NMMakers\_FnF\_CarDemo Class Reference

**Main Class:**

CarDemo

# Methods

**Setup**

**void setupCar()**

Initializes all input and output pins and then places the car in a paused state which is resumed when the car is tilted on its side.

The Motor, Buzzer, Accelerometer, Proximity sensor and LEDs are all initialized by default. Servo and Encoders must be enabled and initialized manually after calling setupCar.

**void setupServo()**

Initializes the servo pin and enables the servo motor

**void setupEncoders()**

Initializes the encoder pins and sets up the callback functions that are called when the encoder values change

**Motor Functions**

**void motorsWrite(int speedL, int speedR);**

Turn on motors at given speed. Positive speeds drive forward; negative speeds reverse.

**int speedL** Right motor speed (-255 to 255)

**int speedR** Right motor speed (-255 to 255)

**void stopMotors();**

Stop both motors

**LED Functions**

**void clearLED();**

Turn off all LEDs (set color to 0x000000)

**void brakeLED();**

Set rear LEDs red

**void driveLED();**

Set front LEDs white

**void pauseLED();**

Set all LEDs blue

**void leftLED();**

Blink left LEDs yellow

**void rightLED();**

Blink right LEDs yellow

**void startingLED();**

Blink all LEDs green

**void setLED(int led, long color);**

Set given LED to be a given color\*

**int led** LED number (0-3, or “ALL\_LEDS” for all LEDs)

**long color** 32-bit GRB color value (see table A)

**Proximity Sensor Functions**

**float getRange();**

Returns proximity sensor range value (in inches)

**bool checkObstacle(int minDist);**

Check if obstacle is detected within given range (in inches). Returns *true* if obstacle is present.

**int mindDist** Distance (in inches) to obstacle that will return a true value

**Servo Functions**

**void setServo(int angle);**

Move servo motor to given position (0-180°) in degrees

**int angle** Angle of servo motor (0 – 180); 90° is center

**Piezo Buzzer Functions**

**void playSong(int notes[], int durations[], int numnotes);**

Plays an array of notes for given durations

**int notes[]** Array of notes\* to play (see Table B)

**int durations[]** Array of note durations

**int numnotes**  Number of Notes

**void playNote(int note, int duration);**

Play a given note for a certain duration

**int note** Note\* to play (see Table B)

**int duration** Note durations

**Accelerometer/Gyro Functions**

**bool tilted();**

Check if car is tilted or significant Z-acceleration change is detected. Returns *true* if change is detected.

# Variables

**float motorLSkew;**

Value to adjust motor speed in order to skew the car in one direction. (> 1.0: skews the car to the Right; < 1.0 skews the car to the Left)

**float motorRSkew;**

Value to adjust motor speed in order to skew the car in one direction. (> 1.0: skews the car to the Left; < 1.0 skews the car to the Right)

**Pin Variables**

These pin assignments are defined when the **CarDemo** class is created. Users can re-set these values before calling **setupCar**.

|  |  |  |
| --- | --- | --- |
| **Pin Label** | **Pin # (Default)** | **Description** |
| MOTORL | 3 | PWM control pin (speed) for left motor |
| MOTORR | 9 | PWM control pin (speed) for right motor NOTE it is pin 11 on the Shield we have to jump 9 and 11 for Arduino 101 |
| DIRL | 12 | Direction control pin for motor A |
| DIRR | 13 | Direction control pin for motor B |
| ENCL | 2 | Encoder for motor pin A |
| ENCR | 8 | Encoder for motor pin B |
| BUZZER | 5 | PWM control pin for horn/buzzer |
| SERVO | 6 | PWM control pin (speed) for servo motor |
| PROXIMITY | A0 | Analog pin for distance sensed |
| LED | 7 | Addressable LEDs |
| extLED | 0 | This is the external LED to use without the RGB LEDs and cable |

# Table A: Color Table

|  |  |
| --- | --- |
| **Color** | **Value** |
| BLACK | 0X000000 |
| RED | 0X00FF00 |
| LIME | 0XFF0000 |
| BLUE | 0X0000FF |
| YELLOW | 0XFFFF00 |
| CYAN | 0XFF00FF |
| MAGENTA | 0X00FFFF |
| SILVER | 0XC0C0C0 |
| GRAY | 0X808080 |
| MAROON | 0X008000 |
| GREEN | 0X800000 |
| PURPLE | 0X008080 |
| TEAL | 0X800080 |
| NAVY | 0X000080 |
| WHITE | 0XFFFFFF |

# Table B Musical Notes

|  |  |
| --- | --- |
| Note | Frequency (Hz) |
| NOTE\_B0 | 31 |
| NOTE\_C1 | 33 |
| NOTE\_CS1 | 35 |
| NOTE\_D1 | 37 |
| NOTE\_DS1 | 39 |
| NOTE\_E1 | 41 |
| NOTE\_F1 | 44 |
| NOTE\_FS1 | 46 |
| NOTE\_G1 | 49 |
| NOTE\_GS1 | 52 |
| NOTE\_A1 | 55 |
| NOTE\_AS1 | 58 |
| NOTE\_B1 | 62 |
| NOTE\_C2 | 65 |
| NOTE\_CS2 | 69 |
| NOTE\_D2 | 73 |
| NOTE\_DS2 | 78 |
| NOTE\_E2 | 82 |
| NOTE\_F2 | 87 |
| NOTE\_FS2 | 93 |
| NOTE\_G2 | 98 |
| NOTE\_GS2 | 104 |
| NOTE\_A2 | 110 |
| NOTE\_AS2 | 117 |
| NOTE\_B2 | 123 |
| NOTE\_C3 | 131 |
| NOTE\_CS3 | 139 |
| NOTE\_D3 | 147 |
| NOTE\_DS3 | 156 |
| NOTE\_E3 | 165 |
| NOTE\_F3 | 175 |
| NOTE\_FS3 | 185 |
| NOTE\_G3 | 196 |
| NOTE\_GS3 | 208 |
| NOTE\_A3 | 220 |
| NOTE\_AS3 | 233 |
| NOTE\_B3 | 247 |
| NOTE\_C4 | 262 |
| NOTE\_CS4 | 277 |
| NOTE\_D4 | 294 |
| NOTE\_DS4 | 311 |
| NOTE\_E4 | 330 |
| NOTE\_F4 | 349 |
| NOTE\_FS4 | 370 |
| NOTE\_G4 | 392 |
| NOTE\_GS4 | 415 |
| NOTE\_A4 | 440 |
| NOTE\_AS4 | 466 |
| NOTE\_B4 | 494 |
| NOTE\_C5 | 523 |
| NOTE\_CS5 | 554 |
| NOTE\_D5 | 587 |
| NOTE\_DS5 | 622 |
| NOTE\_E5 | 659 |
| NOTE\_F5 | 698 |
| NOTE\_FS5 | 740 |
| NOTE\_G5 | 784 |
| NOTE\_GS5 | 831 |
| NOTE\_A5 | 880 |
| NOTE\_AS5 | 932 |
| NOTE\_B5 | 988 |
| NOTE\_C6 | 1047 |
| NOTE\_CS6 | 1109 |
| NOTE\_D6 | 1175 |
| NOTE\_DS6 | 1245 |
| NOTE\_E6 | 1319 |
| NOTE\_F6 | 1397 |
| NOTE\_FS6 | 1480 |
| NOTE\_G6 | 1568 |
| NOTE\_GS6 | 1661 |
| NOTE\_A6 | 1760 |
| NOTE\_AS6 | 1865 |
| NOTE\_B6 | 1976 |
| NOTE\_C7 | 2093 |
| NOTE\_CS7 | 2217 |
| NOTE\_D7 | 2349 |
| NOTE\_DS7 | 2489 |
| NOTE\_E7 | 2637 |
| NOTE\_F7 | 2794 |
| NOTE\_FS7 | 2960 |
| NOTE\_G7 | 3136 |
| NOTE\_GS7 | 3322 |
| NOTE\_A7 | 3520 |
| NOTE\_AS7 | 3729 |
| NOTE\_B7 | 3951 |
| NOTE\_C8 | 4186 |
| NOTE\_CS8 | 4435 |
| NOTE\_D8 | 4699 |
| NOTE\_DS8 | 4978 |