



College of Engineering  
College of Education



## Smart Parking Lot System

### Project Overview

This Arduino-based project will be focused on creating and designing a smart parking lot system.

Course Connections	21 <sup>st</sup> Century Skills	CTE Alignment
Middle School Science High School Physics High School Engineering	Communication, Critical Thinking, Collaboration	Energy, Environment, and Development Pathway

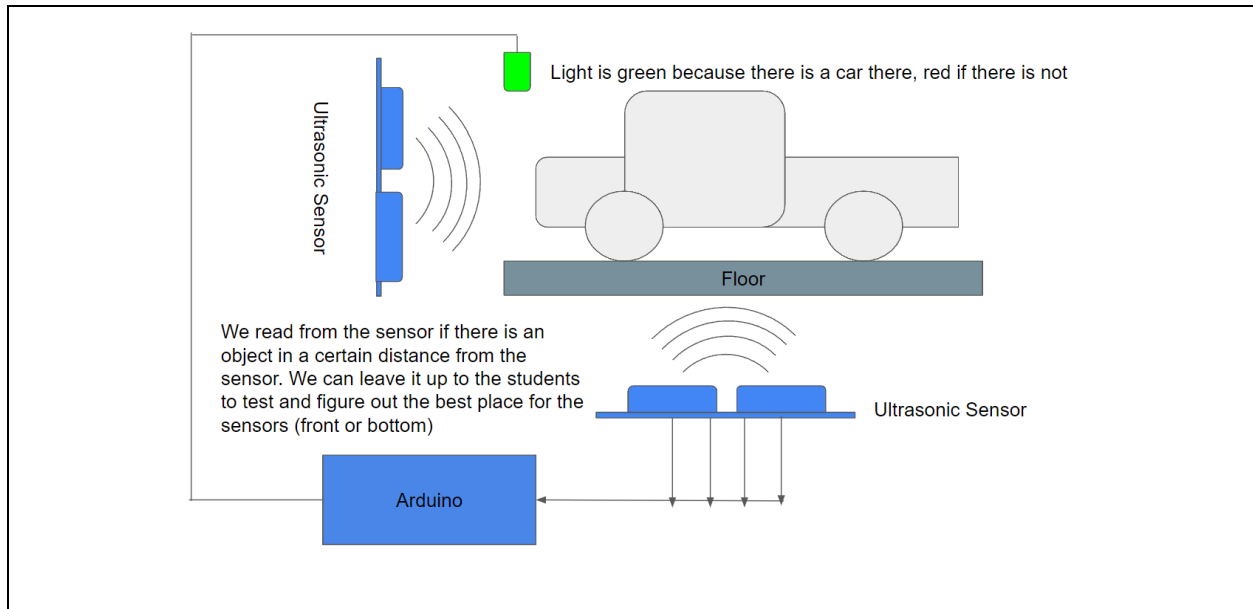
### Objective

Students will design and create a smart parking lot system that will make finding a parking space quicker and easier. The project will give students an opportunity to improve or learn coding and engineering concepts.

### Materials

1. Arduino
2. Ultrasonic sensors
3. LED's
4. Breadboard
5. Wires (Male to female)
6. USB Cable
7. Computer
8. Parts to build model parking garage

### Block Diagram



## Application

It can be difficult to find a parking space in a big or crowded lot. From casinos, arenas, and even UNLV's own parking lot, parking can be a real pain when it is not known where any are. This practice is already used so we know it is very practical already.

## Outline/Schedule

### Part 1: Introduction to Parking garage sensor

- Introduce what the problem of the difficulty in finding a parking space in a lot without sensors
- Introduce the concepts for how the sensor work in general and where they are used, all types of sensors
- Discuss how the project will work in general
- Assign tasks and distribute materials

### Part 2: Programming the Arduino Uno

- Introduce the Arduino and what it can do
- Review the basics of programming with Arduino
- Demonstrate how to program the Arduino and give tips for general stuff
- Let team practice programming
- Record video clips for important steps

### Part 3: Building parking garage

- Allow student to brainstorm how to build the model garage

- Have students research, if they don't drive, the difficulties of finding a parking space in a parking lot
- Have students make a blueprint for the parking lot
- Gather materials needed to build the lot
- Build the actual model parking lot

**Part 4:** Adding Ultrasonic Distance Sensors

- Introduce the sensors and how they will be used in this case
- Demonstrate how to connect and read sensors from Arduino
- Allow teams to test coding to read from sensor and applying different conditions to it
- Record video clips for important steps

**Part 5:** Finalizing and Testing the Project

- Finalize project
- Discuss the troubles that students may encounter and how to troubleshoot
- Prepare the project presentation and make the video demo
- Have teams present their projects

### Reflection

Have students reflect on their experience with the project and what they have learned about programming, robotics, and Arduino

- Discuss how STEM skills and knowledge can be applied to real-world problems and applications
- Have students provide feedback on their experiences

### Sample Code

[Sample Code](#)