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EC 450 Homework 5

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**Overall Approach:**

For the guessing game we implemented communication between two MSP430s using SPI communication. We also used the Master board to output the symbol sent to the slave, simultaneously sending the same character to a PC using a UART connection. By receiving a response from the Master board, the slave’s guess is updated and eventually reaches the correct initial value.

**Master Board:**

The master board is responsible for implementing the SPI clock which is shared through PIN 1.5. The Slave-Out Master-In pin is sent from both boards through PIN 1.6. The Slave-In Master-Out pin is sent from both boards through PIN 1.7. Both boards are connected through a common ground.

The master board initially sends a character to the slave board. By checking the value received in the UCBORXBUF, it can determine if the slave’s guess was too high, or too low. It then sends an appropriate character to the slave, and wait for the next guess. When the guess from the slave is correct, the character sent is the ‘=’ sign, and the LED is turned on to signify the guessing has stopped.

For the UART part of the master, we sent the symbol that indicates how close the slave was to the response. It initializes the USCI to UART mode and programs it with a Baud rate of 9600 and a Clock Rate of 8 Mhz. It utilizes a helper function to load the character into the TXBUF, this was done just in case we wanted to send messages bigger than one character. This is done by checking the length of the word we are sending and populating the TXBUF with the next byte of the array.

**Slave Board:**

The slave board is responsible for sending guesses to the master. It is controlled by the shared clock through PIN 1.5. When the slave guesses, it simultaneously receives a response character from the master board, giving the slave an indication of whether to increase or decrease the guess. When the slave receives the ‘=’ character, the guess is no longer updated, and the slave will stop when the master stops sending response characters.

**Design Challenges/Limitations:**

The limitations for this assignments are that we can only play the guessing game with only one MSP430. We are also limited to the speed of our transmissions since we have to wait for our TXBUF interrupt to finish before we kick off another one.

**Schematic:**

