

## **Michael Angelo (Quecano) Controller**

For the initial sketch design of the controller, I decided to use Microsoft Paint as it is very easy to use, which considerably speeds up this part of the process. My first step was to figure out how to make the letters of my initials look like a controller. I made “M” the base shape of the controller because the tops of the M are the perfect spot for the triggers/buttons on the back of the controller. It took a bit to figure out where to put the A, but I eventually settled for a Gamecube-like design with a joystick in the middle front of the controller. A triangle, made to look like an A, is put around this joystick, making the initials of my first and middle name: MA. Then, I sketched controller components like a D-Pad, AB buttons, and another joystick. I was then ready to start modelling it.

When I started modelling, to speed up the process, I decided to roughly draw out all the edges of the shape using the Line tool. Then, I used the Sketch Dimension tool to quickly get the shape to have proper dimensions. I held up my hands as if I were holding a controller to estimate the overall dimensions of the controller.

During this process, I realized I needed this controller's visual, auditory, and constant input components. At this point, I decided to use Super Mario Galaxy as the game for which this controller is being made. I returned to my original sketch design and added 2 LCDs in the gaps of the M to receive visual data from the game (Hearts, Starbits, Coins, etc.). I also added a speaker to the middle to receive audio data from the game (When Mario jumps, collects starbits, etc.). The final revision noted that the controller would be controlled by a microbit with an accelerometer in it (When you would shake the controller hard, Mario would do his spin move).

Going back to Fusion, I finished modelling the controller components and then added my revisions. I also used the Fillet tool to make the controller's edges smoother so they don't hurt when held.

Once I finished with the model, I went to TinkerCAD to prototype some of the controller functions. I added a microbit and used the block version of the built-in IDE to code the controller since I did not know how to program in Python. I added some variables to store the data of the components, which the game would read as various different inputs. I then added 2 potentiometers to serve as the x-axis and y-axis of a joystick on the controller. The microbit would take the values of the potentiometers and write them to their respective variables. For the buttons, I set it up so that pressing down the A/B buttons on the microbit would write a value of 1 to their variables while letting go would reset it back to 0. The last piece of the TinkerCAD prototype is a piece of code that makes it so that the accelerometer receives a significant amount of force, the variable SHAKE gets set to 1 and then resets when the force is no longer then. This makes it so that when the microbit is shaken hard, it can trigger the spin attack in Super Mario Galaxy.