Eight LEDs and a Shift Register

Overview

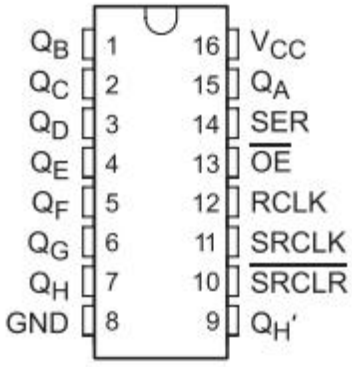
In this lesson, you will learn how to use eight large red LEDs with an Arduino without needing to give up 8 output pins!

Specification

Please view 74HC595-datasheet.pdf

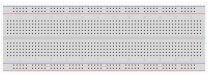
Path: \Public_materials\Datasheet\74HC595-datasheet.pdf

Pin definition

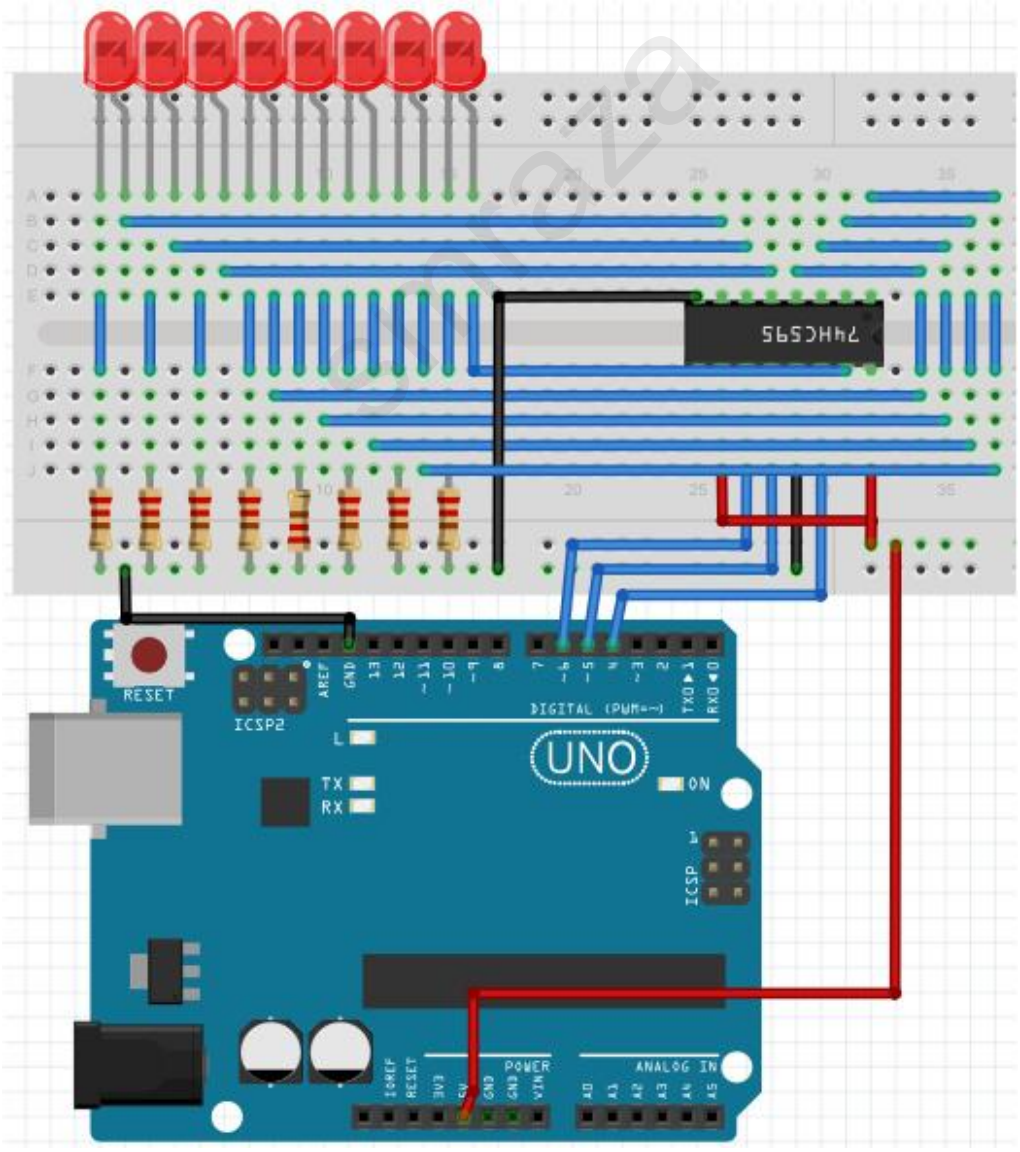


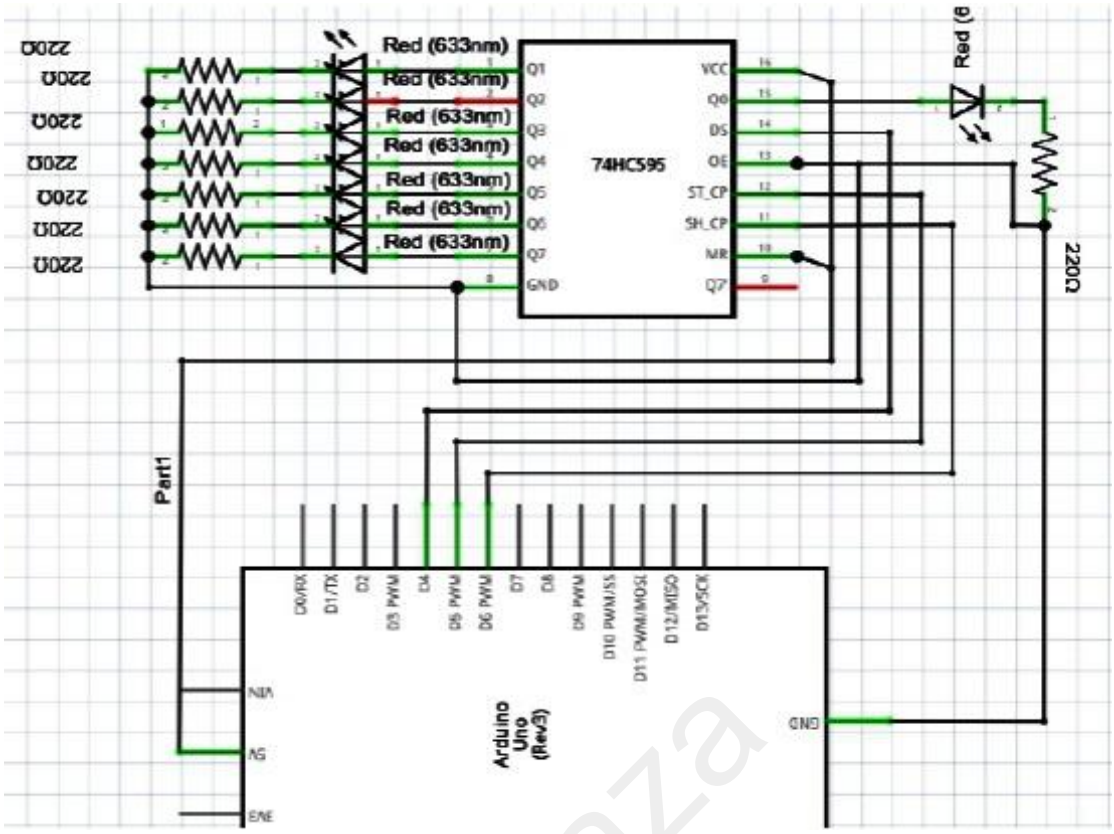
GND	8	10	—	Ground Pin
$\overline{OE}$	13	17	I	Output Enable
Q_A	15	19	O	Q_A Output
Q_B	1	2	O	Q_B Output
Q_C	2	3	O	Q_C Output
Q_D	3	4	O	Q_D Output
Q_E	4	5	O	Q_E Output
Q_F	5	7	O	Q_F Output
Q_G	6	8	O	Q_G Output
Q_H	7	9	O	Q_H Output
$Q_{H'}$	9	12	O	$Q_{H'}$ Output
RCLK	12	14	I	RCLK Input
SER	14	18	I	SER Input
SRCLK	11	14	I	SRCLK Input
$\overline{SRCLR}$	10	13	I	$\overline{SRCLR}$ Input
NC	—	1 16 11 16	—	No Connection
V_{CC}	—	20	—	Power Pin

Hardware required

Material diagram	Material name	Number
	74HC595	1
	LED	8
	220/330Ω resistor	8
	USB Cable	1
	UNO R3	1
	Breadboard	1
	Jumper wires	Several

Connection diagram





Connection:

Q1 -> LED1	VCC->VCC
Q2 -> LED2	Q0->LED8
Q3 -> LED3	DS->D4
Q4 -> LED4	OE->GND
Q5 -> LED5	ST_CP->D5
Q6 -> LED6	SH_CP->D6
Q7 -> LED7	MR->VCC
GND -> GND	Q7->null

Note :

Pay attention to the direction of 74HC595.

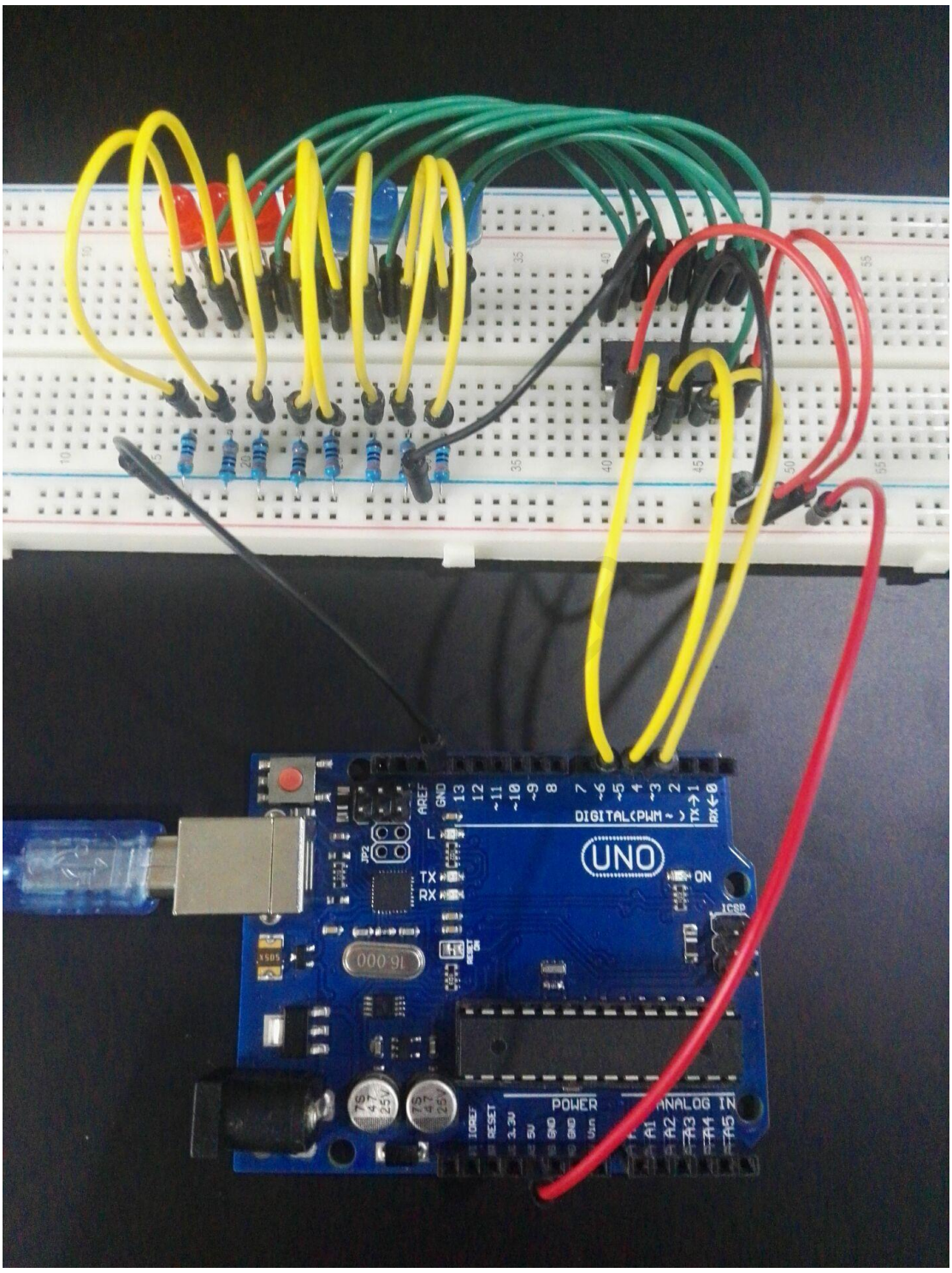
Sample code

Note: sample code under the **Sample code** folder

```
int latchPin = 5;
int clockPin = 6;
int dataPin = 4;
byte leds = 0;
void setup()
{
	pinMode(latchPin, OUTPUT);
	pinMode(dataPin, OUTPUT);
	pinMode(clockPin, OUTPUT);
}
void loop()
{
	leds = 0;
	updateShiftRegister();
	delay(500);
	for (int i = 0; i < 8; i++)
	{
		bitSet(leds, i);
		updateShiftRegister();
		delay(500);
	}
}
void updateShiftRegister()
{
	digitalWrite(latchPin, LOW);
	shiftOut(dataPin, clockPin, LSBFIRST, leds);
	digitalWrite(latchPin, HIGH);
}

/*
The function 'updateShiftRegister', first of all sets the latchPin to low, then calls the
Arduino function 'shiftOut' before putting the 'latchPin' high again. This takes four
parameters, the first two are the pins to use for Data and Clock respectively.
The third parameter specifies which end of the data you want to start at. We are going
to start with the right most bit, which is referred to as the 'Least Significant Bit' (LSB).
The last parameter is the actual data to be shifted into the shift register, which in this
case is 'leds'.
If you wanted to turn one of the LEDs off rather than on, you would call a similar
Arduino function (bitClear) on the 'leds' variable. This will set that bit of 'leds' to be 0
and you would then just need to follow it with a call to 'updateShiftRegister' to update
the actual LEDs.
*/
```

Example picture



Language reference

byte

Application effect

3 LED ports can be used to control the eight IO.
You will see all the LEDs turn on or turn off regularly.

****

* About Smraza:
* We are a leading manufacturer of electronic components for Arduino and Raspberry Pi.
* Official website: http://www.smraza.com/
* We have a professional engineering team dedicated to providing tutorials and support to help you get started.
* If you have any technical questions, please feel free to contact our support staff via email at support@smraza.com
* We truly hope you enjoy the product, for more great products please visit our
Amazon US store: http://www.amazon.com/shops/smraza
Amazon CA store: https://www.amazon.ca/shops/AMIHZKLK542FQ
Amazon UK store: http://www.amazon.co.uk/shops/AVEAJYX3AHG8Q
Amazon DE store: http://www.amazon.de/shops/AVEAJYX3AHG8Q
Amazon FR store: http://www.amazon.fr/shops/AVEAJYX3AHG8Q
Amazon IT store: http://www.amazon.it/shops/AVEAJYX3AHG8Q
Amazon ES store: https://www.amazon.es/shops/AVEAJYX3AHG8Q

****