520.440/640 Machine Intelligence on Embedded Systems

Laboratory Assignment #1

Computing the XOR on the Nano BLE Sense

Question #1 (1.5 points):
Write Arduino code to compute the XOR function taking digital inputs (1/0) from two hardware pins for example any two General Purpose Input Output (GPIO) D2-D10 -pins 20 to 28-. Please check the Nano BLE Sense manual for additional hardware information on the Nano BLE Sense. Use the onboard LED to show the output state of the network and write the output to the Serial Port so you can view the output using the Serial Monitor in the Arduino IDE.

Question #2 (6 points):
Program the Nano BLE Sense device to run the XOR neural network that you created in Homework #1. Follow instructions in Chapter 5 of the book and revised writeup for Chapters 5 and Chapters 6 on the Teams site to create the quantized model in C. Take the hello_world example and substitute your quantized XOR model for the sine wave model used in the example.

For both questions, demonstrate correct functionality by connecting the input pins through wires to Vdd or GND and observe the output. Please take pictures and submit results together with your code on the Teams site.

Hint: Even though there are two inputs we still do this:

```
input = interpreter->input(0);
```

And then to set the values we need to use the same quantization parameters for each just like in the sine wave example. Then we can set two different values in the same input array, for example:

```
input->data.int8[0] = x_quantized_1;

input->data.int8[1] = x_quantized_2;
```

where *x_quantized_1 and x_quantized_2* are the two quantized input values to the XOR model.