Let The Steam Off

Work documentation – Eryk Kwaśniak – 3D Artist

All my work was done in Blender v3.0.2.

The documentation contains a description of all the functions I used while doing the job.

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Object Mode

The default mode, available for all object types, as it is dedicated to Object data-block editing (e.g. position, rotation, size).

Add Mesh

A common object type used in a 3D scene is a mesh.

Cube

A standard cube contains eight vertices, twelve edges, and six faces, and is a three-dimensional object. Objects that can be created out of cubes include dice, boxes, or crates.

Cylinder

Objects that can be created out of cylinders include handles or rods.

Add Armature

An armature in Blender can be thought of as similar to the armature of a real skeleton, and just like a real skeleton an armature can consist of many bones. These bones can be moved around and anything that they are attached to or associated with will move and deform in a similar way.

As armatures are designed to be posed, either for a static or animated scene, they have a specific state, called “rest position”. This is the armature’s default “shape”, the default position/rotation/scale of its bones, as set in Edit Mode.

Object Transform

Each object can be moved, rotated and scaled in Object Mode. However, not all of these transformations have an effect on all objects. For example, scaling a camera has no effect on the render dimensions.

Object Set Origin to Geometry

Moves the origin to the center of the object.

Object Join

Join merges all selected objects into the last selected Active object. All object data is linked to the active object (which must be selected). All objects must be of the same type: mesh, curve, surface or armature.

Object Parent – Armature Deform with automatic weights

When modeling a complex object, such as a watch, you may choose to model the different parts as separate objects. However, all of the parts may be attached to each other. In these cases, you want to designate one object as the parent of all the children. Movement, rotation or scaling of the parent also affects the children.

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Add Modifier Mirror

The Mirror modifier mirrors a mesh along its local X, Y and/or Z axes, across the Object Origin. It can also use another object as the mirror center, then use that object's local axes instead of its own.

Axis

The X, Y, Z axis along which to mirror, i.e. the axis perpendicular to the mirror plane of symmetry.

To understand how the axis applies to the mirror direction, if you were to mirror on the X axis, the positive X values of the original mesh would become the negative X values on the mirrored side.

You can select more than one of these axes. And will then get more mirrored copies. With one axis you get a single mirror, with two axes four mirrors, and with all three axes eight mirrors.

Bisect

If the mesh is already on both sides of the mirror plane, it is cut by that plane, and only one side (the "negative" one by default) is kept to perform the mirror process.

Flip

When Bisect is enabled on an axis, you can use this setting to switch the side kept and mirrored (i.e. when it is enabled, the "positive" side will be kept, instead of the "negative" one).

Merge

Where a vertex is in the same place (within the Merge Distance) as its mirror it will be merged with the mirrored vertex.

Add Material

Materials available in the currently open blend-file can be investigated by clicking on the Materials icon in the Properties editor Header. In this section we look at how to assign or remove a material to/from the Active Object in Blender.

Edit Mode

Edge Subdivide

Subdividing splits selected edges and faces by cutting them in half or more, adding new vertices, and subdividing accordingly the faces involved. It adds resolution to the mesh by divide faces or edges into smaller units.

Number of Cuts

Specifies the number of cuts per edge to make. By default this is 1, cutting edges in half. A value of 2 will cut it into thirds, and so on.

Smoothness

Displaces subdivisions to maintain approximate curvature. The effect is similar to the way the Subdivision Surface Modifier might deform the mesh.

Quad/Tri Mode

Forces subdivide to create triangles or quads instead of n-gons (see examples below). This mode doesn't allow the use of Straight Cut on quad corners.

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Extrude Region

Extrusion tools duplicate vertices, while keeping the new geometry connected with the original vertices. Vertices are turned into edges and edges will form faces.

This tool is of paramount importance for creating new geometry. It allows you to create parallelepipeds from rectangles and cylinders from circles, as well as easily creating such things as tree limbs.

The axis on which vertices and edges are extruded along can be set interactively. Faces are extruded by default along their averaged normal. The extrusion can be limited to a single axis by specifying an axis.

Bevel

The Bevel tool allows you to create chamfered or rounded corners on geometry. A bevel is an effect that smooths out edges and corners.

The Bevel Edges tool works only on selected edges with exactly two adjacent faces. It will recognize any edges included in a vertex or face selection as well, and perform the bevel the same as if those edges were explicitly selected. In “vertex only” mode, the Bevel Vertices tool works on selected vertices instead of edges, and there is no requirement about having any adjacent faces. The Bevel tool smooths the edges and/or “corners” (vertices) by replacing them with faces making smooth profiles with a specified number of segments

Loop Cut

The Loop Cut tool is a modal tool version of the Loop Cut and Slide operator. This tool splits a loop of faces by inserting new edge loops intersecting the chosen edge.

Knife

The Knife tool can be used to interactively subdivide (cut up) geometry by drawing lines or closed loops to create holes.

When using Knife, the cursor changes to an icon of a scalpel and the header changes to display options for the tool. You can draw connected straight lines by clicking LMB, marked with small green squares. Red squares are already defined cuts. Surrounding red squares mean that there is a cut already in that position, so no additional vertex will be created (besides the first one).

Scale

Scaling means changing proportions of objects. Pressing S will enter the Scale transformation mode where the selected element is scaled inward or outward according to the mouse pointer’s location. The element’s scale will increase as the mouse pointer is moved away from the Pivot Point and decrease as the pointer is moved towards it. If the mouse pointer crosses from the original side of the Pivot Point to the opposite side, the scale will continue in the negative direction and flip the element.

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Delete
Deletes selected vertices, edges, or faces. This operation can also be limited to:

Vertices - delete all vertices in current selection, removing any faces or edges they are connected to.
Edges - deletes any edges in the current selection. Removes any faces that the edge shares with it.
Faces - removes any faces in current selection.
Only Edges & Faces - limits the operation to only selected edges and adjacent faces.
Only Faces - removes faces, but edges within the face selection are retained.

Dissolve
Removes selected geometry, but without creating holes, effectively turning the selection into a single n-gon. Dissolve works slightly different based on if you have edges, faces or vertices selected. You can add detail where you need it, or quickly remove it where you do not.

Dissolve Vertices - remove the vertex, merging all surrounding faces. In the case of two edges, merging them into a single edge.

Dissolve Edges - removes edges sharing two faces (joining those faces).

Dissolve Faces - merges regions of faces that share edges into a single face.

Mesh Merge By Distance
This tool allows you to merge all selected vertices to a unique one, dissolving all others.

Merge by Distance is a useful tool to simplify a mesh by merging the selected vertices that are closer than a specified distance to each other.

Bone
In the 3D View, Shift-A to add a new bone to your armature.

This bone will be:
- of one Blender Unit of length.
- oriented towards the global Z axis.
- with its root placed at the 3D cursor position.
- with no relationship with any other bone of the armature.

When you press E, for each selected tip (either explicitly or implicitly), a new bone is created. This bone will be the child of “its” tip owner, and connected to it. As usual, once extrusion is done, only the new bones’ tips are selected, and in grab mode, so you can place them to your liking.

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UV

Mark Seam

Just like in sewing, a seam is where the ends of the image/cloth are sewn together. In unwrapping, the mesh is unwrapped at the seams. Think of this method as peeling an orange or skinning an animal. You make a series of cuts in the skin, then peel it off. You could then flatten it out, applying some amount of stretching. These cuts are the same as seams.

Smart UV Project

Smart UV Project cuts the mesh based on an angle threshold (angular changes in your mesh). This gives you fine control over how automatic seams are be created. It is good method for simple and complex geometric forms, such as mechanical objects or architecture.

This algorithm examines the shape of your object, the faces selected and their relation to one another, and creates a UV map based on this information and settings that you supply.

UV Selection Mode

Vertex
Select individual vertices.

Edge
Select edges.

Face
Select faces.

Island
Select contiguous groups of faces.

Pack Islands

The Pack Islands tool generates an optimized UV layout with non-overlapping islands that tries to efficiently fill the Texture Space.

Viewport – Viewport Overlays

Wireframe

Displays the mesh's face edges, similar to Wireframe Shading but displays edges on top of existing shading. The value slider adjusts which edges to display by only showing wires on prominent edges. Lower values hide edges with angles close to 180 degrees while a value of 1 shows all wires.

Face Orientation

Show the face orientation overlay. In the face orientation overlay all faces where the face normal points towards the camera are colored blue. All faces where the face normal points away from the camera are colored red. With this overlay, it is easy to detect the orientation of the face normals.

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