Programming Small Little Computers

Basics of Arduino Language with *Eric, Andy, Allen*

What is Arduino?

it’s a company that creates microcontrollers and software for them

what do arduinos mean to us, for this lesson?

microcontrollers that are Arduino uno compatible

What is a microcontroller?

small device that has many components of a regular computer,

can execute code, can send input and output signals


SAMSUNG


4:55
VISSANI


Canon
EOS
R7

what does this mean for arduino programming?

we can program logic that takes input, and sends output.

that is it.


4:55
VISSANI

```
if (pressed one button) { set time to one minute }
if (pressed two button) { set time to two minutes }
   if (pressed start button) { start microwave }
```

```
        if (pressed_button == “1”) { time = 1; }
        if (pressed_button == “2”) { time = 2; }
if (pressed_button == “start”) { start(“microwave”); }
```

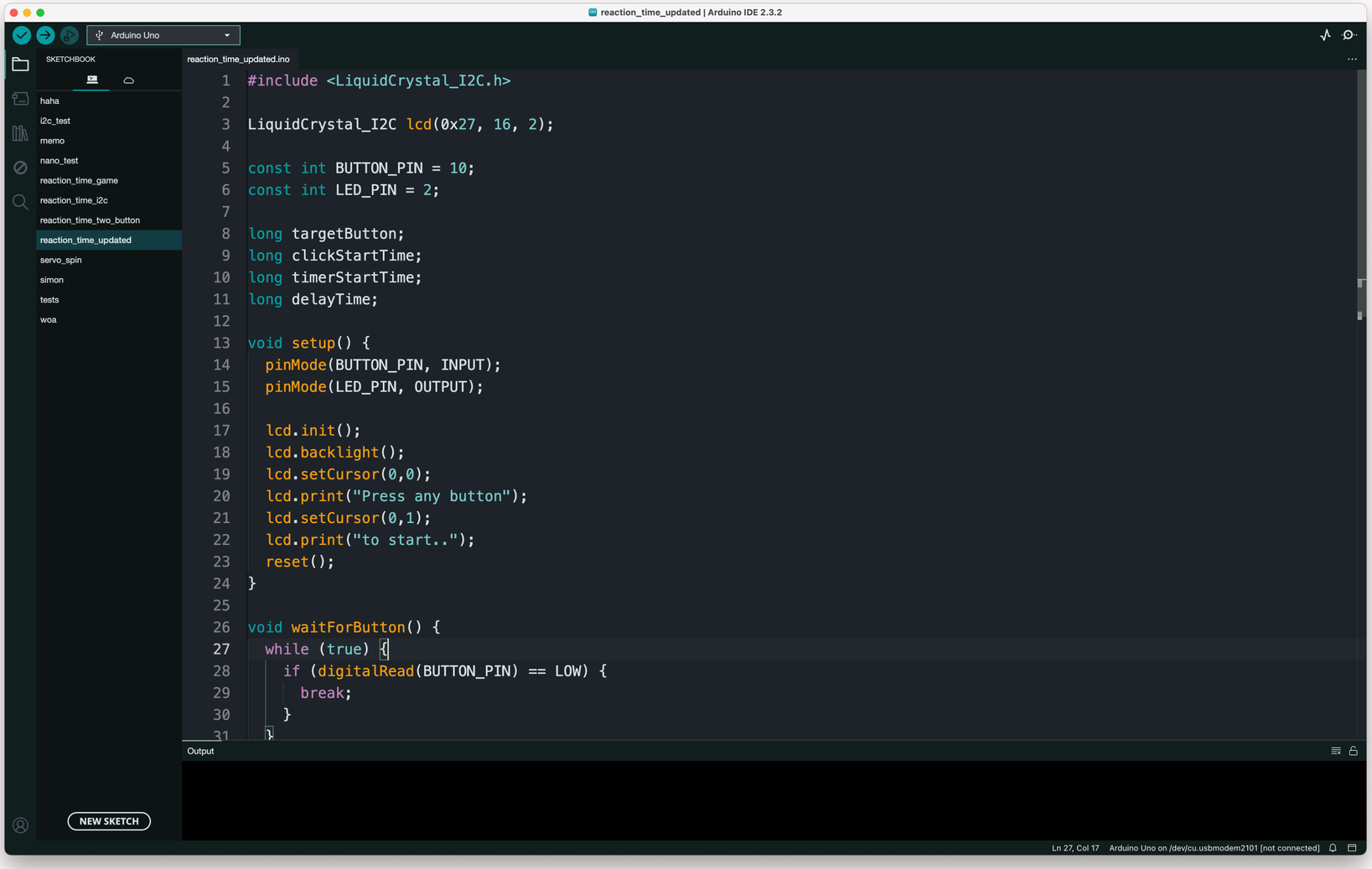
How do we program an arduino?

Arduino Programming Language.

an extended version of C++, for arduino.

How do we program with arduino language?

And how do we upload the code onto the arduino?


reaction_time_updated | Arduino IDE 2.3.2
Arduino Uno
SKETCHBOOK
haha
i2c_test
memo
nano_test
reaction_time_game
reaction_time_i2c
reaction_time_two_button
reaction_time_updated
servo_spin
simon
tests
woa
NEW SKETCH
reaction_time_updated.ino
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 16, 2);
const int BUTTON_PIN = 10;
const int LED_PIN = 2;
long targetButton;
long clickStartTime;
long timerStartTime;
long delayTime;
void setup() {
pinMode(BUTTON_PIN, INPUT);
pinMode(LED_PIN, OUTPUT);
lcd.init();
lcd.backlight();
lcd.setCursor(0,0);
lcd.print("Press any button");
lcd.setCursor(0,1);
lcd.print("to start..");
reset();
}
void waitForButton() {
while (true) {
if (digitalRead(BUTTON_PIN) == LOW) {
break;
}
}
Output
Ln 27, Col 17
Arduino Uno on /dev/cu.usbmodem2101 [not connected]


sketch_aug21a | Arduino IDE 2.3.2
Arduino Uno
select arduino type
void setup() {
// put your setup code here, to run once:
}
void loop() {
// put your main code here, to run repeatedly:
}
write code
upload code

How do I write Arduino Programming Language?

```
// The setup() function runs once when you power the Arduino or press reset
// Lines starting with "//" are comments, only here to explain the code
void setup() {
  // this runs a function to set the Pin 13 to be for output
  pinMode(13, OUTPUT);
  // this runs a function to send a HIGH voltage (5V) to Pin 13 (turns on LED)
  digitalWrite(13, HIGH);
}

// The loop() function runs over and over again after setup() is done
void loop() {
  // nothing is done here just yet
}
```

basics

```
void setup() {
  pinMode(13, OUTPUT);
  digitalWrite(13, HIGH);
}

// The loop() function runs over and over again after setup() is done
void loop() {
  // send HIGH voltage to Pin 13 (turns on LED)
  digitalWrite(13, HIGH);
  delay(100); // waits for 100ms

  // send LOW voltage to Pin 13 (turns off LED)
  digitalWrite(13, LOW);
  delay(100); // waits for 100ms
}
```

loop function

```
// set variables that are often repeated
int LED_PIN = 13;
int DELAY_TIME = 100;

void setup() {
  pinMode(LED_PIN, OUTPUT);
}

void loop() {
  digitalWrite(LED_PIN, HIGH);
  delay(DELAY_TIME);

  digitalWrite(LED_PIN, LOW);
  delay(DELAY_TIME);
}
```

variables

```
int LED_PIN = 13;
int BUTTON_PIN = 2;
int DELAY_TIME = 100;

void setup() {
  // set BUTTON_PIN to be for input
  pinMode(BUTTON_PIN, INPUT);
  pinMode(LED_PIN, OUTPUT);
}

void loop() {
  // stores the voltage of BUTTON_PIN
  int button_voltage = digitalRead(BUTTON_PIN);

  // writes the same voltage to the LED_PIN
  digitalWrite(LED_PIN, button_voltage);
}
```

input

```
int LED_PIN = 13;
int BUTTON_PIN = 2;
int DELAY_TIME = 100;

void setup() {
  pinMode(BUTTON_PIN, INPUT);
  pinMode(LED_PIN, OUTPUT);
}

void loop() {
  // check if BUTTON_PIN is being provided a HIGH voltage
  if (digitalRead(BUTTON_PIN) == HIGH) {
    // if it is being provided HIGH voltage, run this code
    digitalWrite(LED_PIN, HIGH);
    delay(DELAY_TIME);

    digitalWrite(LED_PIN, LOW);
    delay(DELAY_TIME);
  }
  // does nothing if our if statement is false
}
```

if statements

```ino
void setup() {
  // begin communication with computer at a reliable speed
  Serial.begin(9600);
  // prints (displays text) on computer
  Serial.print("Hello World");
}

void loop() {
  // prints out milliseconds since the arduino started
  Serial.print(millis());
}
```

those are the basics.

now you have to piece everything together