Team #13
HW #7
Functional Decomposition

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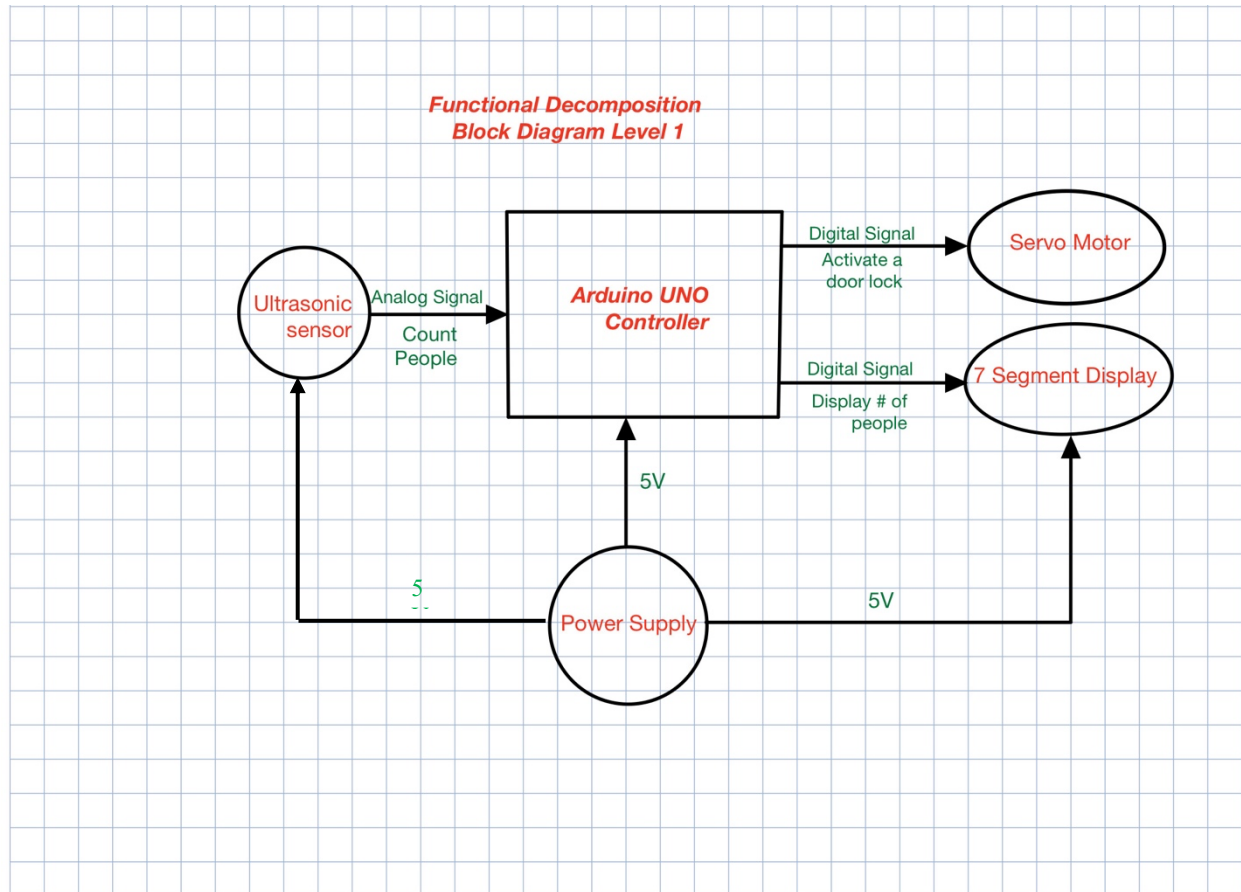
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Functional Decomposition
Block Diagram Level 0

Input 1
Sensor in
Input 2
Voltage
Input 3
Sensor out

Controller
(Arduino UNO)

Output 1
Display
Output 2
Servo motor

Module	Room capacity controller
Inputs	Sensor (in): HC-SR04 Ultrasonic sensor. Sensor (out): HC-SR04 Ultrasonic sensor. Power: 5V.
Outputs	7 segment display: A four digit display (10.00mm x 29mm x 4.3mm). Servomotor: Can rotate approximately 180 degrees.
Functionality	Counts how many people enter and/or leave the room and display the number on the 7 segment display. When the number reaches the required limit, the servo motor is activated.

**Functional Decomposition
Block Diagram Level 1**

Ultrasonic sensor

Analog Signal

Count People

Arduino UNO Controller

Digital Signal
Activate a door lock

Servo Motor

Digital Signal
Display # of people

7 Segment Display

5V

5

Power Supply

5V

Module	Arduino UNO
Inputs	Sensor (in): generates analog signals. Sensor (out): generates analog signals. Power: +5V AC.
Outputs	7 segment display: A four digit display. Servo motor: rotate approximately 180 degrees.
Functionality	Produces digital signals to the servo motor and 7 segment display.

Module	Ultrasonic Sensors
Inputs	Power: +5V AC.
Outputs	Produces digital signals.
Functionality	Counting any person who enter and/or leave the room.

Module	Servomotor
Inputs	Power: +5V.
Outputs	Produces digital signals.
Functionality	Activate a door lock.

Module	7 Segment Display
Inputs	Power: +5V.
Outputs	Produces digital signals.
Functionality	Displays the output.