



Portland State
UNIVERSITY

Department of
Electrical and Computer Engineering

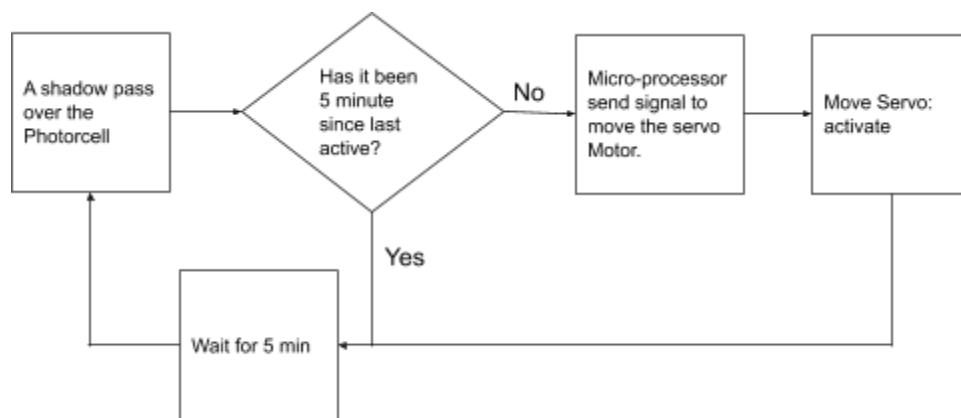
ECE 411: INDUSTRY DESIGN PROCESSES

Team 14: Automatic Bird Feeder Block Diagrams

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Logic Function for the Bird Feeder

- A Shadow pass through the Photocell
- A decision if 5 min have passed?
 - If yes, wait for 5 min
 - No, Continue
- Micro-Processor, tells the Servo Motor to turn the wheel
- Servo-Motor turns the wheel
- Wait for 5 min.

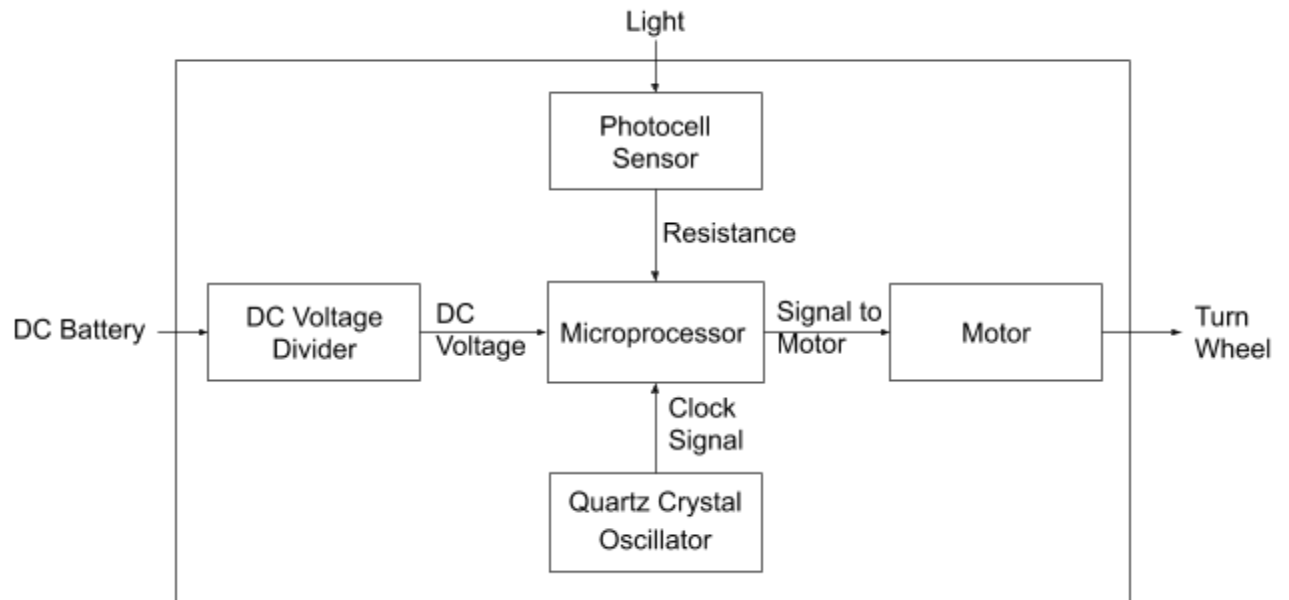


Level 0 Block Diagram



Module	Bird Feeder
Inputs	<ul style="list-style-type: none">- Photoresistor- voltage (power)
Outputs	<ul style="list-style-type: none">- Servo motor
Functionality	<ul style="list-style-type: none">- The voltage will apply power to all components.- The photoresistor will detect change in light. <p>Upon changes of light, the photoresistor will let the feeder know it is time to dispense food. This will turn on the motor that will then distribute a small amount of food for the birds!</p>

Bird-Feeder: Level 1

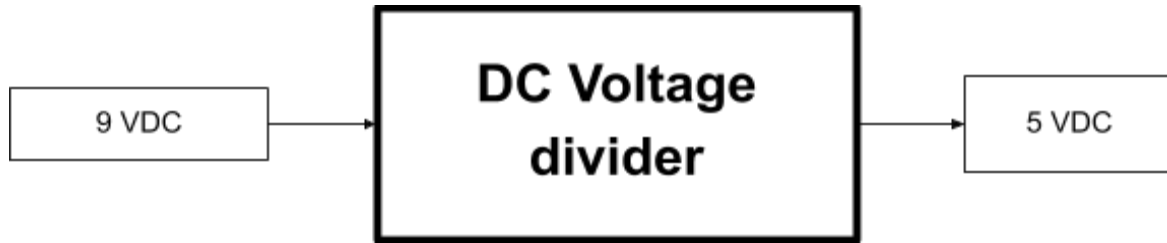


Photoresistor : Level 1



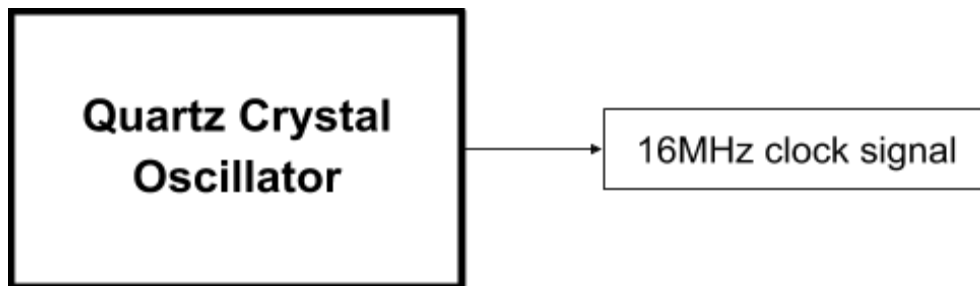
Module	Photoresistor (1K to 5k)
Input	- changes in light
Output	- change in resistance which allows more photons to be excited. More electrons are available to conduct electricity so the resistance drops.
Functionality	The photoresistor detects changes in light. Light will be “normal” to begin with. When there is some change in light intensity, the photoresistor will detect it and the resistance of the photoresistor will change. This change will be outputted to the processor and the processor will do what needs to be done with this information.

DC Voltage Devitor: Level 1



Module	DC Voltage Divide
Input (DC Voltage Divider)	- 9 VDC Battery
Output (Input to ATMEGA)	- 5 VDC
Functionality	The DC voltage divider will use the 2 (10k) resistor in series to reduce the voltage input from Approximately (9 VDC to 4.5 VDC)

Quartz Crystal Oscillator: Level 1



Module	Quartz Crystal Oscillator
Input	- Voltage source from ATmega
Output	- 16 Mhz Clock Signal
Functionality	Generate the Clock for the ATMega328

ATmega328p-U : Level 1



Module	ATmega328p-U
Input	<ul style="list-style-type: none">- 5 VDC Input- 16 Mhz clock- Photocell
Output	<ul style="list-style-type: none">- Servo Motor
Functionality	<p>The ATmega processor will take the inputs (photocell) to control output (Servo Motor).</p> <p>The ATmega source are 5 VDC and 16 Mhz.</p> <p>The ATmega processor will take a photoresistor voltage reading to determine whether or not to give a signal to the Servo Motor motor.</p> <p>The photocell will give a differential voltage reading when it senses a shadow and will wait for 5 minute before accepting another reading.</p>

Servo Motor : Level 1



Module	Servo Motor
Input	- 5V Signal
Output	- Turn wheel
Functionality	The servo motor will receive a signal from the processor. This signal will allow the step motor to move 180 degrees from its initial position and back. The movement of the motor turns a wheel inside of the feeder open and drops the bird seed to the treys.