This project will use an Arduino Nano Every, along with a single button and an OLED display, to create a digital D20 dice roller. We’ll also look at some opportunities to make the hardware and software better and discuss the security of the included “anti-cheat” system.

Part 1: hardware setup

1. If your Arduino did not come with its header pins already soldered on, you’ll need to do that first. Insert the short legs of the headers up through the bottom of the board, then carefully solder the pins to the board on the top side.
2. We need to connect a few components together (pinout https://docs.arduino.cc/static/90c04d4cfb88446cafa299787bf06056/ABX00028-pinout.png).
   1. 5v out (Nano) <-> VCC (display)
   2. GND (Nano) <-> GND (display)
   3. SDA (Nano) <-> SDA (display)
   4. SCL (Nano) <-> SCL (display)
   5. D7 (Nano) <-> Switch
   6. Switch <-> GND (Nano)
   7. 9v + (Battery) <-> VIN (Nano)
   8. 9v – (Battery) <-> GND (Nano)
   9. A0 (Nano) <-> leave dangling
3. I shipped all of the Arduinos with a basic program loaded on them so at this point, all that is lefty to do is connect the battery. You should see the LCD turn on a message displayed.

Part 2: software

1. Download and install v 1.8.x of the Arduino IDE (download link)
   1. Choose to install drivers when prompted
2. Download the “U8g2lib.h” library and copy it into c:\program files (x86)\arduino\libraries\
3. Connect the Arduino Nano Every to your computer with the USB cable
4. Download the sketch from (github link)
5. Open the sketch with Arduino IDE
6. From the Tools menu, ensure the correct Board, Processor, and Port are set
7. Upload the code
8. The digital dice should still be working the same as before.

Discussion points:

* Improvements
  + Button debounce
  + Random number generator
* “anti-cheat” system
  + <https://ryantadams.com/dice/checksum.php>
  + Pitfalls
  + Improvements
* Other project ideas