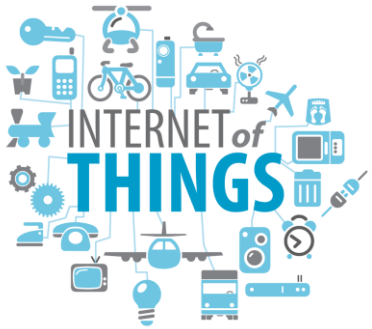
UNIVERSITY OF SCIENCE - VNUHCM
Faculty of Information Technology

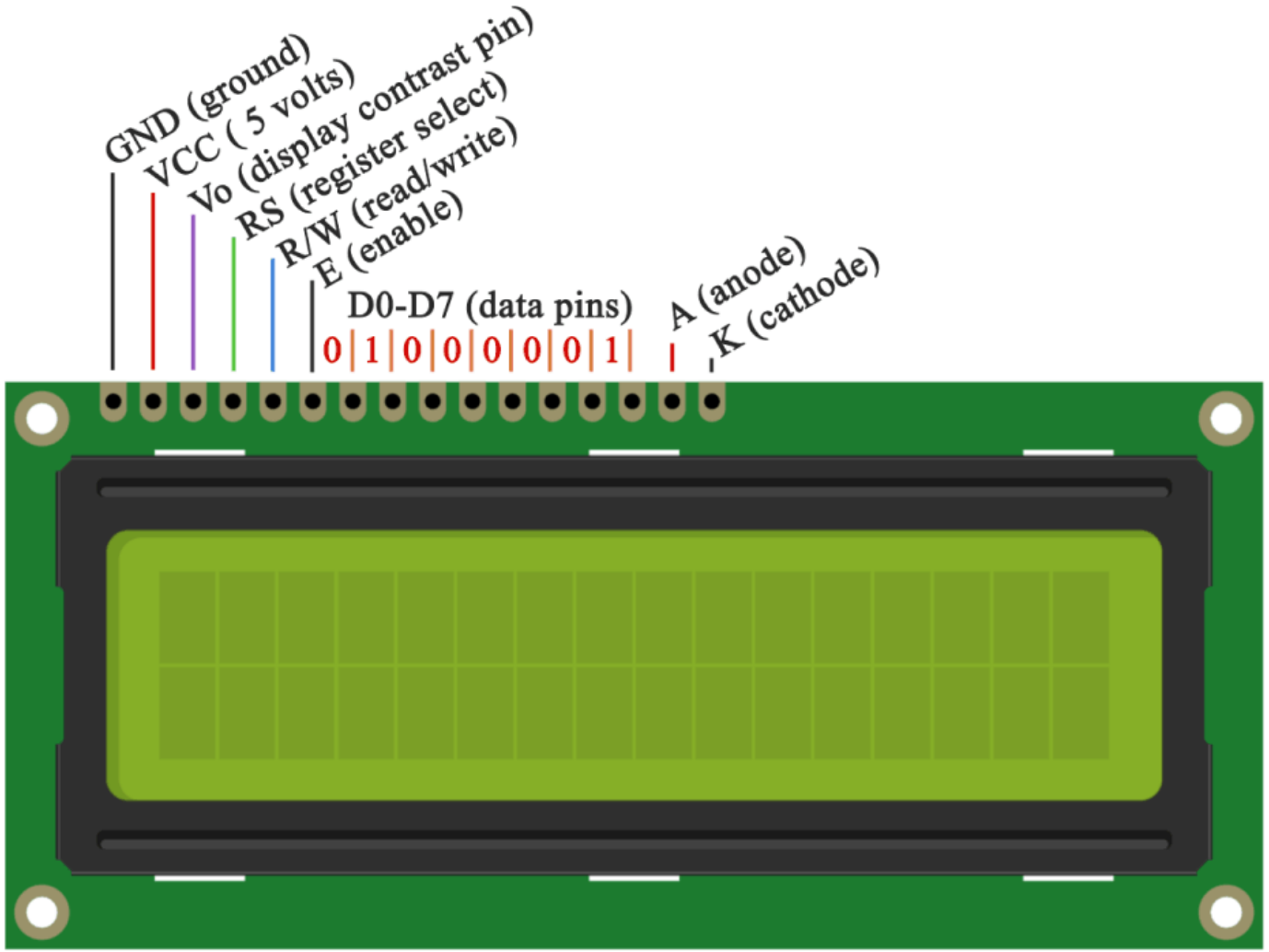
# INTERNET OF THINGS

## 1.10

## LCD



# LCD
# Liquid Crystal Display


GND (ground)
VCC ( 5 volts)
Vo (display contrast pin)
RS (register select)
R/W (read/write)
E (enable)
D0-D7 (data pins)
0 1 0 0 0 0 0 1
A (anode)
K (cathode)

| LCD | Arduino |
| --- | --- |
| GND | GND |
| VCC | 5V |
| SDA | A4 |
| SCL | A5 |

**Install the Library**

In **Arduino IDE:**

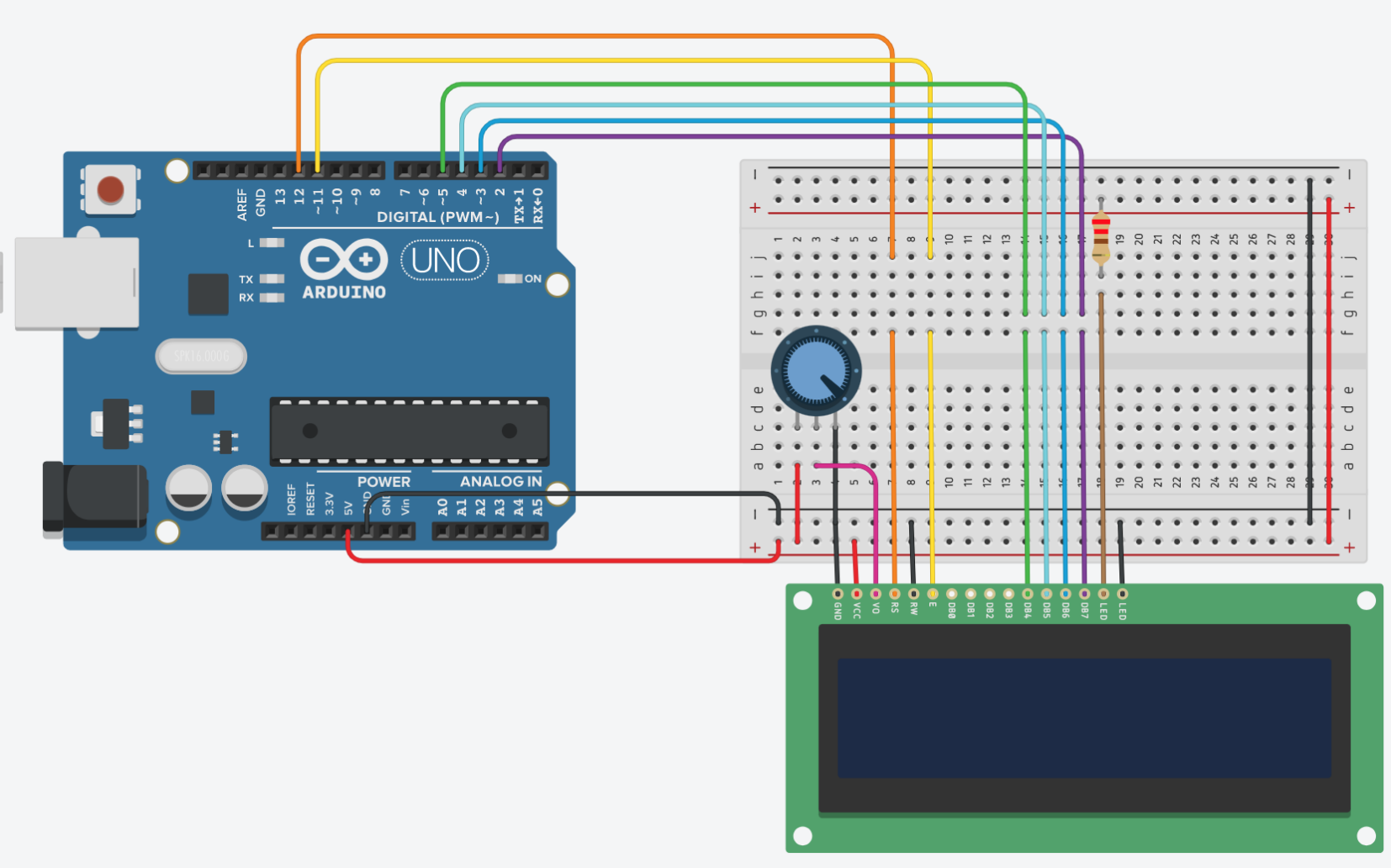
1.Go to **Sketch → Include Library → Manage Libraries…**

2.Search **“LiquidCrystal I2C”**

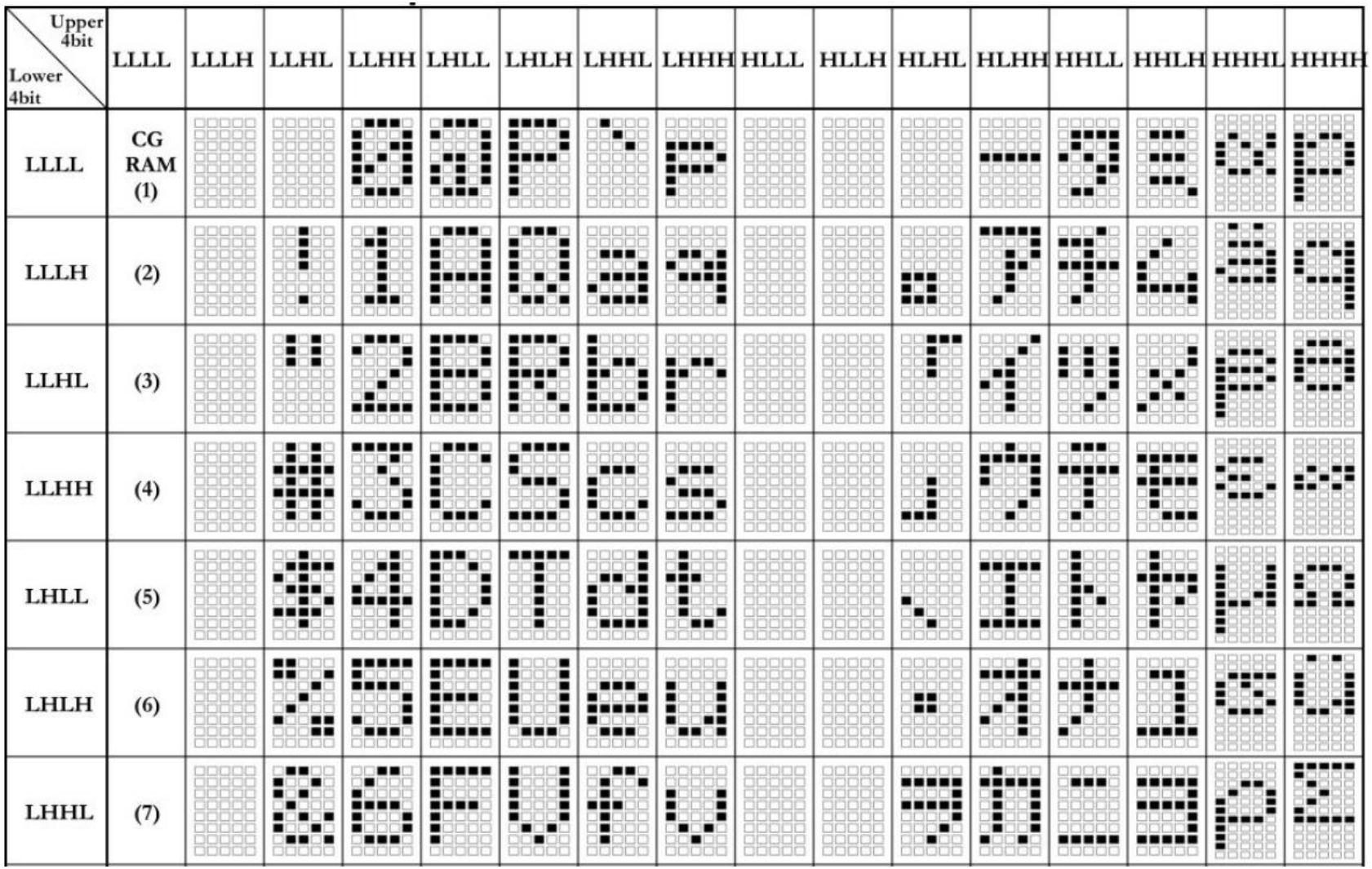
```ino
#include <Wire.h>
#include <LiquidCrystal_I2C.h>

// Address 0x27 or 0x3F (depends on module)
LiquidCrystal_I2C lcd(0x27, 16, 2);

void setup() {
  lcd.init();             // initialize the LCD
  lcd.backlight();        // turn on backlight
  lcd.setCursor(0, 0);    // column 0, row 0
  lcd.print("Hello, world!");
  lcd.setCursor(0, 1);    // column 0, row 1
  lcd.print("I2C LCD Test");
}
```




| LCD Module | Arduino Pin | Potentiometer |
|---|---|---|
| VSS | GND | 1 |
| VDD | 5v | 3 |
| V0 | | 2 |
| RS | 12 | |
| RW | GND | |
| E | 11 | |
| D4 | 5 | |
| D5 | 4 | |
| D6 | 3 | |
| D7 | 2 | |
| A | 5V | |
| K | GND | |


Upper 4bit
Lower 4bit
LLLL
LLLH
LLHL
LLHH
LHLL
LHLH
LHHL
LHHH
HLLL
HLLH
HLHL
HLHH
HHLL
HHLH
HHHL
HHHH
LLLL
CG RAM (1)
LLLH
(2)
LLHL
(3)
LLHH
(4)
LHLL
(5)
LHLH
(6)
LHHL
(7)

```
// include the library code:
#include <LiquidCrystal.h>

// initialize the library with the numbers of the interface pins
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);

void setup() {
  // set up the LCD's number of columns and rows:
  lcd.begin(16, 2);
  // Print a message to the LCD.
  lcd.print("hello, world!");
}

void loop() {
  // set the cursor to column 0, line 1
  // (note: line 1 is the second row, since counting begins with 0):
  lcd.setCursor(0, 1);
  // print the number of seconds since reset:
  lcd.print(millis() / 1000);
}
```

# LiquidCrystal library

- Autoscroll
- Blink
- Cursor
- Display
- Scroll

***Reference:***
***https://www.arduino.cc/en/Reference/LiquidCrystal***

# Display Temperature + Humidity on LCD