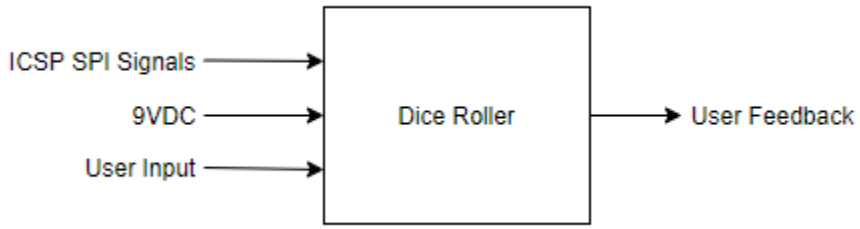
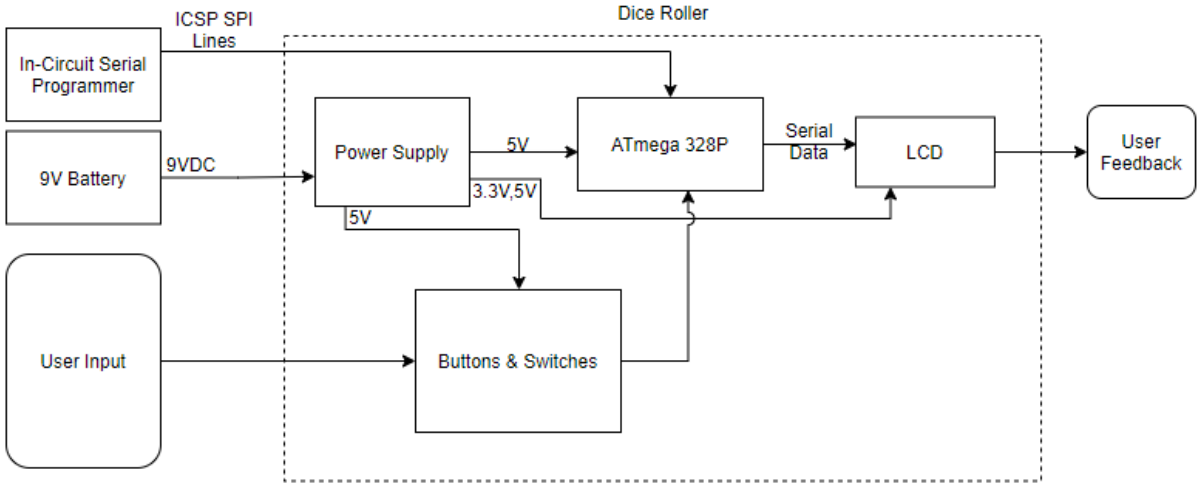
Team 2 Functional Decomposition

Dice Roller: Level 0

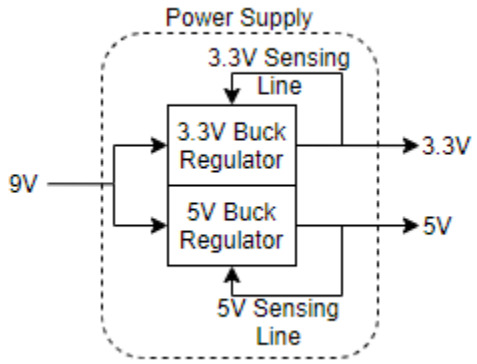


Module	Dice Roller
Inputs	ICSP SPI Signals: SPI protocol to program processor 9VDC: Single 9V battery User Input: User actuating mechanical buttons and switches
Outputs	User Feedback: Visual feedback on a LCD
Functionality	Simulates rolling a user specified number and type of dice. Provides a number of options to the user to initiate a dice roll (physical shake, toggle switch, button). Reports results of the roll to the user with a LCD screen.

Dice Roller: Level 1

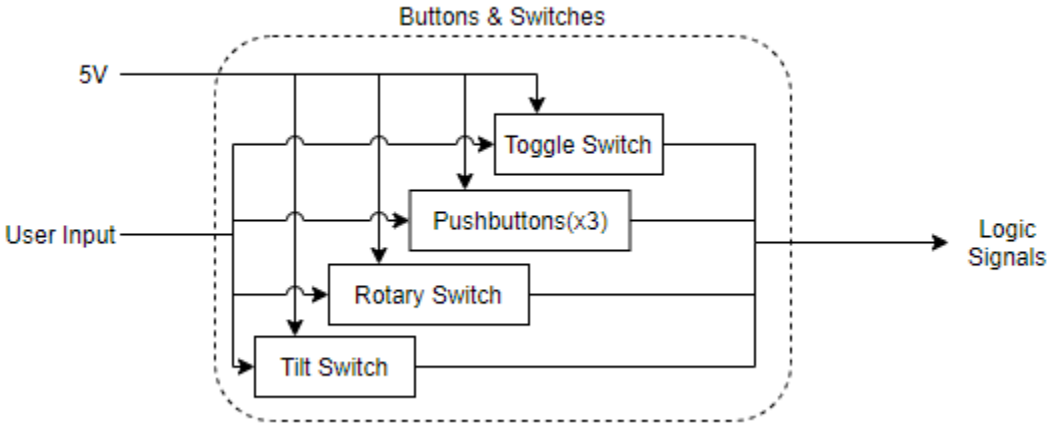


Power Supply: Level 1



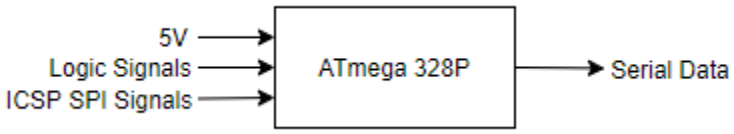
Module	Power Supply
Inputs	9V: Single 9V battery
Outputs	3.3V: Regulated 3.3VDC 5V: Regulated 5VDC
Functionality	Steps down the 9V input to 5V and 3.3V logic levels for use by the rest of the circuit.

Buttons & Switches: Level 1



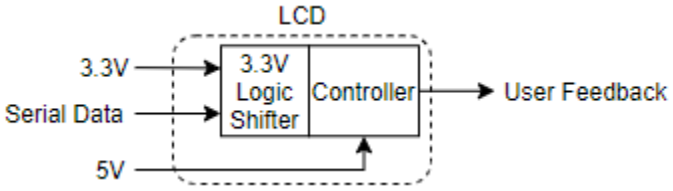
Module	Buttons & Switches
Inputs	5V: 5V for logic 1 User Input: Physical action such as pressing a button
Outputs	Logic Signals: Logic 1's and 0's for each actuator that indicates its status
Functionality	A collection of buttons and switches that the user can interact with to generate logic signals that will be sent to the processor.

ATmega 328P: Level 1



Module	ATmega 328P
Inputs	5V: VCC for chip Logic Signals: Single logic levels for each button & switch indicating status ICSP SPI Signals: MOSI, MISO, CS, and SCK from serial programmer to program the chip
Outputs	Serial Data: Serial data for the LCD controller
Functionality	Monitors the state of buttons and switches. Generates random numbers when a dice roll occurs. Sends data to be displayed on the LCD.

LCD: Level 1



Module	LCD
Inputs	5V: VCC for LCD 3.3V: Used for shifting the logic level of the serial data down to 3.3V Serial Data: Commands and data from the processor to control the display
Outputs	User Feedback: Visual feedback for the user on the display.
Functionality	Level shifts and receives data from the processor. Interprets that data into commands and data to be displayed on the screen.