Nutcracker

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I picked this object because I thought I could make it detailed, colorful, and fun. Also, with Christmas time coming up, it reminded me of the holiday and in class I had something to really look forward to. We always put nutcrackers around our house when decorating for the holidays so it seemed like the perfect project to do this time of year. For the overall features, such as the legs and the hat, the nutcracker that I designed was inspired by the ones shown in Figure 2.

When beginning my process, I decided to start from the bottom up. My project consists of three major chunks: the platform and legs, the arms, and the body and head. For the platform and legs, I started by boss extruding the platform and adding a fillet. I did the same for the shoes. I drew circles on the shoes and boss extruded those for the boots. For the top part of the legs, I completed a loft. Next, I moved onto the arms. I started the arms by boss extruding the bottom gold cuff, drawing a smaller circle and then boss extruding the blue portion of the arms. I did the same for the second set of gold cuff and arm portion. I then boss extruded a tiny circle from the top, so that it could mate with a hole in the shoulder of the body portion of my nutcracker. For the hand, I created a loft from the bottom gold cuff down, and did a fillet to the end to make it more round. Then, I moved on to the body. Starting again from the bottom up, I lofted the skirt and added a fillet.
Then I cut extruded two holes for the legs to mate with the body. I then boss extruded the waistband from a sketch on the skirt and lofted the chest, which I also added a fillet to (seen as the top gold band). Then I boss extruded the upper portion of the body and from there boss extruded the shoulders. I filleted the shoulders so that they would blend into the body. I then cut extruded holes from the bottom portion of the shoulders that had dimensions that matched the extruded top part from the arms so that they could mate. I then lofted the head between two planes and the top of the body. I boss extruded the hat in two separate parts and added a fillet to the top. I cut extruded the eyes so that the green color would pop. I then boss extruded part of the nose and lofted the rest of it outwards. I added a fillet to the nose. Next I moved to the mouth. I boss extruded it, with holes left for the teeth, and added a fillet, so that it morphed with the face. I sketched and boss extruded the eye brows and added a fillet. I then went back and boss extruded buttons onto the skirt of the nutcracker, for added detail. My final step was the hair. I sketched it out using a spline and then revolved it around the head. I added color to all the features and completed my nutcracker.

c. The hardest part of the model to complete was the teeth. It was difficult to know how to dimension them so that they did not look funny. It was also a challenge to see where to place them because on a typical nutcracker, it would open at the teeth, but mine does not have this feature. Another challenging part of the project was the hair because I was not sure how to make a solid object look like hair. A new feature that I learned was the Spline tool under the sketch tab. I had no idea that we could do that and found it very helpful in my project. Having the option to do more of a freestyle drawing, not a shape or straight line, was a huge help when creating the hair.

d. In the SolidWorks portion of the class, I learned a lot more than I expected to at the beginning of the course. I had no experience with CAD or any online design systems like that so, although challenging, I had a very good learning experience in this class. I learned to create 3D objects by lofting and extruding. I learned how to add details by utilizing features, such as fillets and cuts. Although at first I found it to be very frustrating, I now feel like I could use it for a variety of projects and hope to be exposed to it more in years to come.