BASIC WATER SIMULATION

Bring a figure into a basic scene. In Edit model extrude two of the sides of the ground plane furthest from the camera along the Z direction to make walls. Apply a level 2 subdivision modifier to the room and wall.

To sharpen up the corners use Control_R in Edge select mode to add geometry. Make it smooth shaded and give it a matt white material.
Add a cube to the scene and turn it into a shower base with face extrusion. Raise the figure slightly to stand it realistically on the base.

Add some geometry to the shower base with the Bevel modifier, smooth it, and give it a new color.

Now add a cube around the figure and about twice as high above its head, extending slightly through the sides and base of the pool. Call this 0_domain, and change its appearance so that it is always wireframe no matter how the 3D window is being shown. Do this under the Object tab in Properties. Go to the Display panel and then choose Wire in the Maximum Draw Type drop-down menu. Now even though everything else in the scene is shaded, the domain will be wireframe and you can see everything going on inside it.
Relocate the camera so that the entire domain object and the pool are visible.

With the domain box selected, go to the Physics tab and choose Fluid, then make the Type Domain from the drop-down list. Then make an icosphere above the figure’s head but still inside the domain. This will represent the amount and position of fluid in the simulation that we are dropping on the figure, so name it 0_fluid. In the Physics tab, select the Fluid simulator and choose Fluid for the type. If the fluid is not to go through the figure we must tell Blender that this is an obstacle, so again use Fluid physics but this time select the figure; the type is Obstacle (note: not Collision, which is for Physics simulations like Cloth).

A feature of the Fluid simulator in Blender is that the fluid color is defined by the domain, not the fluid object; the fluid object only defines location, shape, and volume. So select the domain object and give it a raytraced transparent material with some refraction (around 1.3 is good for water) and an alpha of around 0.02. If you render it you’ll find that the water, though transparent, will cast a dark shadow. If you have Ambient Occlusion enabled in the scene remove it and make sure the lighting comes from from shadow casting lights such as Point and Sun. Pick one example of each material in the rest of the scene, then under the Shadows panel in Materials make sure Receive Transparent Shadows
is checked. By default, to save memory, Blender renders shadows from transparent objects as if they were opaque.

The water can be made more accurate, at the cost of being slower to calculate, by increasing the Resolution in the physic tab for the domain. Preview mode in the 3D window is generally kept lower than Final for rendering, though you can choose to see the Final mode in the 3D window by using the list called Viewport Display in the Physics tab.

**Baking**

Water simulation is not the same as cloth. If you hit Alt_A to start a simulation preview nothing will happen. Select the domain object, as this controls the simulation, and in the Physics tab, change the default directory for the simulation files (under Time) to be something in or near to the project Blend file. Then hit the Bake button. This will calculate the shape of the fluid for each frame; when the calculation reaches the current frame the icosphere will change to a fluid form. Render the image at an interesting frame and you will see the fluid – but also the fluid object. Hide that from rendering in the Outliner (toggle the camera icon, and you can also hide it in the preview by toggling the eye icon), make the domain object smooth shaded, and rerender. To stop the bake operation use Escape.

Baking simply means taking a property which is calculated at render time and precalculating it. Many things can be baked, including complex multiple textures (projection painting is similar), lighting, ambient occlusion, and complex multilayered animation. Why would you want to do this? To greatly speed rendering of a complex scene, reduce memory requirements, and – in some situations – reduce the number of threads needed for that particular element. When you send someone a file with a baked simulation remember to include the bake files if they are not to have to rebake the simulation.

You may need to increase your water material’s Depth in the Transparency panel; this will increase render time but give a better result. Depth controls the number of times that light rays are calculated as they bounce and refract internally. 8 is a good depth value. The image below shows the effect of insufficient bounce depth and transparent shadows not being enabled. The water is clear, but casts dark shadows.

Finally, you can see that your render has some features of water but probably looks more viscous. Change this by increasing the Final resolution in the Domain Physics properties, and by setting the Real World Size in the Fluid World panel to something larger than the default 0.5 meters (even though your
model dimensions may be accurate, Blender’s water simulation still calculates the domain width as if it was 0.5 meters). The larger the domain width (no matter what its real size) the less sticky the liquid will appear.

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