Class Report 5

ELC 4396 System on a Chip

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Introduction

For this assignment, I used the I2C communication protocol to read from an onboard temperature sensor. This data was then displayed on the built-in seven-segment displays.

Implementation

In Vivado, I was able to add in the I2C communication by adding it in to the appropriate slot and making the necessary wires travel out to the base file. On the software side, I utilized the sampler code as a base for getting the temperature and converting it to Celsius. From there, I multiplied it by 100 and stored it in an integer to eliminate further decimal places, treating this number a a fixed-point number. I then iterated through the number, output each digit individually. Finally, I placed a decimal point between the second and third digits from the right.

```
float temp = getTemp(&adt7420, &led);
int16_t tempManip = getTemp * 100;
int8_t i = 1;
uint8_t isPositive = tempManip > 0;

sseg.write_1ptn(F,0);
sseg.set_dp(0x08);

//output each digit starting at one's place
while(tempManip != 0){
    sseg.write(sseg.h2s(tempManip % 10), i);
    i++;
    tempManip = tempManip / 10;
}

//if only a decimal part, pad zeros until leading zero for decimal point
while (i < 4){
    sseg.write(zero, i);
    i++;
}

if(!isPositive){
    sseg.write(neg, i);
}
```

Figure 1: Display code

Results

I have yet to test this code as I do not currently have access to Vitis to compile or upload it.