Smart Car Parking System Project with Arduino Uno

Objective:
Automatically detect and display available parking slots using sensors and manage car entry/exit efficiently.

Components Required:

- Arduino Uno
- Ultrasonic sensors (e.g., HC-SR04) for slot detection
- IR sensors for entry/exit gate control
- Servo motor (for gate barrier)
- LCD display or LEDs (for showing slot status)
- Jumper wires & breadboard

Circuit Overview:

- **Ultrasonic sensors** are placed at each parking slot to detect if a car is present.
- **IR sensors** at the entry and exit gates detect vehicle movement.
- A **servo motor** controls a barrier that opens/closes for vehicles.
- An **LCD display** or set of LEDs shows available and occupied slots.

Working Principle:

- When a car approaches, the IR sensor detects it and opens the gate using a servo.
- As cars enter or exit, the system updates the count and slot status in real time.
- Ultrasonic sensors monitor each slot's availability and display it accordingly.

Use Cases:

- Reduces time spent searching for parking
- Helps manage limited space in smart cities
- Ideal for malls, offices, or automated parking garages