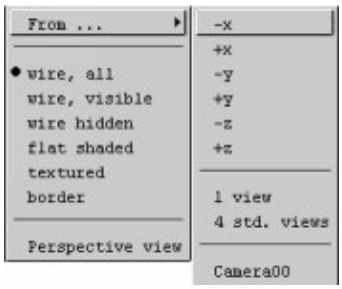


Configuring colours

You can set the grid step, along each axis. A step of 0 disables the grid on this axis. The default spline subdivision is set here. The colours configuration can be changed in the 'Colors' tab. The changes will be saved if the PPMODELER_DIR system variable is set properly (for BeOS and Linux).

1.2.2 Using a view

When a view is selected, the 3 axes in the bottom of the view have a different colour (depending of your colour settings). **The point of view can be change with the keyboard**. The arrow keys turn the selected objects in the corresponding direction. The 'Page Up' and 'Page Down' keys turn the view in clockwise and counter clockwise manner. The 'x', 'y', 'z' keys set the view so that the named axis points inside the screen. The '+' and '−' keys increase and decrease the zoom factor, or move the point of view toward or backward the selected objects. Right clicking in a view open a popup menu which contains a view submenu. This menu allows changing the view point of view:



View popup menu (right click in a view).

The view point of view can also be change with the mouse by **left clicking** on a view while holding the **ctrl key down**.

1.2.3 The view toolbox

This toolbox allows the user to move the point of view with mouse.

- The first four tools rotate the point of view around the center of the selected objects.
- The zoom tool changes the zoom factor in the parallel mode or move the point of view toward or backward the center of the selected objects.
- The pan tool allows selecting an area to be displayed.

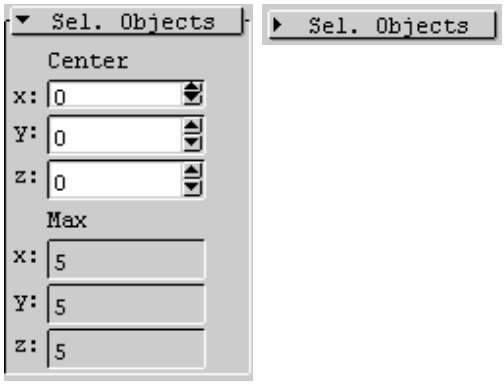
1.2.4 Short keys

- **o** : open the configure view window
- **x** : the x axis points inside the screen
- **y** : the y axis points inside the screen
- **z** : the z axis points inside the screen
- **c** : view the scene from the camera
- **f** : flip the view (view from the opposite point of view)
- **v** : view toward the selected part
- **w** : center the view
- **−** : the view goes backward
- **+** : the view goes forward
- **Up, down, left, right, page up, page down**: rotation of the view around the center of the selected part.
- **A**: select all objects, or all faces or all vertices according to the selected tool box.
- **I**: Invert selection.

1.3 Working in the control panel

The control panel contains dropdown buttons. Each dropdown button contains a group of related controls. The controls can be hidden/shown by pressing the dropdown button.

Show Hide

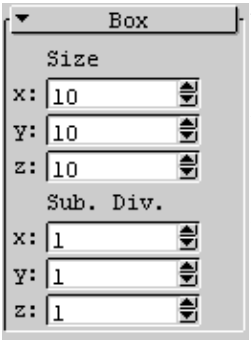


The Control panel content changes dynamically, depending on the current tool and the current selection.

The control panel can be resized with the mouse. There is a small area on the left side and in the bottom side of the control panel where the mouse cursor becomes or . When the mouse cursor is like one of the two previous, dragging the mouse will resize the control panel.

The control panel stores numerous input fields. The numerical input fields have two small buttons on their right 0 . When clicking on the top button, the value increases. When clicking on the bottom button, the value decreases. When dragging from the top or down button, the value changes with the vertical position of the mouse. The value can be entered with the keyboard. Enter a number, and then **press enter to validate it**.

1.3.1 Adding a box



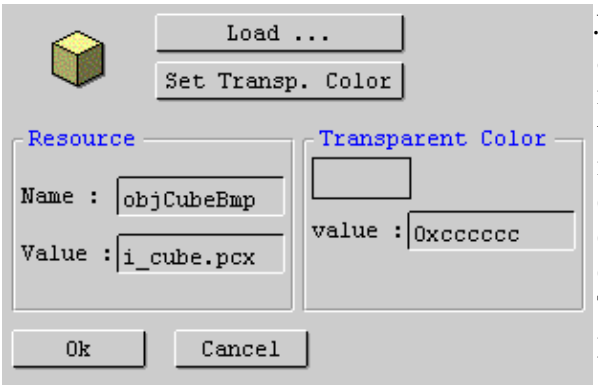
When you click on the Add box button  or press CTRL−K a default box object is added in the center of the world. At the same time, a 'Box' dropdown button is added in the control panel. You can change the size of the box, or the number of subdivision by changing the values there.
If you edit faces, edges or vertices of the box, the object is automatically converted to mesh object. After, the object is no longer considered by ppModeler as a box object, and the 'Box' dropdown button won't be displayed any more when you select the object.

1.4 Configuration

The configuration of ppModeler is stored in one file: the resource file **rc/modeler.rc**. This file contains the string displayed in ppModeler, and the name of the images. This file also contains the current configuration, like the number of views when starting ppModeler, or the last 4 loaded files.
This file can be edited with a text editor, like emacs or notepad. The image files, referenced in the resource file as 'i=', must be in the rc directory. There is also a way to change tools' icons without editing this file:

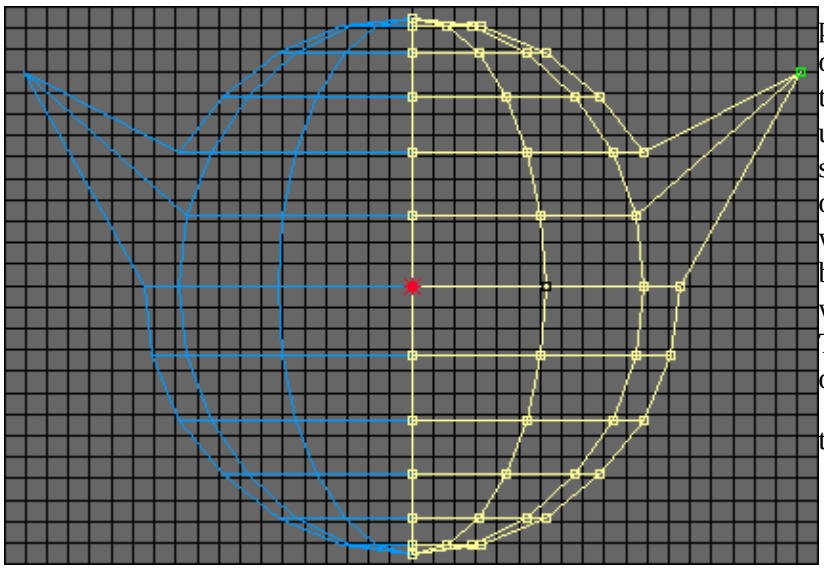
- The menu: 'option−>change current icon set...'

When selected, the mouse pointer changed to  . ppModeler is waiting a click on one of the icons on the left.

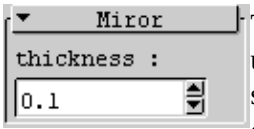


.When an icon is clicked, the associated function is ignored, and the window on the left is opened. There you can see the resource name, the associated image file and the transparency colour. Click on the 'Load...' button to select a new image. The image will be resizing to 32x32, and saved on the rc directory. In order to change the transparency colour, click on the 'Set Transp. Color' button, and then click on one point of the icon file. Press 'Ok' when finished. The icon changment will take effect the next start of ppModeler.

2 Symmetrical objects



ppModeler allows creating symmetrical objects. The user works on one half of the object, the other part is automatically updated. The picture on the left shows a symmetrical object. The user can work on the vertices, edges or faces of the white part. The blue part is uneditable but follows the changes made to the white part.
To create a symmetrical object, select an object and open the mirror tool( ), in the object modifier ( ) toolbox.

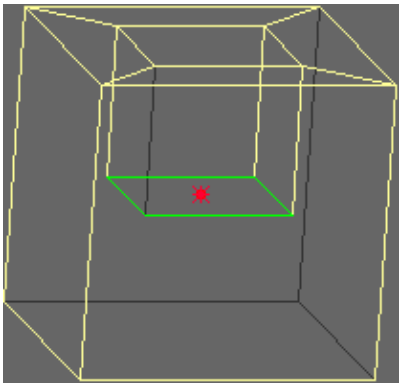


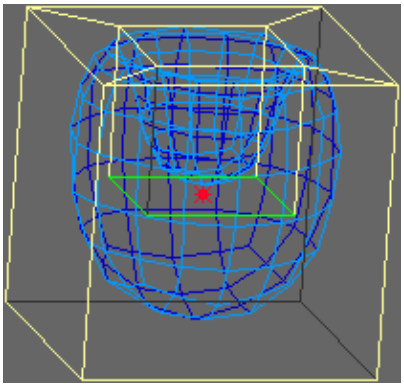
To define the mirror plane, the user must select three points (in green). Each time the user click on a point, the oldest selected point is deselected, and the clicked one is selected. The other points that are close to the plane defined by these three points (the distance can be change) are drawn in red. The mirror thickness can be change in the parameter panel.

When the user click on the "Ok" button, ppModeler asks if the user wants to mirror the object or wants to create a symmetrical object. The mirror tool just produces a normal mesh, where the user can work on the two parts independently. On a symmetrical object, the user can only work on one half, the other part will follow the changes.
If a symmetrical object need to be converted to a mesh (standard object), then select it and use the 'No more symmetrical' item of the 'effects' menu.

3 SDS

The Sub Division Surface is a method that transforms a raw object into a smooth one. The user works on a raw object and ppModeler computes interactively the smooth object and displays it.


An object without SDS activated.


The same object with SDS activated.

Any object can be use as a SDS object, even symmetrical object. There are two objects displayed for an SDS object:

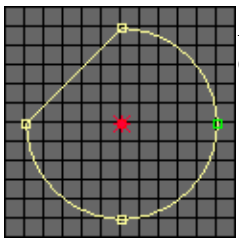
- **The control object**, *i.e.* the raw base object.
- **The SDS Object**, *i.e.* the smooth computed object.

The '**Effect**' menu holds the commands to work on SDS object:

- **Use Object as SDS control**: Activates SDS for the selected object,
- **Use SDS control as Object**: Disables SDS for the selected SDS objects,
- **Convert SDS object to object**: Converts the selected SDS object to mesh. The control object is deleted. As long as the object is not edited, it is possible to go back to the SDS mode with the next menu item.
- **Back to SDS object**: If the selected object was build from a SDS object, this menu item converts it back to SDS object. This command is possible as long as the object's faces, edges or vertices were not edited.

The short key **[CTRL−S]** can be use to convert back and forth from mesh to SDS. It is important to understand the way SDS works in order to use it efficiently.

4 Curves

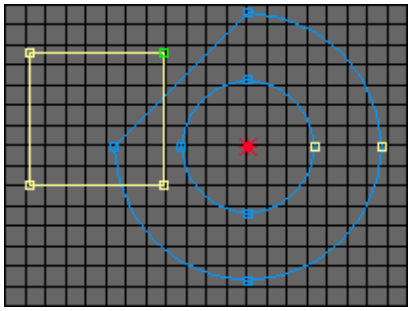


A curve is continuous line made of splines and lines. ppModeler allows mixing lines and curves in any way. There are 2D and 3D curves, and curves can be open or close.

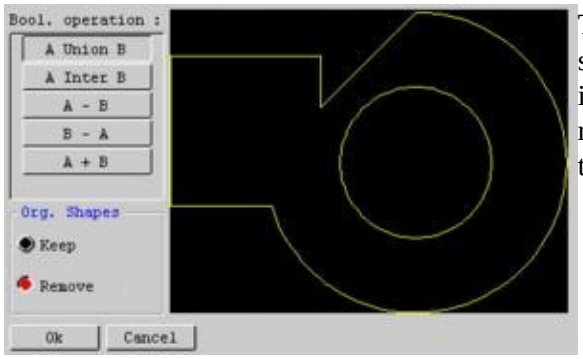
2D closed curves can be grouped/ungrouped. A group of curves (eventually one) is called a **shape**. The inner curves of a shape define holes in the outer curve. That's why curves that intersect can't be grouped.

Two curves grouped... defines a face with a hole.

Boolean operations can be performs on shapes. A Boolean operation is done by selecting two shapes, and press the csg button (). For example, the following 2 shapes

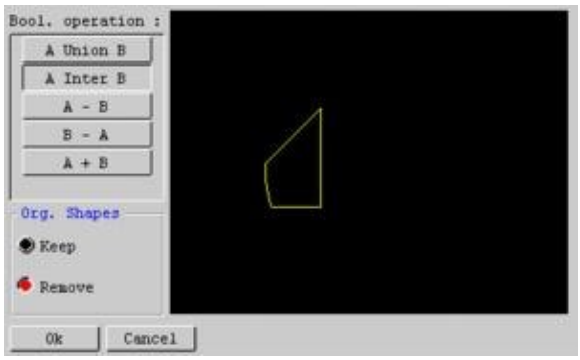


can be mix in the following ways:

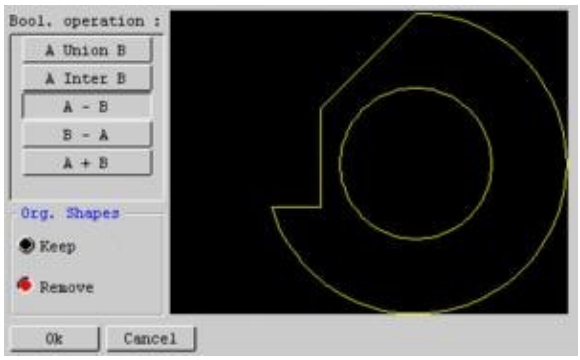


The Boolean operation window is opened, where the user can select the appropriate operation (and preview the result), and if he/she wants to replace the two selected curves by the resulting one, or add the resulting curve without touching the two selected curves.

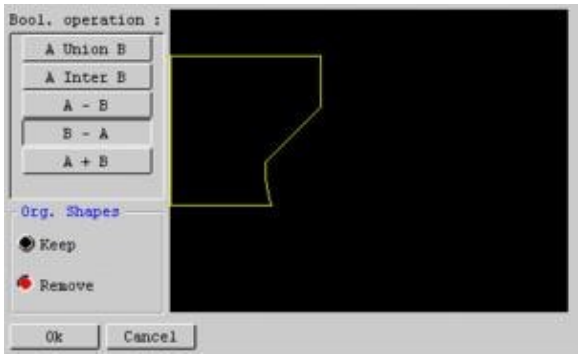
Union of the two curves



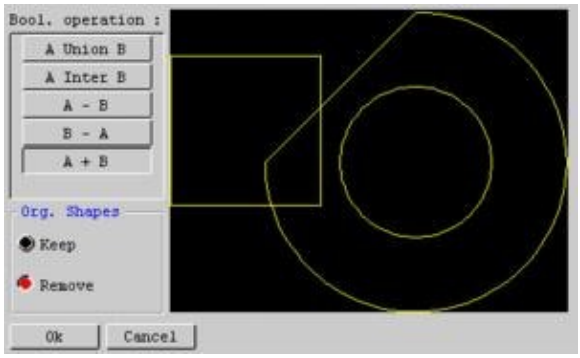
Intersection of the two curves



Substraction of one curve



Substraction of the other curve

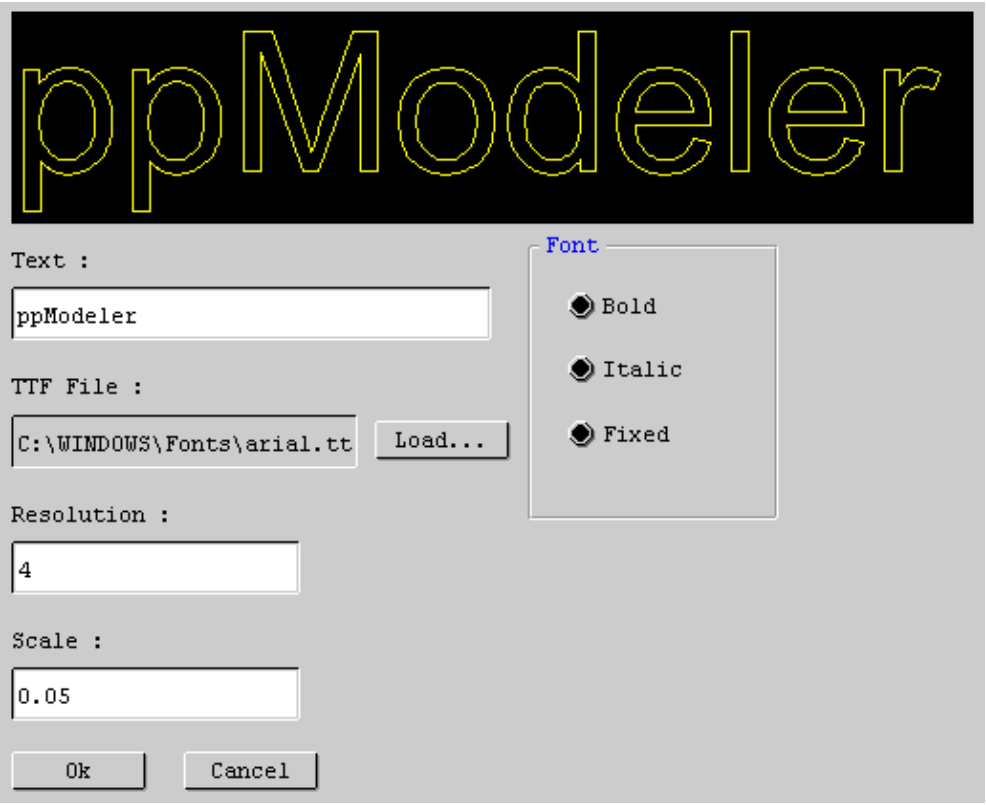


XOR of the two curves

There are 4 different basic shapes ():

- Rectangle: two parameters in the control panel, the x and y sizes.
- Circle: One parameter in the control panel, the radius.
- Polygon: Two parameters in the control panel, the radius and the number of points.
- Text: opens a modal window to create curves (see below).

Text Curves

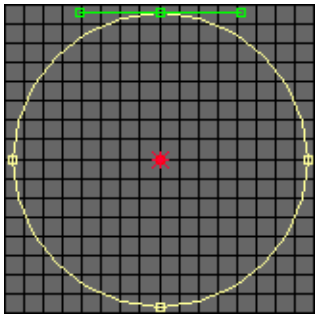


First, the user must point to a True Type Font file by clicking on the 'Load...' button. Then, the text can be edited, and previewed. There are two parameters:

- **Resolution**: the number of lines used to approximate a curve in the preview panel.
- **Scale**: the relative scale of the text.

Editing Curves

The curve tools work at two levels. The curve level, where you can add, move, rotate, group and delete basic curves, and the point level where you can edit the curves (add, remove, and edit points and tangents). A shape can be edited at the point level by Clicking on the point tool ().



When the user selects a point, the tangents are displayed. The user can then drag the point or the tangents ends. In the control panel, a dropdown button allows to move numerically the selected point, and also to change its continuity type.
There are 3 continuity types:

- **Corner**: The two tangents (left and right) can be changed independently in length and direction.
- **Continuous**: The two tangents must have the same direction, but a different length.
- **Smooth**: The two tangents must have the same length and direction.

5 Blob

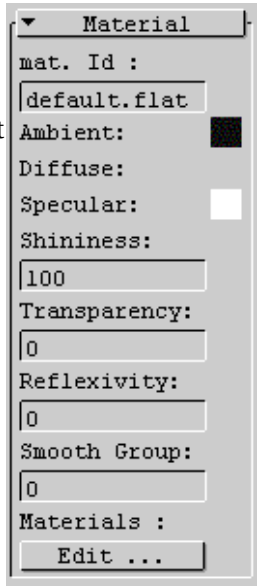
TO BE DONE.

6 Materials and Textures

Materials are assigned to objects or faces. A material defines the way the faces will interact with light. Basically, the light emitted by a point is the sum of 5 components:

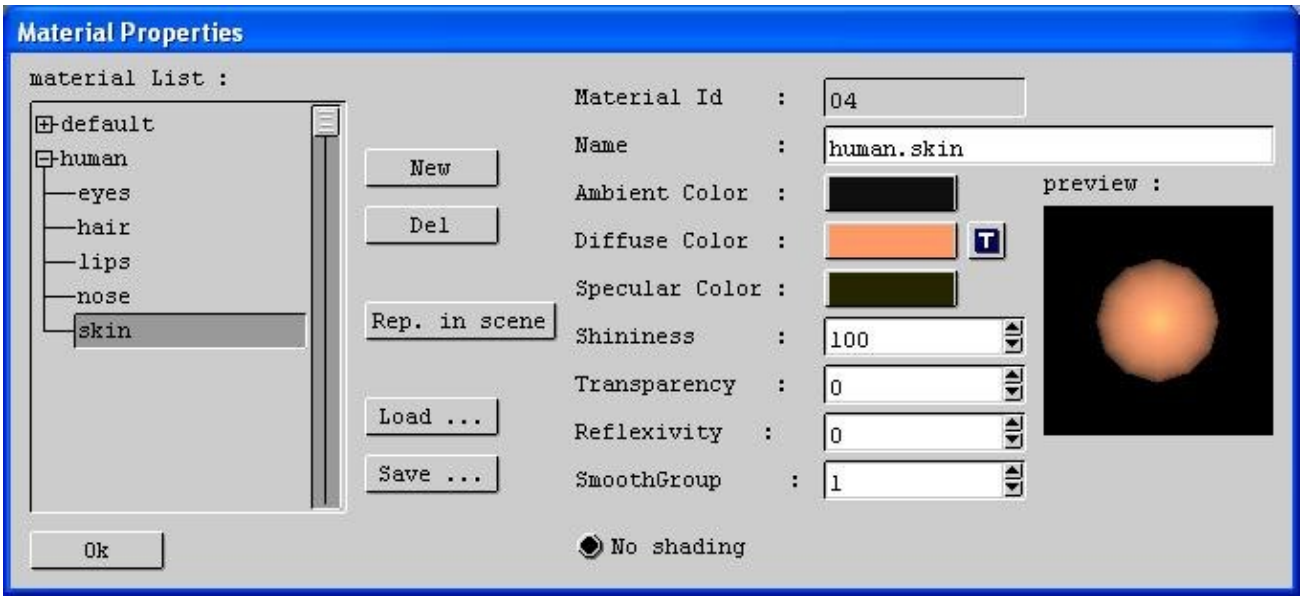
- The **ambient** Colour. The colour of the material when no light hit it.
- The **diffuse** colour of the material. The intensity of this colour depends of the angle between the lights and the normal of the lighted point.
- The **specular** colour. For shiny material, there is a highlight that reflects the lights. The size of the highlight is controlled by the shininess parameter.
- **Transparency**. The amounts of light that go throw the object.
- **Reflexivity**. The amount of reflection of the world on the object.

When only one object is selected, or when some faces of an object are selected, the control panel displays the dropdown button shown on the left. This dropdown button displays the properties of the material assigned to the first face of the selected object, or the last selected face. The user can change the material with the help of the combo box at the top of the group. There are three ways to edit/add a material:



- Option−>raw materials... menu
- Click on the 'edit' button in the material dropdown button
- Use the  in the toolbar.

There are two default materials: **'defaultFlat'** and **'defaultSmooth'**. These two default materials can not be edited.
The following window is opened each time the user asked to edit materials:



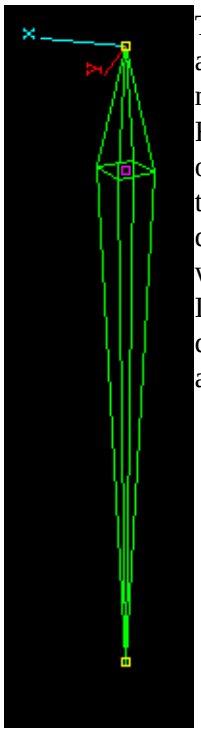
The list on the left is the list of all available materials.
The button **'new'** copies the selected material.
The button **'del'** removes the selected material. ppModeler asks to the user if he/she really wants to proceed if the material is in used in the current scene.
The button **'Rep. in scene'** opens a window where the user can replace one material by another in the current scene.
The buttons **'Load'** and **'Save'** allow loading and saving materials. This is a quick way to share materials among many scenes.
On the right, there is a preview image. The current material is assigned to a sphere. The user can move the point of view with the mouse (drag) or the keyboard (arrows).
The inputs allow changing the current material properties. They are:

- **Material Id**: A number automatically assigned to the material by ppModeler. This number cannot be changed.
- **Name**: The name of the material. ppModeler don't allow two materials to have the same name.
- **Ambient Colour**: The colour emitted when no light hits the material.
- **Diffuse Color**: The colour reflected when light hits the material. A texture can also be used to define the ambient colour, but at the level of the objects or the faces...
- **Specular Color**: The colour of the highlight.
- **Shininess**: The size of the highlight.
- **Transparency**: The level of transparency of the material. Apply only in raytraced images.
- **Reflexivity**: The level of reflexivity of the material. Apply only in raytraced images.
- **Smooth group**: If two faces have the same smooth Group, the edge between the two faces will be soft. If the two faces have a different smooth Group, the edge between the two faces will be sharp. A smooth Group of 0 is flat shading for all faces. There are 255 possible smooth groups.
- **No shading**: If this radio button is on, the objects with this material will be drawn with the ambient colour (no shading).

Texture Projector

7 Animation

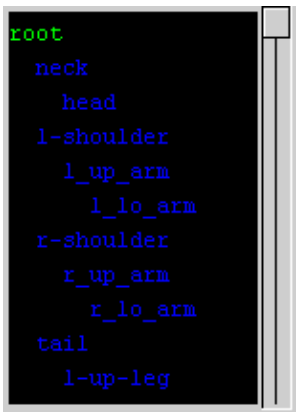
7.1 Skeleton

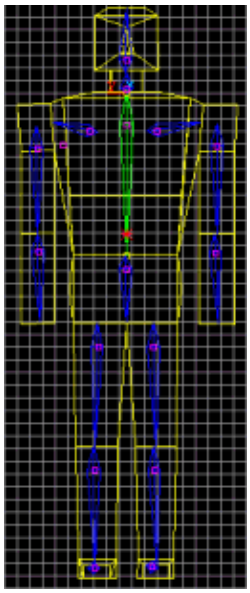


The animation system in **ppModeler** is based on skeleton, and a skeleton can only be attached to a single object. Use the merge object tool if you want to apply animation on multiple objects.
First, the user defines the skeleton itself (a hierarchy of bones). Then, he/she defines the type of articulation between the bones (rotation/translation). The vertices are, by default, attached to the root bone. So, the user has to attach the vertices to the bones, so that the object will deform properly when moving the bones. A vertex can be attached to multiple bones, with a weight. This weight gives the influence of a given bone on the vertex.
During the skeleton definition, the object list displays the skeleton hierarchy. A bone is displayed as a square diamond, with two local axis *x* and *y*. The purple handle is used to select and move the bone. The two yellow handles to set the bone orientation.

Once the skeleton is defined, the user can create sequences. A sequence is a single movement, for example, a step or a jump. A sequence a time indexed series of keyframes. A keyframe is simply a given position of the skeleton, which is related to a given position of the object.
During the definition of sequences, the object list displays the sequence list. During the sequence edition, the object list displays the keyframe list.

A bone is displayed as a square diamond, with two local axis *x* and *y*. The purple handle is used to select and move the bone. The two yellow handles to set the bone orientation. For example, this is a simple skeleton and the associated hierarchy:



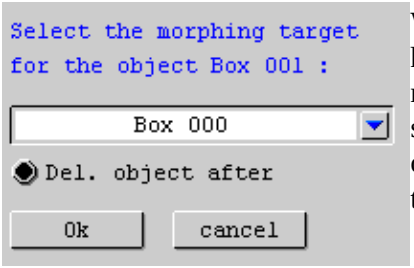


There is only one bone selected at a time. The selected bone is displayed in green. Its father is displayed in yellow, and the others bones are displayed in blue. A bone can be selected by a click on its selection handle, or by a click on the bone hierarchy.

8 Morphing

A morphing target is an object with the same number of vertices. ppModeler blend the object into its morphing targets, deforming the object, or a part of the object.
There is two ways to define a morphing target for an object:

- Edit a copy of the object (or use an object with the same number of vertices), and define the edited copy as morphing target,
- Directly create a morphing target from the object.

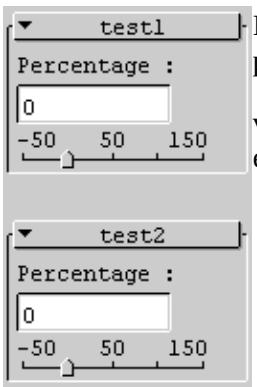


When the user wants to set an object as a morphing target of another, he/she must select the object that will receive the morphing target. In the menu 'Animation', select the 'Set an object as morphing target of the selected object' item. Then a modal window is opened with the list of all objects in the scene that have the same number of vertices. Select the one that will become the morphing target, and press 'Ok'.

The other way to create a morphing target is to select in the menu 'Animation', the item 'Create Morphing Target'. This opens the morphing target toolbox (). Adding a morphing target is as follow:

1. Enter a name for the target
2. Select faces from the object. Only the vertices of the selected faces will be editable for this morphing target.
3. Edit the vertices by moving them.

Play with morphing targets



It is possible to test the blending between multiple morphing targets by clicking on the play tool (). The user can change the percentage of each target displayed in the views by changing the parameters in the control panel. There is one dropdown button for each morphing target of the object.

9 A quick overview of the toolboxes

Object Toolbox

Contains the tools to create, move, group and ungroup objects.
rc Key:tbxObjectsBmp

Select 3D object
rc Key:objSelect
shortkey: CTRL−B

Move selected 3D objects
rc Key:objMove
shortkey: CTRL−D

Rotate selected 3D objects
rc Key:objRotate
shortkey: CTRL−F

Scale selected 3D objects
rc Key:objScale
shortkey: CTRL−G

Duplicate selected 3D objects
rc Key:objDup
shortkey: CTRL−H

Remove selected 3D objects
rc Key:objDel
shortkey: CTRL−I

Material edit
rc Key:objMaterial
shortkey: CTRL−J

Add a cube
rc Key:objCube
shortkey: CTRL−K

Add a cylinder
rc Key:objCylinder
shortkey: CTRL−N

Add a sphere
rc Key:objSphere
shortkey: CTRL−O

Add a 2D Close Polygon
rc Key:objPolygon
shortkey: CTRL−P

Add a cone
rc Key:objCone
shortkey: CTRL−Q

Add a Skin object
rc Key:objSkin

shortkey: CTRL−R

Add a pyramid
rc Key:objPyramid
shortkey: CTRL−T

Add a Lathe object
rc Key:objLathe
shortkey: CTRL−U

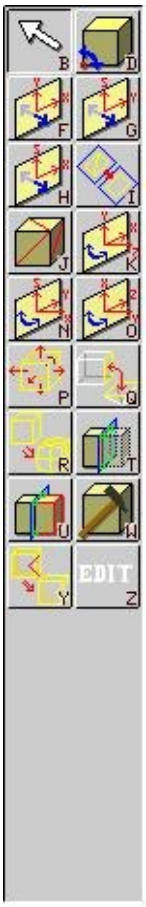
Add a Tube object
rc Key:objTube
shortkey: CTRL−W

Merge selected 3D objects
rc Key:objMerge
shortkey: CTRL−Y

Unmerge
rc Key:objUnmerge
shortkey: CTRL−Z

Modifier Toolbox

Contains all the tools that work on Objects.
rc Key:tbxToolboxBmp



Select objects
rc Key:toolSelect
shortkey: CTRL−B

Edit the pivot point of the last selected object
rc Key:toolPivot
shortkey: CTRL−D

(xy) Symmetry
rc Key:toolXYSym
shortkey: CTRL−F

(yz) Symmetry
rc Key:toolYZSym
shortkey: CTRL−G

(xz) Symmetry
rc Key:toolXZSym
shortkey: CTRL−H

Merge coplanar faces
rc Key:toolSimplify
shortkey: CTRL−I

Triangulate (or quandrangulate) the selected objects
rc Key:toolTriangulate
shortkey: CTRL−J

Rotate by 45§ around the z axis
rc Key:toolZRot
shortkey: CTRL−K


Rotate by 45§ around the x axis
rc Key:toolXRot
shortkey: CTRL−N


Rotate by 45§ around the y axis
rc Key:toolYRot
shortkey: CTRL−O


Perturb randomly the selected objects
rc Key:toolRand
shortkey: CTRL−P


Move the second object to stick it on the first object
rc Key:toolStick
shortkey: CTRL−Q


Mesh subdivision
rc Key:toolSubdivide
shortkey: CTRL−R


Cut the selected objects with a plane
rc Key:toolPlanCut
shortkey: CTRL−T


Miror or create a symetrical object with the last selected object
rc Key:toolMiror
shortkey: CTRL−U


Open the modifiers selection
rc Key:toolModifiers
shortkey: CTRL−W


Cut with a polygon, NOT DONE YET
rc Key:toolPolyCut
shortkey: CTRL−Y


Edit the last selected object
rc Key:toolEdit
shortkey: CTRL−Z

 Face Toolbox

Contains all the tools that work on faces. An object must be selected before activating that toolbox.
rc Key:tbxFacesBmp


Select faces
rc Key:faceSelect
shortkey: CTRL−B


Select faces by rectangle
rc Key:faceRectSel
shortkey: CTRL−D


Edit material of selected faces
rc Key:faceMaterial
shortkey: CTRL−F


Remove the selected faces
rc Key:faceDel

shortkey: CTRL−G

Add a vertex in the center and split the selected faces
rc Key:faceMid
shortkey: CTRL−H

Add small faces inside the selected faces
rc Key:faceSmall
shortkey: CTRL−I

Sudivide the selected faces
rc Key:faceSplit
shortkey: CTRL−J

Split the last selected face by drawing poygons on it
rc Key:faceAddPoly
shortkey: CTRL−K

Flip the normal of the selected faces
rc Key:faceFlip
shortkey: CTRL−N

Extrude the selected faces
rc Key:faceExtrude
shortkey: CTRL−O

Scale the selected faces
rc Key:faceScale
shortkey: CTRL−P

Rotate the selected face
rc Key:faceRotate
shortkey: CTRL−Q

Convert the selected faces to planar convex faces
rc Key:faceConvex
shortkey: CTRL−R

Create a new object with the selected faces
rc Key:faceToObj
shortkey: CTRL−T

Select the vertices of the selected faces and activate the vertex Toolbox
rc Key:faceVertices
shortkey: CTRL−U

Create a new face
rc Key:faceNew
shortkey: CTRL−W

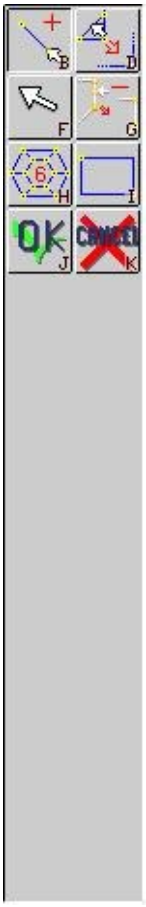
Hide selected face
rc Key:faceHide
shortkey: CTRL−Y

Unhide all faces
rc Key:faceUnhide
shortkey: CTRL−Z

Split Face Toolbox

Draw polygons on a face toolbox

rc Key:tbxAddPolyFaceBmp




Add a new edge
rc Key:facePolyAddEdge
shortkey: CTRL−B


Remove an added edge
rc Key:facePolyRmEdge
shortkey: CTRL−D


Move an added vertex
rc Key:facePolyMoveVtx
shortkey: CTRL−F


Remove an added vertex
rc Key:facePolyRmVtx
shortkey: CTRL−G


Add a regular polygon
rc Key:facePolyRegular
shortkey: CTRL−H


Add a rectangle
rc Key:facePolyRectangle
shortkey: CTRL−I


Proceed
rc Key:facePolyOk
shortkey: CTRL−J


Cancel
rc Key:facePolyCancel
shortkey: CTRL−K

Edge Toolbox

Contains all the tools that work on edges. An object must be selected before activating that toolbox.
rc Key:tbxEdgesBmp


Select edges
rc Key:edgeSelect
shortkey: CTRL−B


Select edges by rectangle
rc Key:edgeRectSel
shortkey: CTRL−D


Move the selected edges
rc Key:edgeMove
shortkey: CTRL−F


Cut an edge in equal parts
rc Key:edgeCut
shortkey: CTRL−G


Add an edge
rc Key:edgeAdd
shortkey: CTRL−H


Replace an edge by a face
rc Key:edgeToFace
shortkey: CTRL−I


Remove the selected edge
rc Key:edgeRm
shortkey: CTRL−J


Bevel the selected edge
rc Key:edgeBevel
shortkey: CTRL−K


Duplicate the selected edge path
rc Key:edgeDouble
shortkey: CTRL−N


Duplicate the selected edge path on both side
rc Key:edgeTriple
shortkey: CTRL−O


Hole along the selected edge path
rc Key:edgeHole
shortkey: CTRL−P


Extrude faces of selected edges
rc Key:edgeBorder
shortkey: CTRL−Q

 Vertex Toolbox

Contains all the tools that work on vertices. An object must be selected before activating that toolbox.
rc Key:tbxVerticesBmp


Select vertices
rc Key:vtxSelect
shortkey: CTRL−B


Select Vertices by Rectangle
rc Key:vtxRectSel
shortkey: CTRL−D


Move the selected vertices
rc Key:vtxMove
shortkey: CTRL−F


Grab the selected vertices
The selected vertices follow the mouse. The others vertices follow the mouse according to their distance to the selected vertices and the radius of the grab tool (defined in the control panel).
rc Key:vtxGrab

shortkey: CTRL−G

Rotate the selected vertices
rc Key:vtxRotate
shortkey: CTRL−H

Scale the selected vertices
rc Key:vtxScale
shortkey: CTRL−I

Add vertices on edges
rc Key:vtxAdd
shortkey: CTRL−J

Remove selected vertices
rc Key:vtxDel
shortkey: CTRL−K

Merge selected vertices
rc Key:vtxMerge
shortkey: CTRL−N

Move selected vertices in a parallel direction of a plane
rc Key:vtxParallel
shortkey: CTRL−O

Move selected vertices perpendicularly to a plane
rc Key:vtxOrtho
shortkey: CTRL−P

Edit the vertices normals
rc Key:vtxNormal
shortkey: CTRL−Q

Bevel the selected vertices
rc Key:vtxBevel
shortkey: CTRL−R

Add a new vertex
rc Key:vtxNew
shortkey: CTRL−T

Light Toolbox

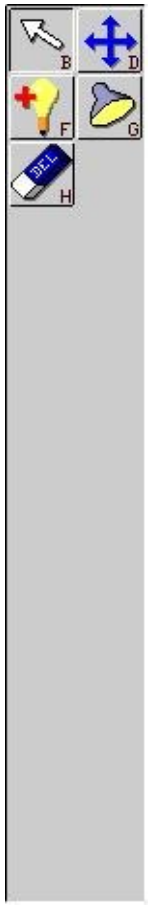
Light toolbox

rc Key:tbxLightsBmp

Select a light
rc Key:lightSelect
shortkey: CTRL−B

Move selected light
rc Key:lightMove
shortkey: CTRL−D

Add a new point light
rc Key:lightAdd
shortkey: CTRL−F




Add a new spot light
rc Key:lightSpot
shortkey: CTRL−G


Delete Selected light
rc Key:lightDel
shortkey: CTRL−H

Camera Toolbox

Camera toolbox

rc Key:tbxCamerasBmp

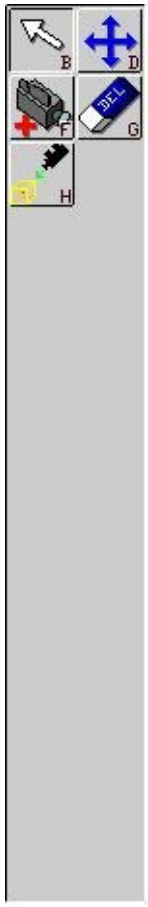

Select a camera
rc Key:cameraSelect
shortkey: CTRL−B


Move selected camera
rc Key:cameraMove
shortkey: CTRL−D


Add a new camera
rc Key:cameraAdd
shortkey: CTRL−F


Delete Selected camera
rc Key:cameraDel
shortkey: CTRL−G


Point selected camera toward world center
rc Key:cameraPoint
shortkey: CTRL−H



Plane Toolbox

Camera toolbox

rc Key:tbxCamerasBmp

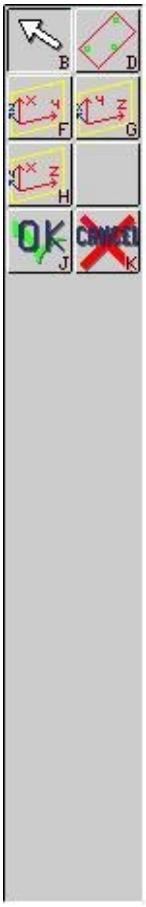

Select a face to define a plane
rc Key:planeSelSelect
shortkey: CTRL−B


Select 3 vertices to define a plane
rc Key:planeSel3Vtx
shortkey: CTRL−D


Select the (xy) plane
rc Key:planeSelXY
shortkey: CTRL−F


Select the (xy) plane
rc Key:planeSelYZ
shortkey: CTRL−G


Select the (xy) plane
rc Key:planeSelXZ
shortkey: CTRL−H



Proceed
rc Key:planeSelOk
shortkey: CTRL−J

Cancel the plane selection
rc Key:planeSelCancel
shortkey: CTRL−K

Mirror Toolbox

Miror tool

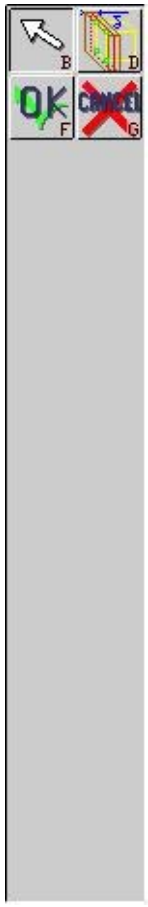
rc Key:tbxMirorBmp

Select 3 vertices that define the miror plane
rc Key:mirorSelect
shortkey: CTRL−B

Change the thickness of the miror
rc Key:mirorPlaneThickness
shortkey: CTRL−D

Miror the object or define it as a symmetrical object
rc Key:mirorOk
shortkey: CTRL−F

Cancel the miror operation
rc Key:mirorCancel
shortkey: CTRL−G



2D Curve Toolbox

Look at the curves chapter for more explanations on this toolbox.
rc Key:tbxPolyBmp

Select curves
rc Key:curve2dSel
shortkey: CTRL−B

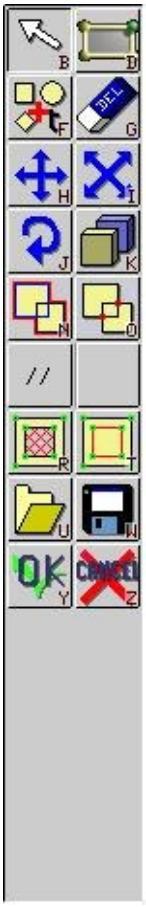
Edit the points of the last selected shape
rc Key:curve2dPoints
shortkey: CTRL−D

Add a new shape
rc Key:curve2dAdd
shortkey: CTRL−F

Remove the selected shapes
rc Key:curve2dDel
shortkey: CTRL−G

Move the selected shapes
rc Key:curve2dMove
shortkey: CTRL−H

Scale the selected shapes
rc Key:curve2dScale



shortkey: CTRL−I

Rotate the selected shapes
rc Key:curve2dRot
shortkey: CTRL−J

Duplicate the selected shapes
rc Key:curve2dDup
shortkey: CTRL−K

Boolean operation on the last two selected shapes
rc Key:curve2dBool
shortkey: CTRL−N

Add point at intersections of the last two selected shapes
rc Key:curve2dIntersec
shortkey: CTRL−O

//

Not done Yet
rc Key:curve2dParalel
shortkey: CTRL−P

Group the selected shapes into one shape
rc Key:curve2dGroup
shortkey: CTRL−R

Ungroup the selected shape
rc Key:curve2dUngroup
shortkey: CTRL−T

Load shapes from file (.s2d)
rc Key:curve2dLoad
shortkey: CTRL−U

Save shapes to file (.s2d)
rc Key:curve2dSave
shortkey: CTRL−W

Proceed
rc Key:curve2dOk
shortkey: CTRL−Y

Cancel
rc Key:curve2dCancel
shortkey: CTRL−Z

2D Curve Points Toolbox

Look at the curves chapter for more explanations on this toolbox.
rc Key:tbxPolyBmp


Select curve's points
rc Key:curve2dPtSel
shortkey: CTRL−B


Set last selected point type (smooth, continuus, corner)
rc Key:curve2dPtType
shortkey: CTRL−D


Change the view mode
rc Key:curve2dPtView
shortkey: CTRL−F


Move the selected points
rc Key:curve2dPtMove
shortkey: CTRL−G


Add points tool
rc Key:curve2dPtAdd
shortkey: CTRL−H


Remove the selected points
rc Key:curve2dPtDel
shortkey: CTRL−I


Line between the two last selected points
rc Key:curve2dPtStraight
shortkey: CTRL−J


Spline between the two last selected points
rc Key:curve2dPtSpline
shortkey: CTRL−K


Bevel the selected points
rc Key:curve2dPtBevel
shortkey: CTRL−N


Load a curve from file (.c2d)
rc Key:curve2dPtLoad
shortkey: CTRL−P


Save curve to file (.c2d)
rc Key:curve2dPtSave
shortkey: CTRL−Q


Proceed
rc Key:curve2dPtOk
shortkey: CTRL−R


Cancel
rc Key:curve2dPtCancel
shortkey: CTRL−T

 3D Curve Toolbox

Look at the curves chapter for more explanations on this toolbox.
rc Key:tbxPolyBmp

Select curve's points
rc Key:curve3dPtSel
shortkey: CTRL−B

Set last selected point type (smooth, continuus, corner)
rc Key:curve3dPtType
shortkey: CTRL−D

Change the points view mode
rc Key:curve3dPtView
shortkey: CTRL−F

Move selected points
rc Key:curve3dPtMove
shortkey: CTRL−G

Add points tool
rc Key:curve3dPtAdd
shortkey: CTRL−H

Remove the selected points
rc Key:curve3dPtDel
shortkey: CTRL−I

Line between the two last selected points
rc Key:curve3dPtStraight
shortkey: CTRL−J

Spline between the two last selected points
rc Key:curve3dPtSpline
shortkey: CTRL−K

Not done yet
rc Key:curve3dPtBevel
shortkey: CTRL−N

Save curve to file (.c3d)
rc Key:curve3dPtSave
shortkey: CTRL−P

Load a curve from file (.c3d)
rc Key:curve3dPtLoad
shortkey: CTRL−Q

Proceed
rc Key:curve3dPtOk
shortkey: CTRL−R

Cancel
rc Key:curve3dPtCancel
shortkey: CTRL−T

Blob Toolbox

Blob toolbox

rc Key:tbxBlobBmp

Select blob components
rc Key:blobSelect
shortkey: CTRL−B

Move blob components
rc Key:blobMove
shortkey: CTRL−D

Rotate blob components
rc Key:blobRotate
shortkey: CTRL−F

Scale blob components
rc Key:blobScale
shortkey: CTRL−G

Add Sphere component
rc Key:blobSphere
shortkey: CTRL−H

Add Ellipse component
rc Key:blobEllipse
shortkey: CTRL−I

Add spline components
rc Key:blobSpline
shortkey: CTRL−J

Add face components
rc Key:blobFace
shortkey: CTRL−K

Add box components
rc Key:blobCube
shortkey: CTRL−N

Add Cylinder Component
rc Key:blobCylinder
shortkey: CTRL−O

Add cone components
rc Key:blobCone
shortkey: CTRL−P

Edit selected Component
rc Key:blobEdit
shortkey: CTRL−Q

Delete selected components
rc Key:blobDelete
shortkey: CTRL−R

Duplicate selected components
rc Key:blobDup
shortkey: CTRL−T

Switch view mode
rc Key:blobView
shortkey: CTRL−U

Import blb files
rc Key:blobLoad

shortkey: CTRL−W

Create the blob object
rc Key:blobOk
shortkey: CTRL−Y

Cancel
rc Key:blobCancel
shortkey: CTRL−Z

Bone Toolbox

Animation toolbox

rc Key:tbxAnimBmp

Select a bone
rc Key:boneSelect
shortkey: CTRL−B

Move selected bone
rc Key:boneMove
shortkey: CTRL−D

Add a new bone, child of the selected bone
rc Key:boneAdd
shortkey: CTRL−F

Delete Selected bone
rc Key:boneDel
shortkey: CTRL−G

Configure the joint between the selected bone and its father
rc Key:boneJoint
shortkey: CTRL−H

Select vertices and then weight them
rc Key:boneVertex
shortkey: CTRL−I

Attach vertices to the selected bone
rc Key:boneAttach
shortkey: CTRL−J

Weight vertices attached to the selected bone
rc Key:boneWeight
shortkey: CTRL−K

Activate sequence toolbox
rc Key:boneSequence
shortkey: CTRL−N

Test the deformation for the current skeleton
rc Key:boneDeform
shortkey: CTRL−O

Load skeleton, sequences from a 3da file
rc Key:boneLoad

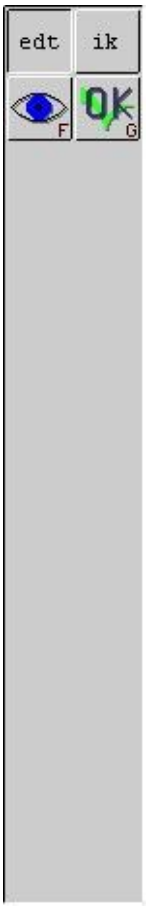
shortkey: CTRL−P

Save skeleton, sequences to a 3da file
rc Key:boneSave
shortkey: CTRL−Q

Edit Position Toolbox

Edit a keyframe

rc Key:tbxEditPosBmp



edt Edit the position by setting angles
rc Key:animPosEdit
shortkey: CTRL−B

ik Edit position by moving end points
rc Key:animPosIk
shortkey: CTRL−D

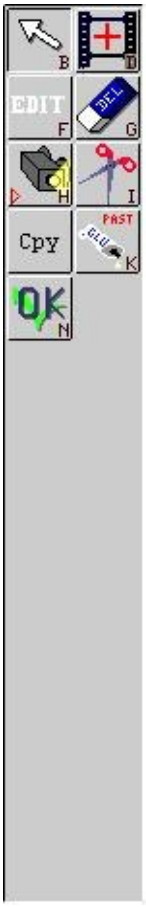
Show/Hide the bones
rc Key:animPosShow
shortkey: CTRL−F

Stop editing the position
rc Key:animPosOk
shortkey: CTRL−G

Keyframe Toolbox

Edit keyframes toolbox

rc Key:tbxKeyframeBmp




Select a keyframe in the keyframe list
rc Key:animKeySelect
shortkey: CTRL−B


Add a new keyframe
rc Key:animKeyAdd
shortkey: CTRL−D


Edit the selected keyframe
rc Key:animKeyEdit
shortkey: CTRL−F


Remove the selected keyframe
rc Key:animKeyDel
shortkey: CTRL−G


Play the sequence
rc Key:animKeyPlay
shortkey: CTRL−H


Cut the selected keyframe
rc Key:animKeyCut
shortkey: CTRL−I

Cpy Copy the selected keyframe
rc Key:animKeyCopy
shortkey: CTRL−J


Paste a cut/copy keyframe
rc Key:animKeyPaste
shortkey: CTRL−K


Stop editing the sequence
rc Key:animKeyOk
shortkey: CTRL−N

Sequence Toolbox

Edit movement toolbox

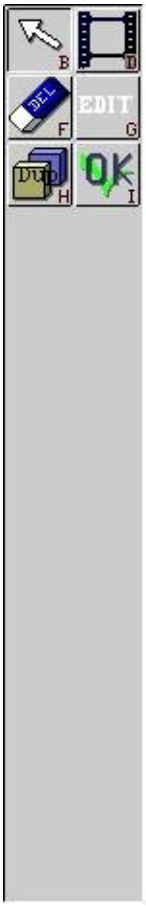
rc Key:tbxAnimBmp


Select a sequence in the sequence list
rc Key:animSeqSelect
shortkey: CTRL−B


Create a new sequence
rc Key:animSeqNew
shortkey: CTRL−D


Remove the selected sequence
rc Key:animSeqDel
shortkey: CTRL−F


Edit the selected sequence
rc Key:animSeqEdit
shortkey: CTRL−G



Duplicate the selected sequence
rc Key:animSeqDup
shortkey: CTRL−H

Returns to the bone editing toolbox
rc Key:animSeqOk
shortkey: CTRL−I

Morph Toolbox

Morphing animation tool

rc Key:tbxMorphBmp

Edit the selected Morphing target
rc Key:morphEdit
shortkey: CTRL−D

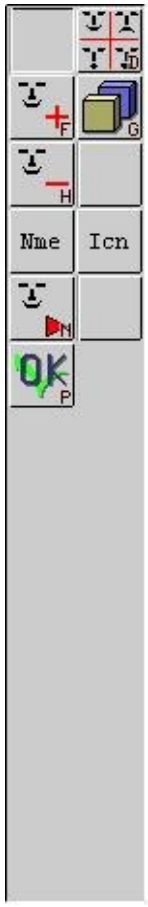
Add a new Morphing target
rc Key:morphAdd
shortkey: CTRL−F

Duplicate the selected Morphing target
rc Key:morphDup
shortkey: CTRL−G

Remove the selected Morphing target
rc Key:morphRm
shortkey: CTRL−H

Nme Set the name of the selected Morphing target
rc Key:morphName
shortkey: CTRL−J

Icn



Set the icon of the selected Morphing target
rc Key:morphIcon
shortkey: CTRL−K

Test the Morphing targets
rc Key:morphPlay
shortkey: CTRL−N

Return to the modeling tools
rc Key:morphOk
shortkey: CTRL−P

View Toolbox

view

rc Key:tbxViewBmp

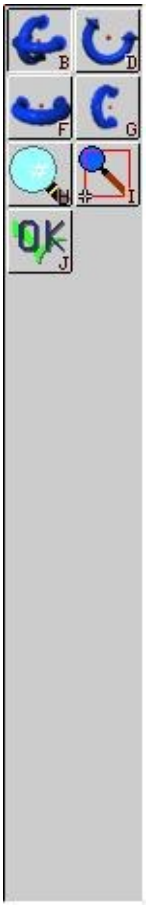
Rotate view around selected object with mouse
rc Key:viewRotate
shortkey: CTRL−B

Rotate view
rc Key:viewClock
shortkey: CTRL−D

Rotate view right/left
rc Key:viewRightLeft
shortkey: CTRL−F

Rotate view up/down
rc Key:viewUpDown
shortkey: CTRL−G

Zoom
rc Key:viewZoom
shortkey: CTRL−H



Pan
rc Key:viewPan
shortkey: CTRL−I

Quit view toolbox
rc Key:viewQuit
shortkey: CTRL−J

Menus

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- **New**
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- **Save As ...**
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    - **Export to C code**
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    - **Import from 3ds**
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    - **Sphere**
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    - **Cone**
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    - **Cylinder**
    - **Sphere**
    - **Cone**

    - **Torus**
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- **Materials ...**
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- **About ...**