CE351 Microcontrollers Final Exam

S2023 Final Exam (open-book, open-notes, open-internet)
(Insert the answers, screenshots, link to demo videos, and code into a single Word file, convert the Word file into a **SINGLE PDF file** and send it to yli@fortlewis.edu)

1. Design the schematic and PCB layout of a wearable temperature monitor which is powered by a 7.4V Lipo battery (just leave a pair of +/- header pins on your PCB for battery connections). Use any display units you are comfortable with. You can use any MCUs/temperature sensors you are familiar with. Only schematic/PCB layout are needed for this problem, no programming and implementation on MCUs. (Provide the schematic and layout snapshots). (30 points)

2. Using either UNO or NANO, write a program that detects a push activity (debounce required) on a pushbutton to add 1 to a 3-bit binary number. The binary number counts from 000 – 111 then resets back to 000. The results are displayed by 3 LEDs plugged onto a breadboard. (Provide the code and the demo video). (30 points)

3. Use the thermistor as the temperature sensor, use an ISR to acquire the new temperature and update it in the serial monitor in Arduino IDE every 1s. You need to show the calculation of the 1s interrupt for credits. (Provide the code, calculation, and the demo video). (40 points)