Your House 3D Printed for the Birds

by rabbitcreek

I have been 3D printing model versions of peoples houses as birdhouse housewarming gifts for several years. It is a great present and really easy to do. Building birdhouses is a wonderful side hobby that started me off in Instructables with this one:
https://www.instructables.com/Bentwood-Birdhouse/ amazingly that birdhouse is still hanging outside through all these Alaskan winters. Whether they sit forlorn and unused and take on a natural patina or are enlivened with the movement of bird families is really immaterial--they provide for customization of our living space that used to be so commonplace. When you

have to ask your homeowners association if you can put up a garden troll the joy of scanning your home for signs that you actually live there is greatly diminished. To spice things up I will show you my easy method for making a bird house doppelgänger of your current living situation. After modifying it for a cleanup access and adding a hole or two for the birds you can 3D print it. For those of you that are living in a house that's already 3D printed you can just download your plans as a STL file set CURA to 1% and your done!


Step 1: Gather Your Materials

This is a real simple project. All that is required are a copy of Fusion 360 and a 3D printer. Fusion 360 is a wonderful piece of software that I have used in just about every one of my Instructables. It is easy to use and there are a ton of How-To videos on the web for implementation.

top or side diminishing the number of overhangs and support features. The alternative is to divide up your house into printable chunks and then superglue them

They provide an Educational License for home tinkerers and teachers. The one limit with 3D printing for this project is the size of the birdhouse. I have a Creality CR-10 which has an enormous print bed size limit especially in the Z direction. This allows you to turn the print on its

together---nice to have a modular looking house to make this easily happen.
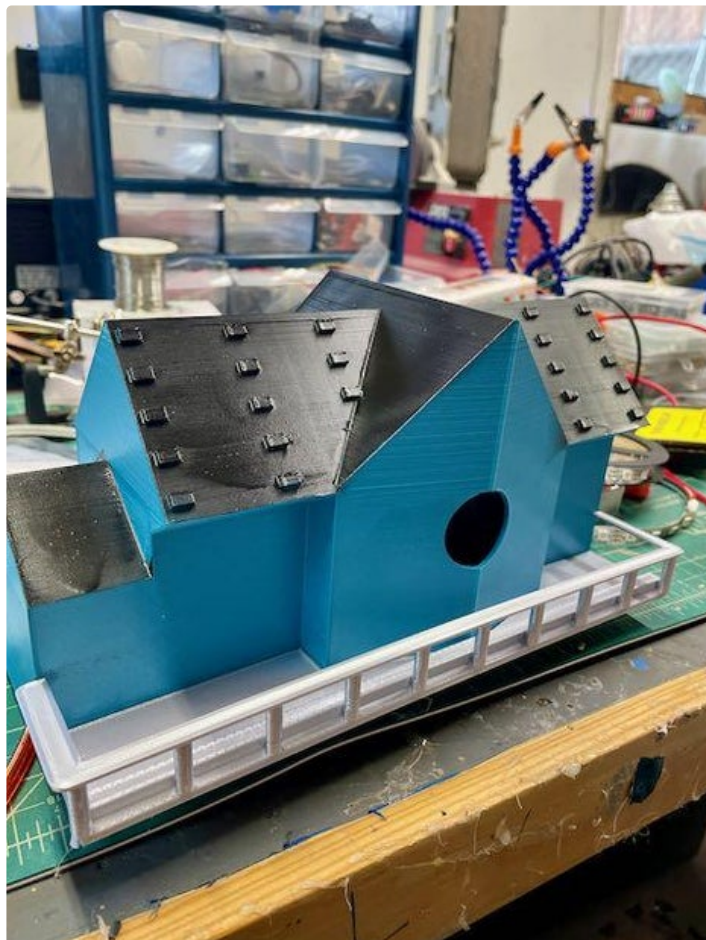
Step 2: Take a House Photo

You will be uploading this photo into your design software so try to make it as close to straight on and as flat a perspective as possible. This will allow you to adapt the composite pieces of your model house to the graphical perspective of your real one. This is a cartoon interpretation of your home into a small one; not

anything that will be used by LEGO to make a 1000 piece model. Choose the face of the building that you will want in front. All your want is the basic structure and relative size and shape of the roof angles. Save the photo to your desktop for use in the next section.
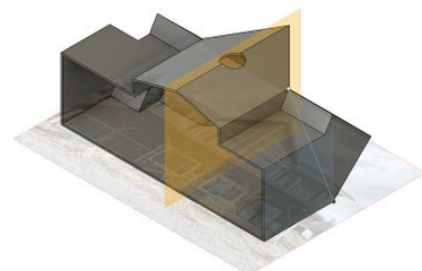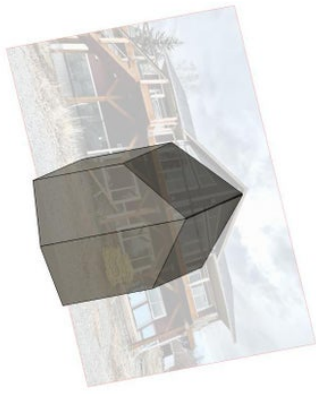
Step 3: Design It

The first step is importing your house photo into Fusion 360. I will not get into the details of installing the program and setting it up on your machine. Start a new design and under **Insert** select **Canvas** and choose a flat plane to import the image taken in the last step. This is your last opportunity for moving and centering the image to your x-y plane. This is also the time to enlarge or shrink the image to the size that is accommodated by your printers build surface. You will also be able to do this in your slicer software so don't despair if your creation grows slightly in the design you can always fine tune in the end. My bird houses have been in the range of 20 to 30 cm. Of note this is a great time to learn to calibrate the view if you are bringing in a design of a PCB layout or some other picture and you want it to scale. Open the arrow associated with the canvas to reveal the IMG listing of the photo and right click it--this will allow you to reEdit the photo and adjust the calibration to

exactly the right size for your design.

The process for building this house model is pretty simple but of course it will vary with every house design. In this case the design was basically four blocks with tilted roofs. I designed the first cube to the correct roof dimensions and placed a plane in the center so I could angle the roof lines from it. Under tools I cambered the two roof lines until they matched the photo. I then drafted (Tools) the two front window panels to match their angle in the photo. I then placed two cubes primitives on either side and made a roof triangle drawing to match the rooflines and Press-Pulled it out into the intersecting roof shape. I then mirrored the shape on the other half. The garage was added in the same way. I provided the design files for you in case you want to see how all the details were done.

Step 4: Adding the Details

After the general structure has been shaped the details of making it a functional bird house as well as adding the details that make it fun are needed. Placement of the the entrance hole and its size is dependent on the design of course ... I usually use 1.25 inches. Get mostly sparrows but always want swallows. The floor structure of each house is carefully outlined in sketch mode followed by Push-Pull to give it structure. Openings for the clean-out ports are outlined and then cut. The clean-out port in the bottom is a small trapdoor design held in place with a zip tie until the fall. You can put several of these in to make it easier. Architectural details like railings, decks and texturing for roofs and imaginary doors and windows can now be added as needed. The best detail I always add is the miniature bird house and bird that is added to the structure on completion. It is kind of a meta commentary on the whole process. This is easily done in your slicing software by reducing the size of the whole print in Cura to 10% or so.

Step 5: Printing It

These turn out to be long prints. You don't really have to print these at high quality so I tend to reduce them to 0.28 (low quality) and standard settings for PLA in Cura. They can still take over a day to print. I have also printed them in PET-G for heat resistance but have not really noticed any difference in a couple years of exposure. Depending on your designs your need for support structure will vary but do to the steady increase in print times I tend to minimize this by changing the design. Roof overhangs can be changed easily to chamfered angles. If the structures have to be assembled in several pieces I always use superglue. It has tended to be dependable on long outdoor exposures. I have not had trouble with water penetration into the structures when examined at the end of the year. The birds seem to accept the structures without issue. I have used Plastidip as a paint on the roofs of several of them and perhaps this has helped with the weather resistance. For the tiny bird house add-on the design file in Fusion 360 must be modified to thicken the wall beyond the usual 2 mm thickness I usually use for structures of this type. If reduced to 10% size this wall thickness would be paper-thin so I usually up it to 30 mm. The bird file is from Thingiverse and I include the file...design by **ibudmen**.
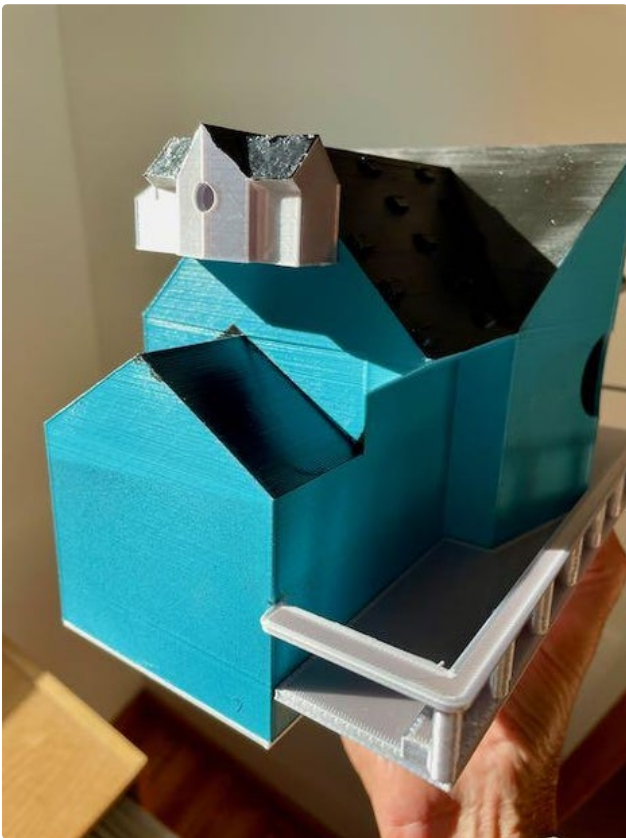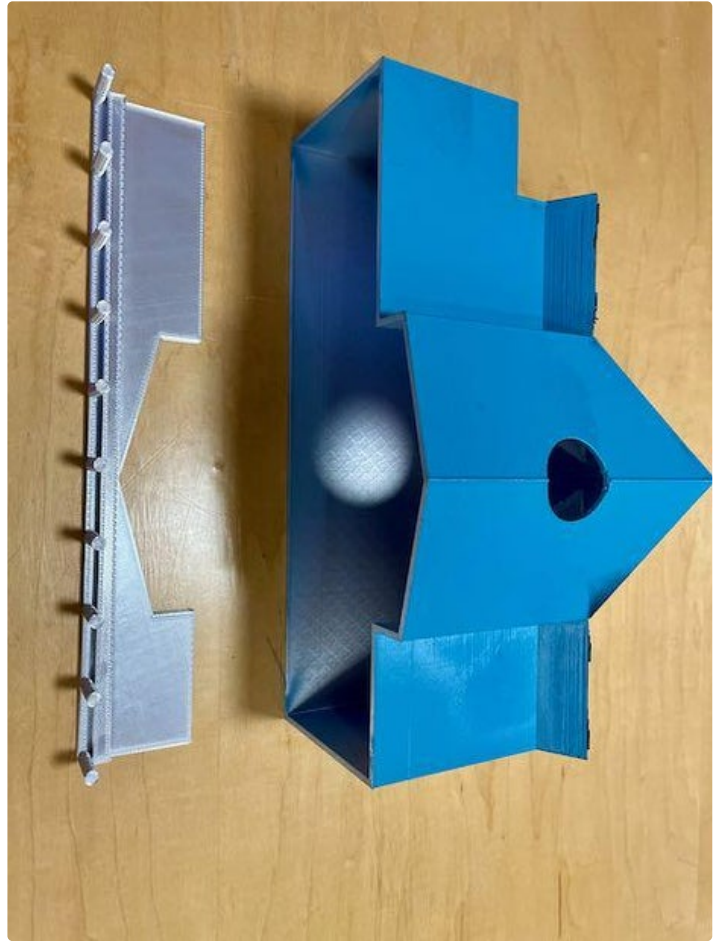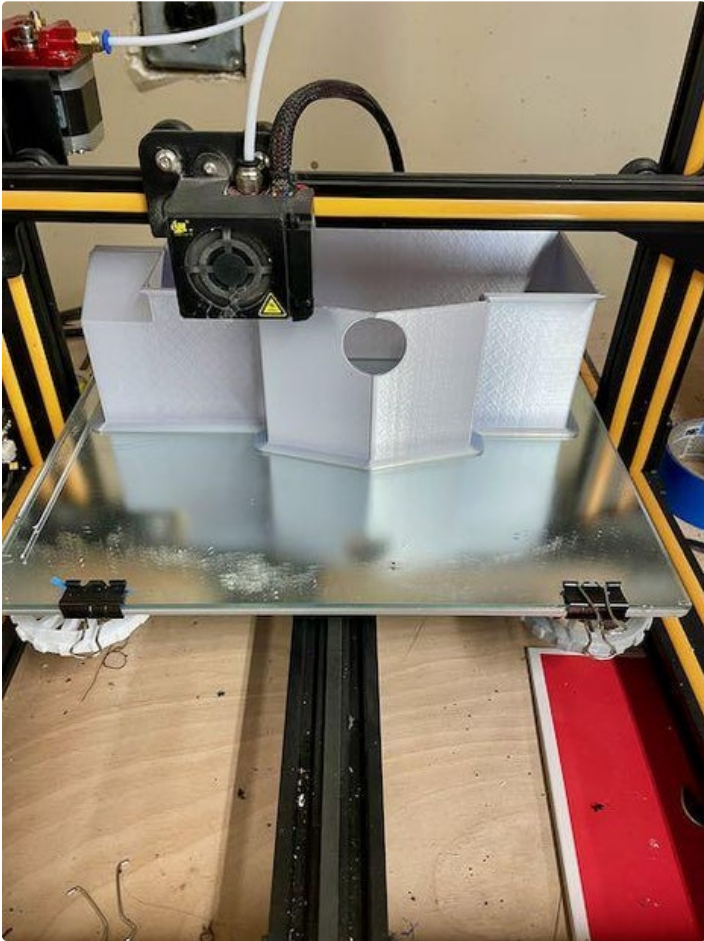
Step 6: Using It

There are many ways to attach these to good nesting areas. The above one has a 3D printed holder for a pole that is superglued to the base and a corresponding one in an old stump. This enables easy adjustment in height. The other houses I have adapted simple 90 degree 3D printed side mounts that are easily glued to the back of the houses that enable mounting to the upper reaches of the house eaves. Both files are included. This is a great starter project for learning design on Fusion 360 and has been one of the more welcome home-addition 3D printing projects.

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