ECE 411
Homework 5
System Design and Modeling
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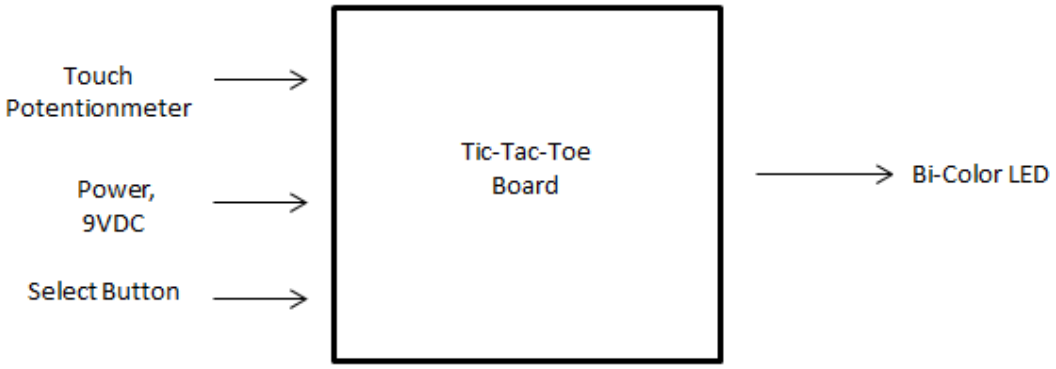
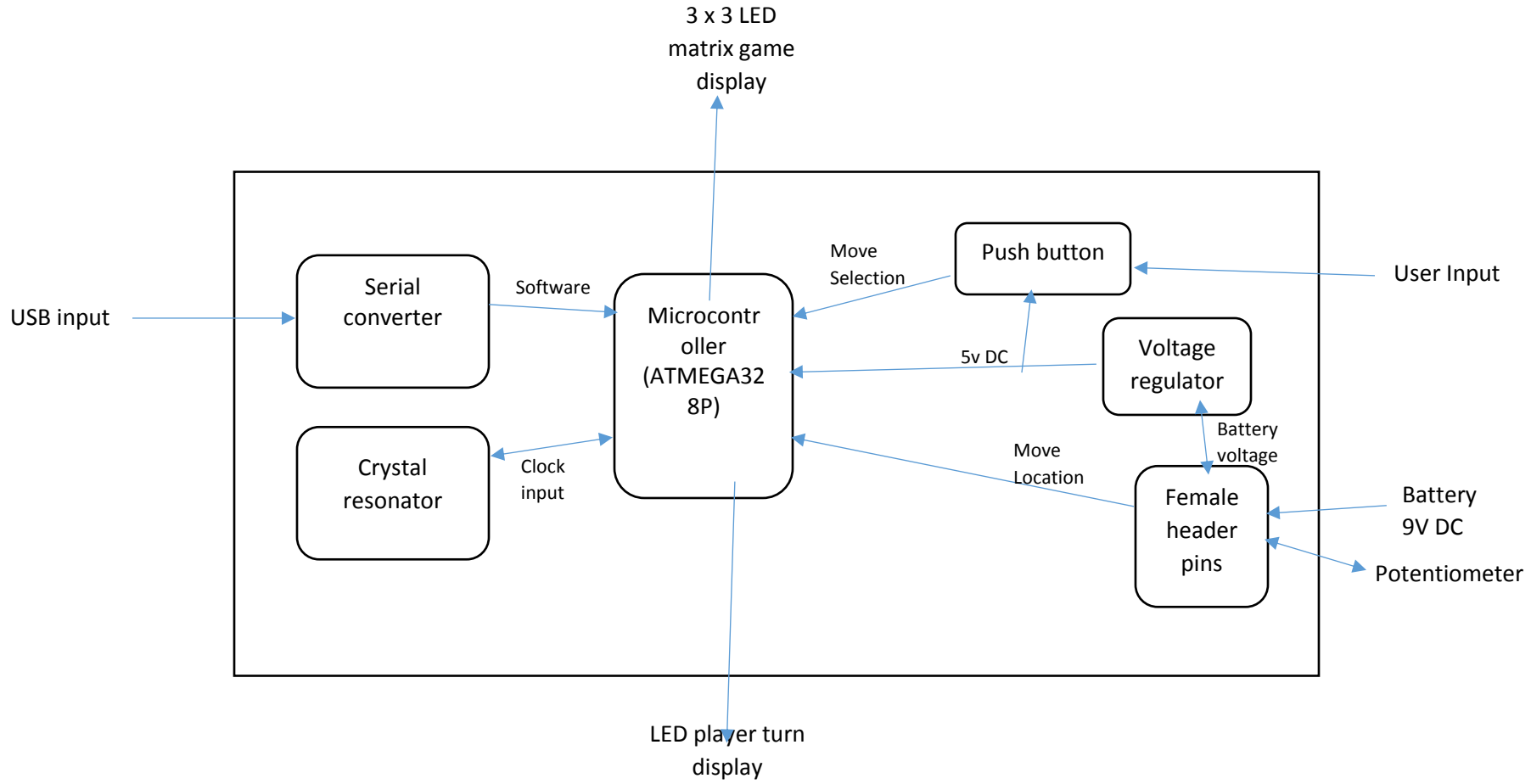
Revision: 3

Level 0

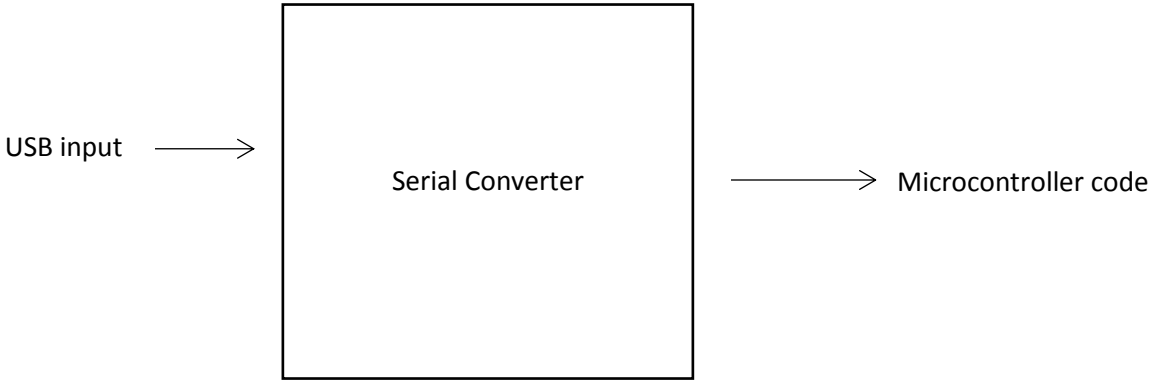


Module	Tic Tac Toe
Input:	Potentionmeter: prescribes a particular voltage that pertains to the illumination of a specific LED. Select Button: Affirms the paricular voltage selected by potentionmeter. Power: 9VDC
Output:	Bi-Color LED: illuminates the LED based off of the partition of voltage
Functionality	Takes in the partition of voltage from the potentionmeer, and illuminates the LEDs according to the the select button that finalizes the users input decision.

Level 1 (whole module)

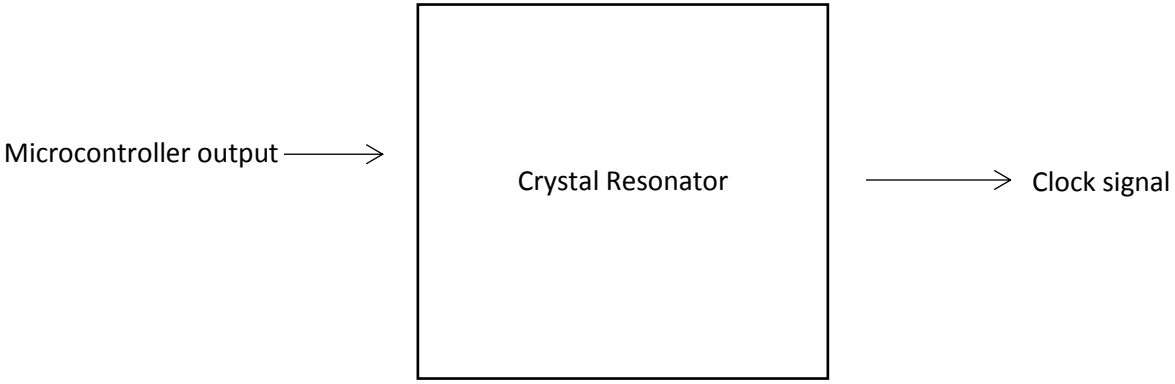


Level 1 (Serial Converter)



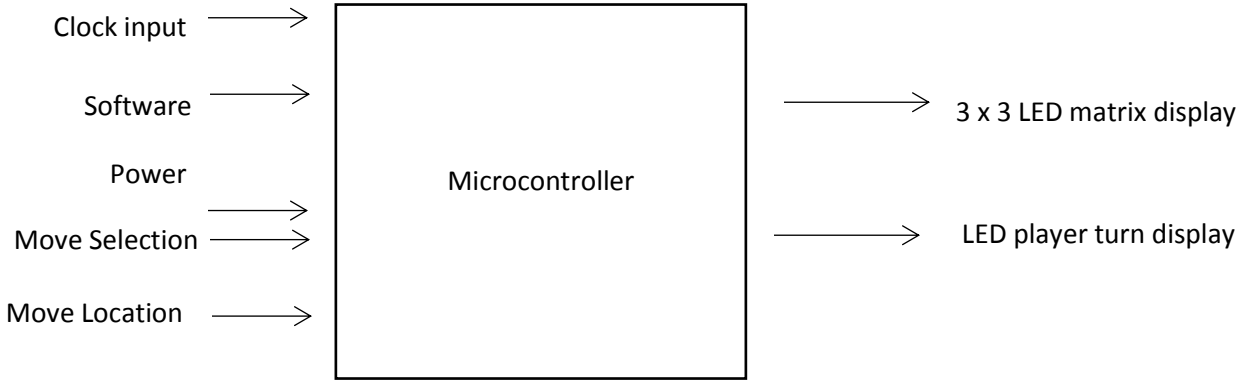
Module	Serial Converter
Input:	USB: Computer programming software
Output:	The arduino IDE and the microcontroller code
Functionality	It takes a USB parallel signal from a computer and converts it to a serial signal for the microcontroller to read.

Level 1 (Crystal Resonator)



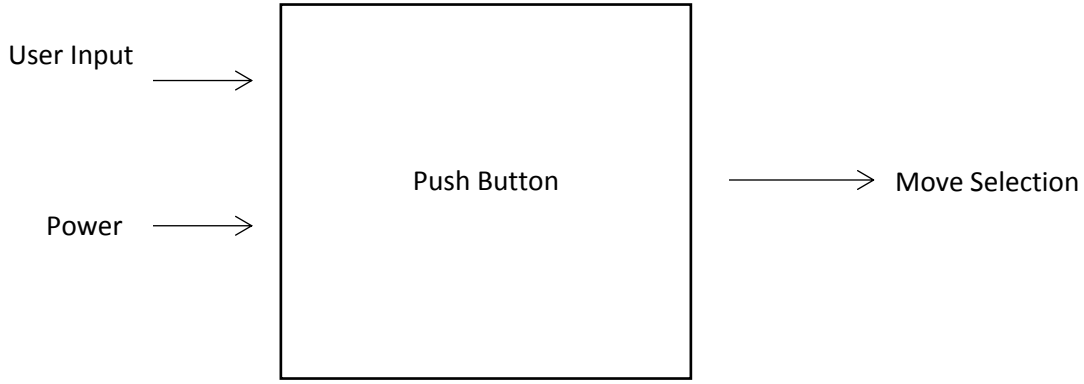
Module	Crystal Resonator
Input:	A microcontroller output signal
Output:	A 16MHz clock signal
Functionality	It keeps track of the time of the system

Level 1 (Microcontroller)



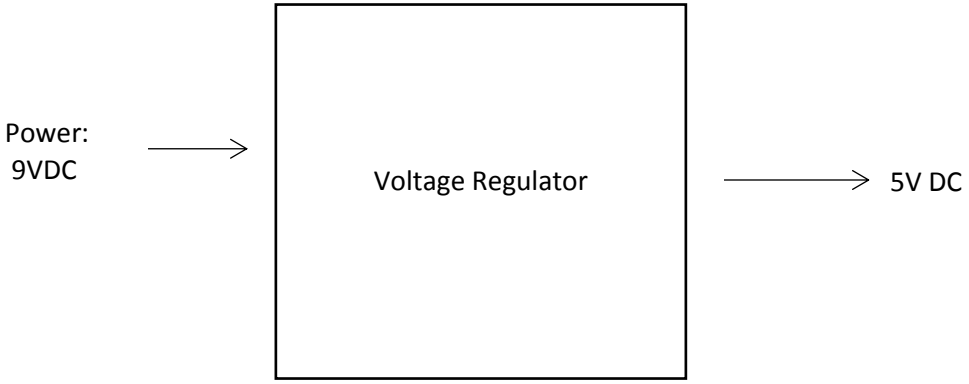
Module	Microcontroller
Input:	• Clock input: 16MHz clock signal • Software: Arduino IDE and microcontroller code • Power: 5V DC • Move Selection:affirms user's choice • Move Location: voltage division based off of potentiometer input
Output:	• 3 x 3 LED Matrix display: displays the tic tac toe game • LED player turn display: indicates the red or green users turn.
Functionality	The microcontroller receives player input in the form of selecting a location within the LED matrix, and a signal indicating a selection of the move. The grid will display a bulb either red or green, depending on the player. Also, it will manage the gameplay and determines the winner.

Level 1 (Push Button)



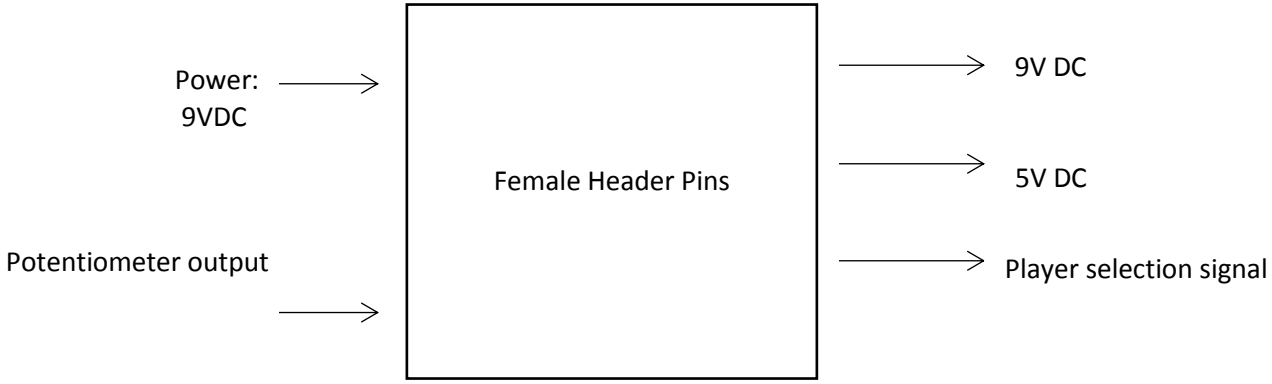
Module	Push Button
Input:	• User Input: to differentiate between the two users. • Power: 5V DC
Output:	Move Selection: microcontroller input
Functionality	The determiniaion of when a player confirms a speciic location within the LED matrix, by pressing the push button.

Level 1 (Voltage Regulator)



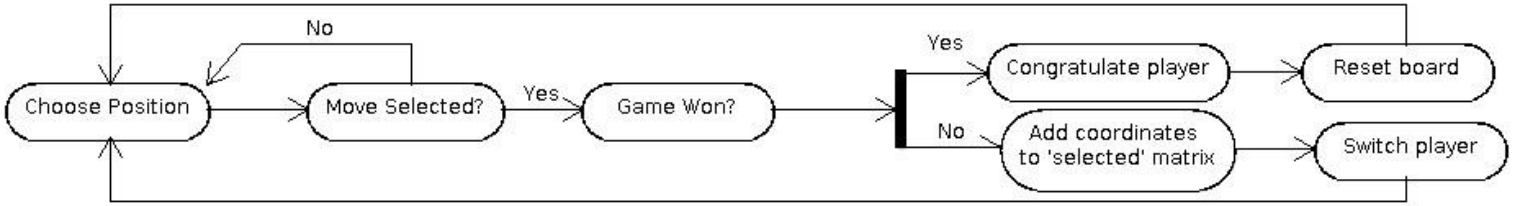
Module	Voltage Regulator
Input:	Battery: 9V DC
Output:	Regulated power: 5V DC
Functionality	Takes battery input and supplies the microcontroller, the potentiometer, and the push button with 5V DC voltage

Level 1 (Female Header Pins)



Module	Female header pins
Input:	• Potentionmeter input: to distinguish user input on the board. • Power, 9VDC
Output:	• 9V DC: to the voltage regulator • 5V DC: from the voltage regulator to the potentiometer voltage pin • Player selection: the potentiometer input to the controller
Functionality	5 female header pins that will take battery input and the potentiometer input. It will provide 5V DC voltage to the potentiometer taken from the voltage regulator.

State Diagram View for our Tic Tac Toe project:



Activity View for Parking Meter Payment: