# Interrupts Interfacing

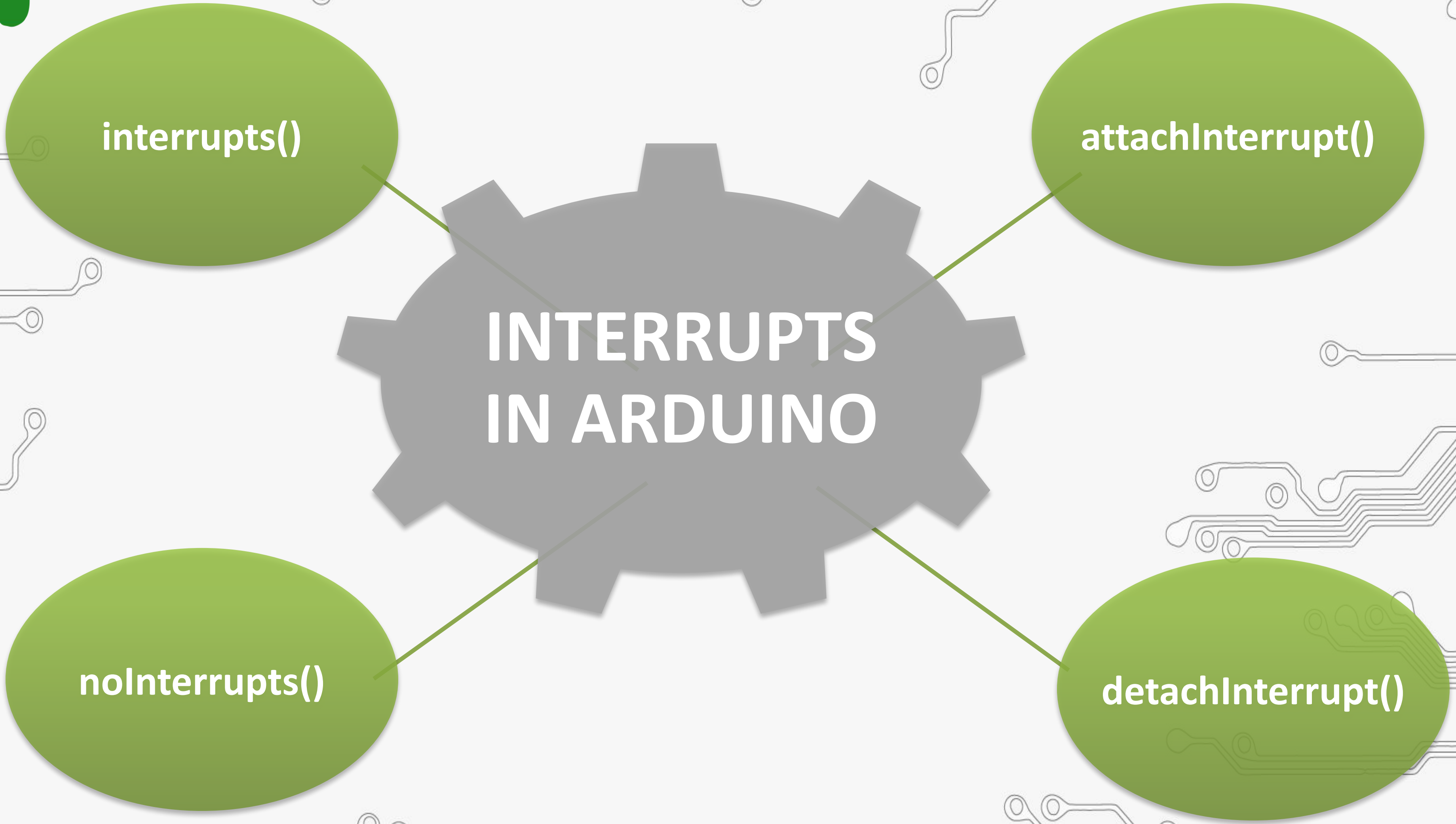
# Introduction to Interrupts

- Interrupts are mechanisms which enable instant response to events such as counter overflow, pin change, data received, etc.

- In normal mode, microcontroller executes the main program as long as there are no occurrences that would cause an interrupt.

# Executing an Interrupt

Upon activation of interrupt in the microcontroller, it executes the instruction defined in interrupt service routine.



# INTERRUPTS IN ARDUINO

interrupts()

attachInterrupt()

noInterrupts()

detachInterrupt()

# Interrupts()

- Interrupts allow certain important tasks to happen in the background and are enabled by default.

- Some functions will not work while interrupts are disabled, and incoming communication may be ignored.

- Interrupts can slightly disrupt the timing of code, however, and may be disabled for particularly sections of code.

# noInterrupts()

It interrupts are disable then you can re-enable them with interrupts().

**Example:**

```
void setup()
{
}
void loop() {
noInterrupts(); //Disables interrupt
// critical, time-sensitive code here
interrupts(); //Enables Interrupt
// other code here
 }
```

# attachInterrupt()

- Specifies a function to call when an external interrupt occurs.

- Replaces any previous function that was attached to the interrupt.

- Most Arduino boards have two external interrupts: numbers 0 (on digital pin 2) and 1 (on digital pin 3).

- The Arduino Mega has an additional four: numbers 2 (pin 21), 3 (pin 20), 4 (pin 19), and 5 (pin 18).

## Syntax:

attachInterrupt(interrupt, function, mode);

## Parameters:

- **Interrupt** : the number of the interrupt (int).
- **Function** : the function to call when the interrupt occurs.

Mode defines when the interrupt should be triggered.

**Four modes are predefined as valid values.**

- Low to trigger the interrupt whenever the pin is low.
- Change to trigger the interrupt whenever the pin changes value.
- Rising to trigger when the pin goes from low to high.
- Falling for when the pin goes from high to low.

# Example:

```
int pin = 13;
int state = LOW;
void setup() {
pinMode(pin, OUTPUT);
 attachInterrupt(0, blink, CHANGE); }
 void loop(){
 digitalWrite(pin, state);
 }
void blink() {
state = !state;
}
```

# detachInterrupt()

Turns off the given interrupt.

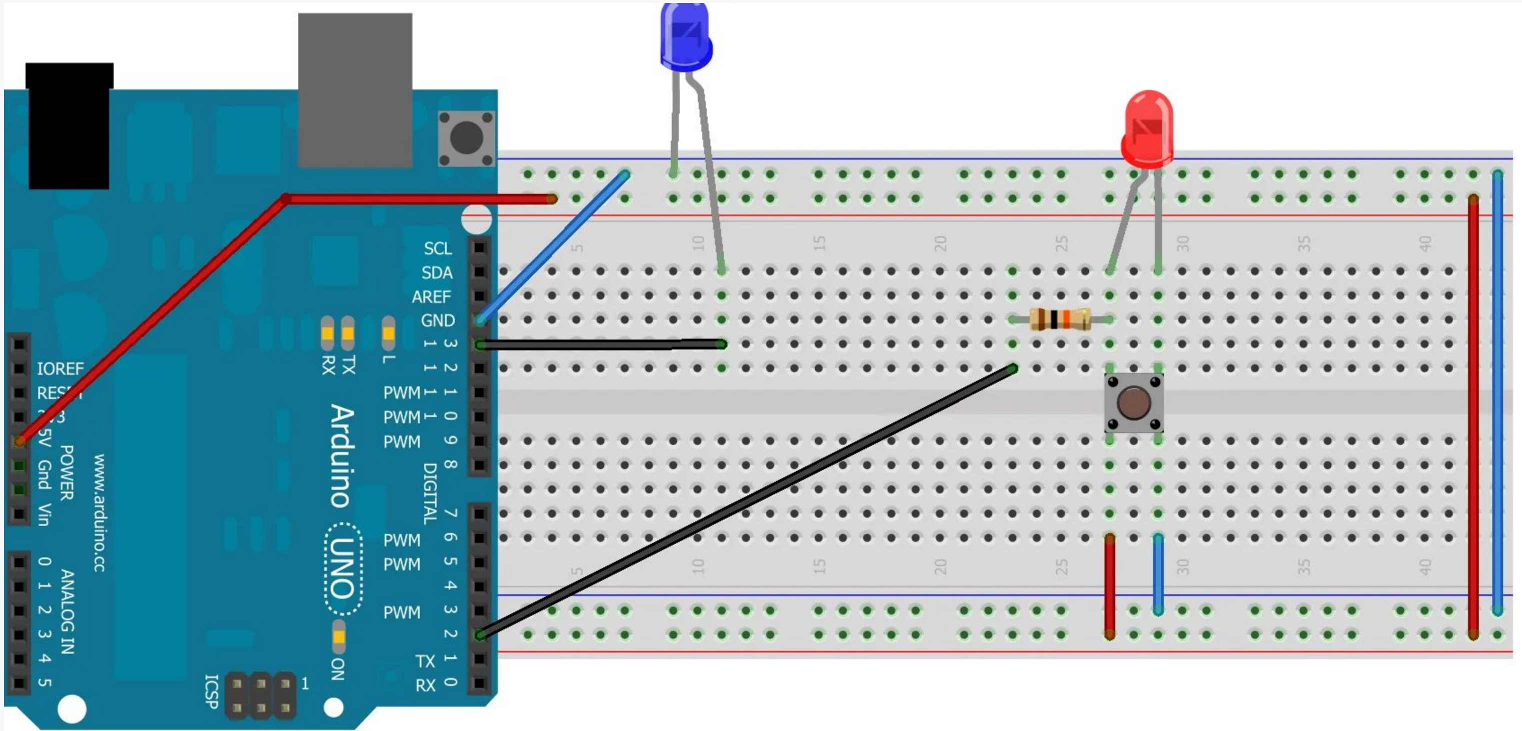
**Syntax:**

```
detachInterrupt(interrupt);
```

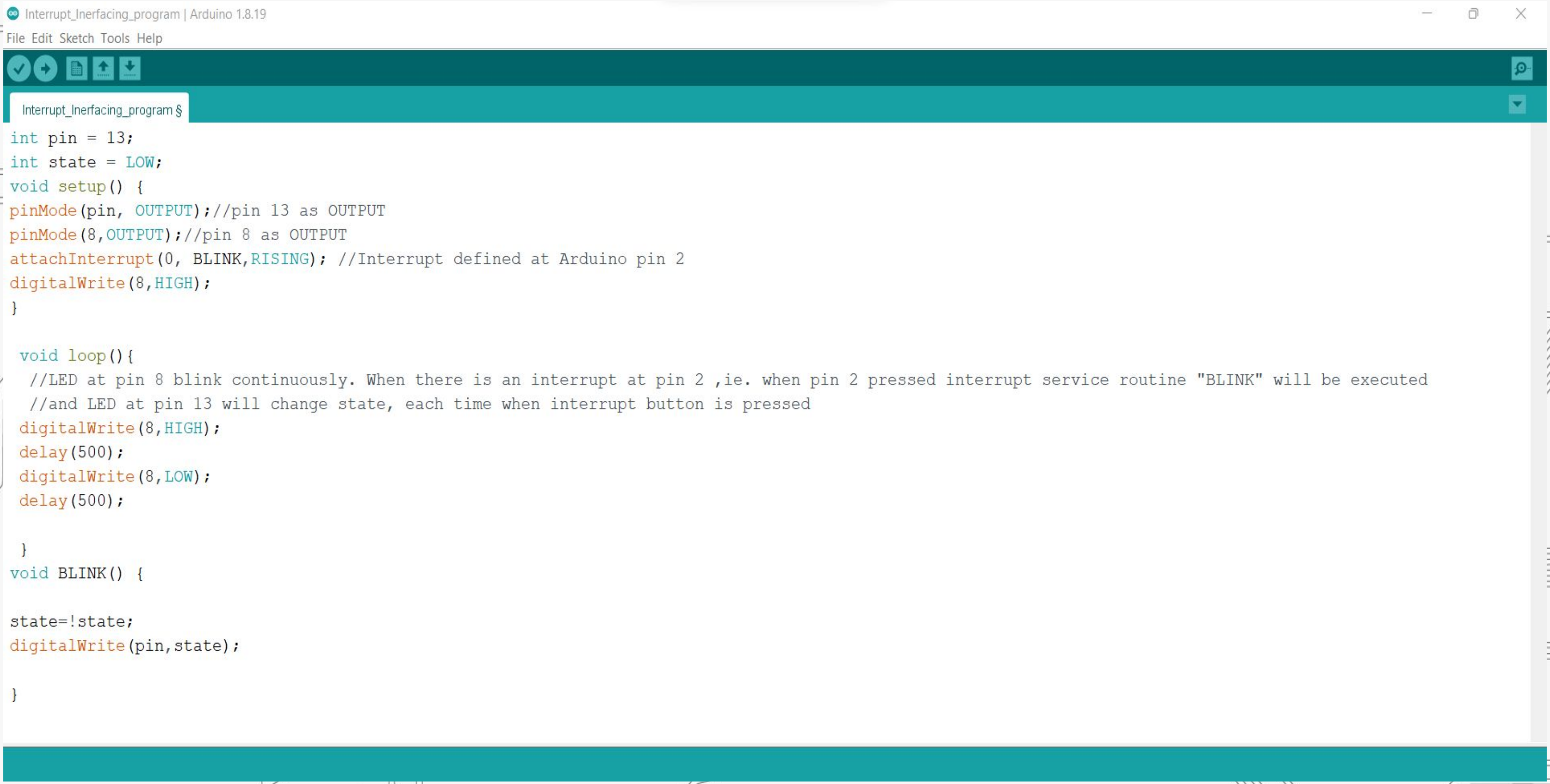
**Parameters:**

interrupt: the number of interrupt to disable (0 or 1).

# Connection Diagram



# Code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```
int pin = 13;
int state = LOW;
void setup() {
pinMode(pin, OUTPUT);//pin 13 as OUTPUT
pinMode(8,OUTPUT);//pin 8 as OUTPUT
attachInterrupt(0, BLINK,RISING); //Interrupt defined at Arduino pin 2
digitalWrite(8,HIGH);
}

 void loop(){
  //LED at pin 8 blink continuously. When there is an interrupt at pin 2 ,ie. when pin 2 pressed interrupt service routine "BLINK" will be executed
  //and LED at pin 13 will change state, each time when interrupt button is pressed
 digitalWrite(8,HIGH);
 delay(500);
 digitalWrite(8,LOW);
 delay(500);

 }
void BLINK() {

state=!state;
digitalWrite(pin,state);

}
```

Project Link : https://youtu.be/Ko42rdDFtGU