SAKURA Science Workshop

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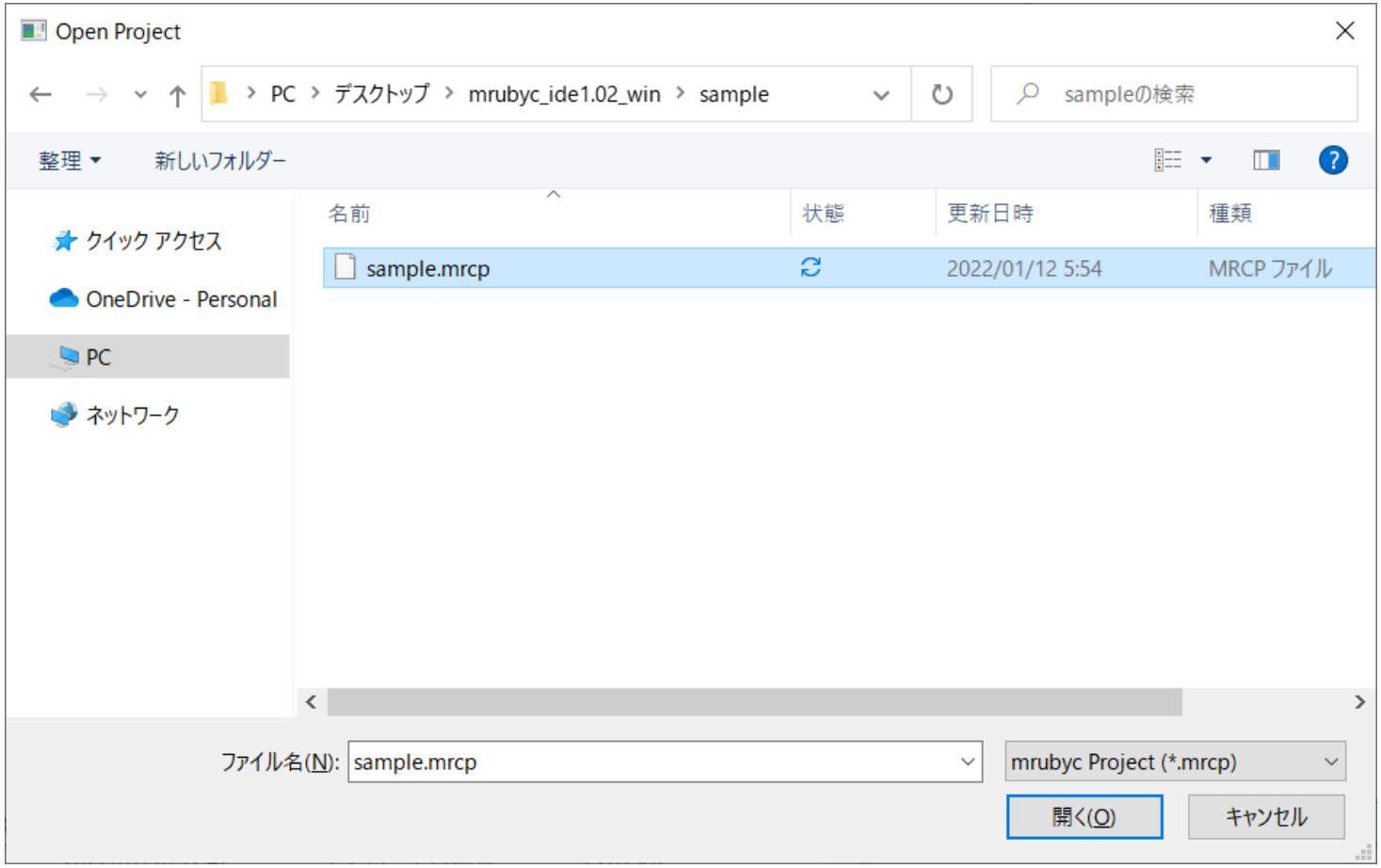
Check your environment, again

To CHECK your environment

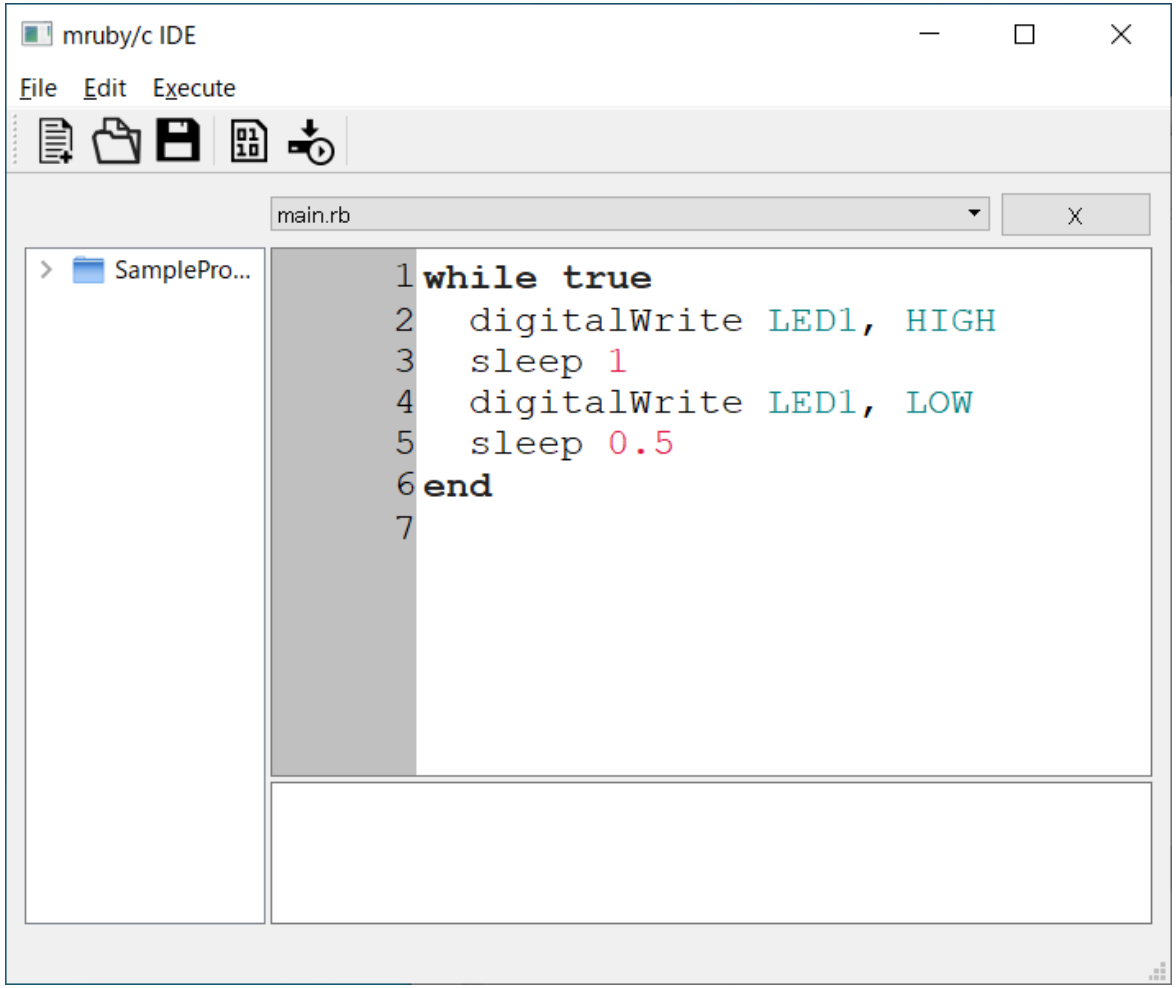
- Execute a quite simple program

- [File] → [Open]
  select “SampleProgram” and
  open “SampleProgram.mrcp”

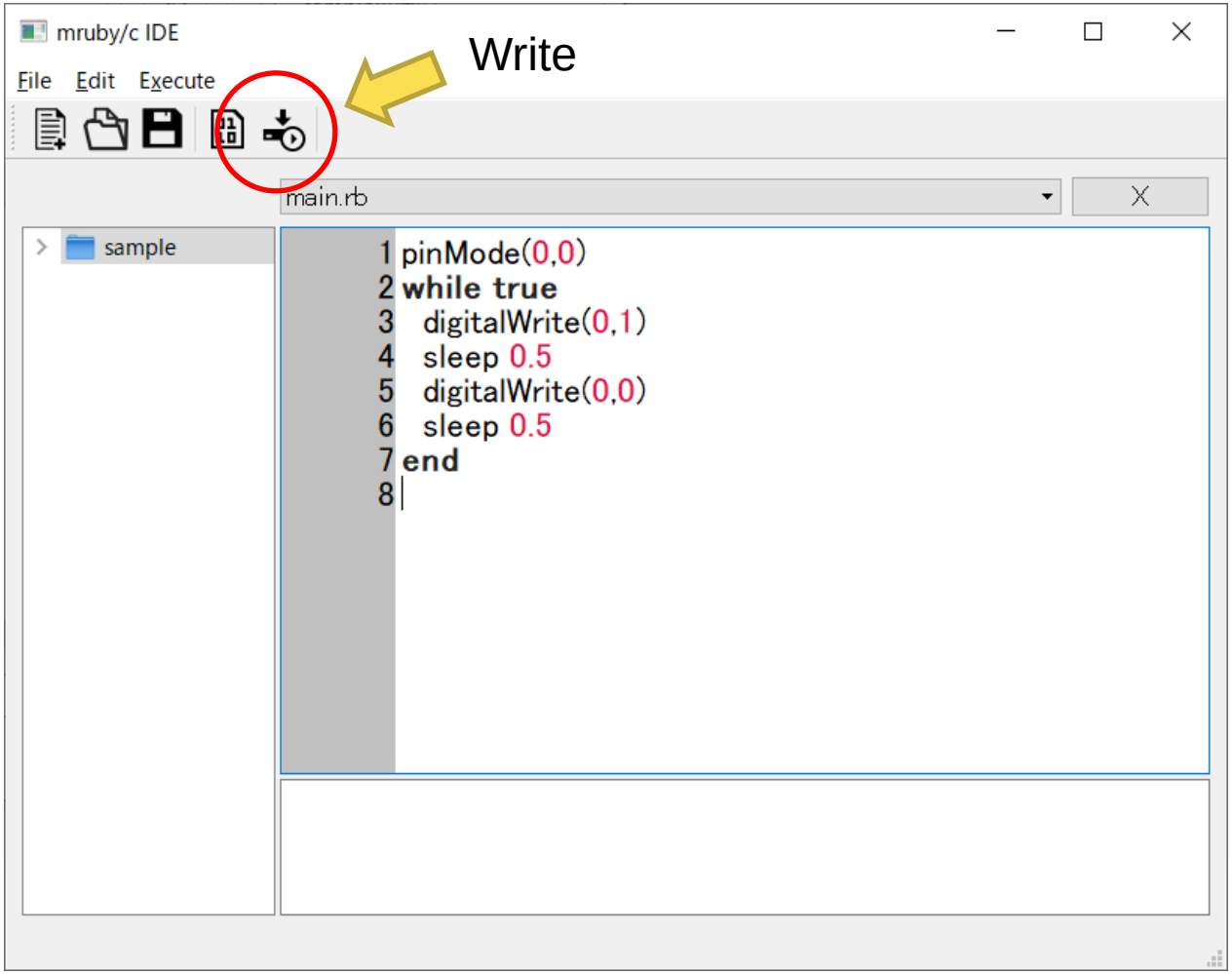
SampleProgram.mrcp



Sample program



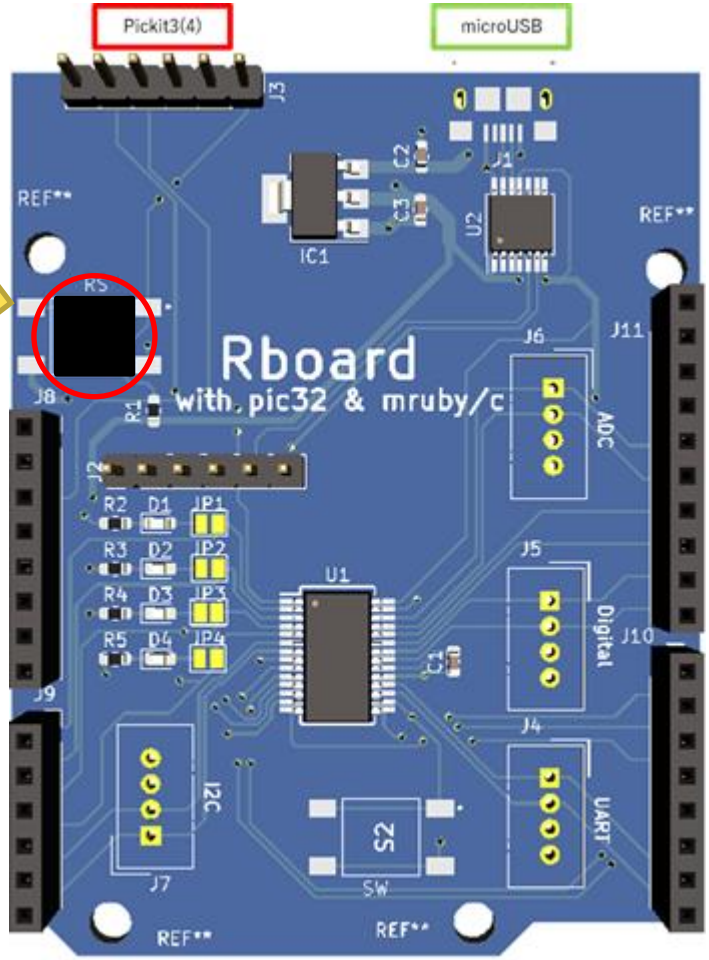
Execute


mruby/c IDE
File Edit Execute
Write
main.rb
sample
1 pinMode(0,0)
2 while true
3 digitalWrite(0,1)
4 sleep 0.5
5 digitalWrite(0,0)
6 sleep 0.5
7 end
8

Executing procedure

- Click “Write”
  - IDE will wait for preparation
- Press “RS” button on Rboard
  - Reset button, then accept external program
  - After writing, starts your program

RS button
(Reset)



About this sample program

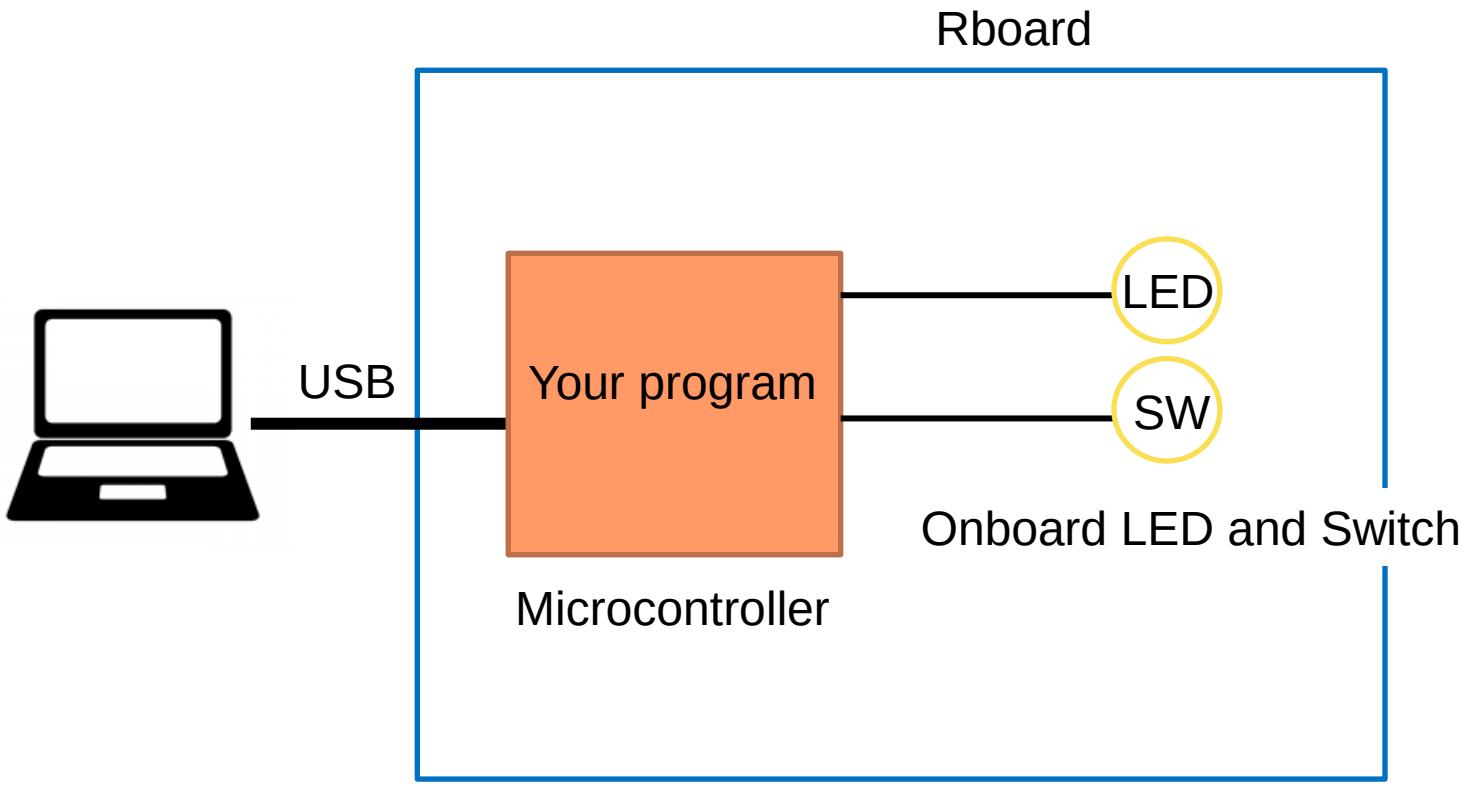
```
pinMode(0,0)
while true
  digitalWrite(0,1)
  sleep(0.5)
  digitalWrite(0,0)
  sleep(0.5)
end
```

Repeat forever

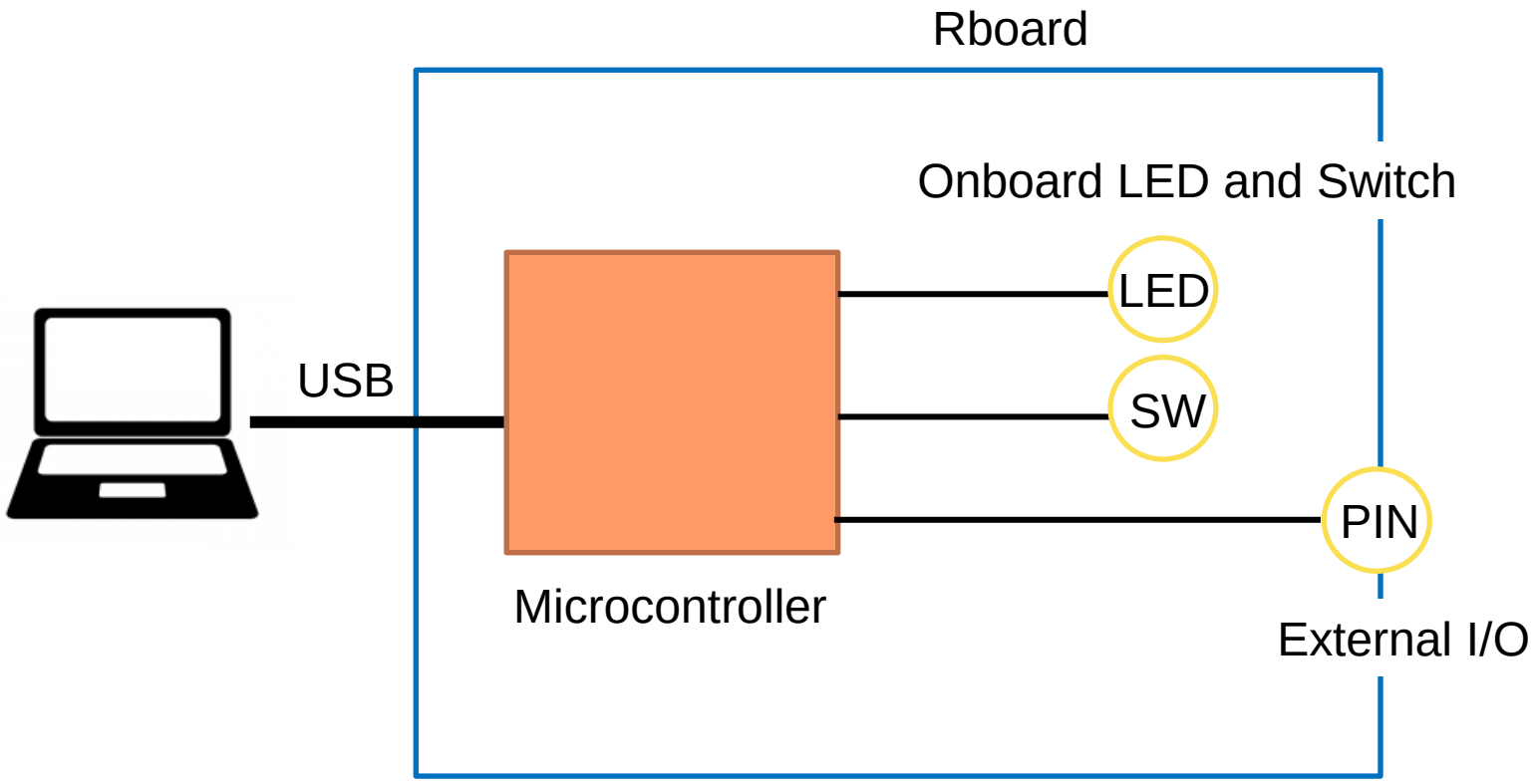
- digitalWrite <pin>, <0or1>
  - Output voltage to PIN(or LED)
- sleep <time>
  - Wait for specified seconds

Embedded System
= Software + Hardware

Previous exercises

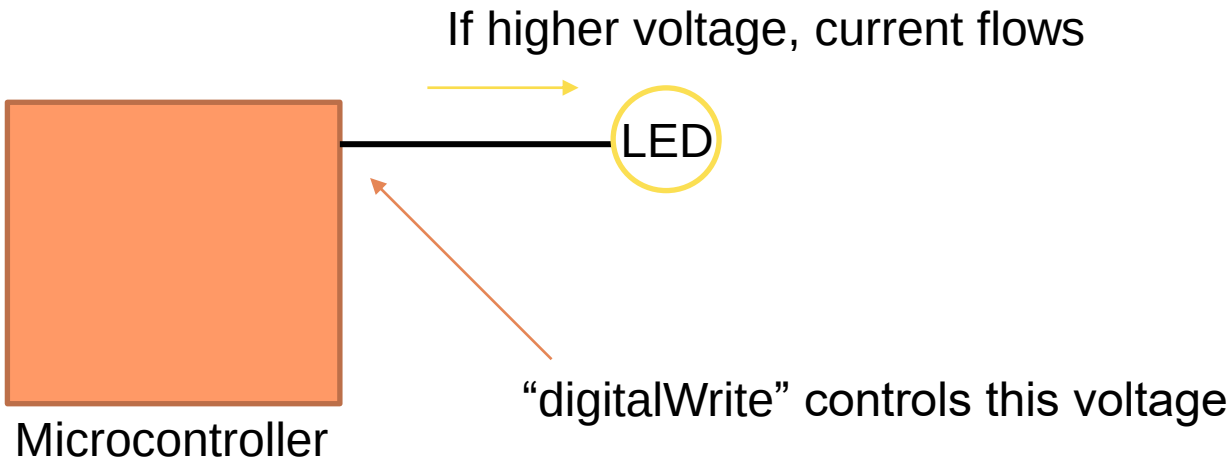


Today, external circuit

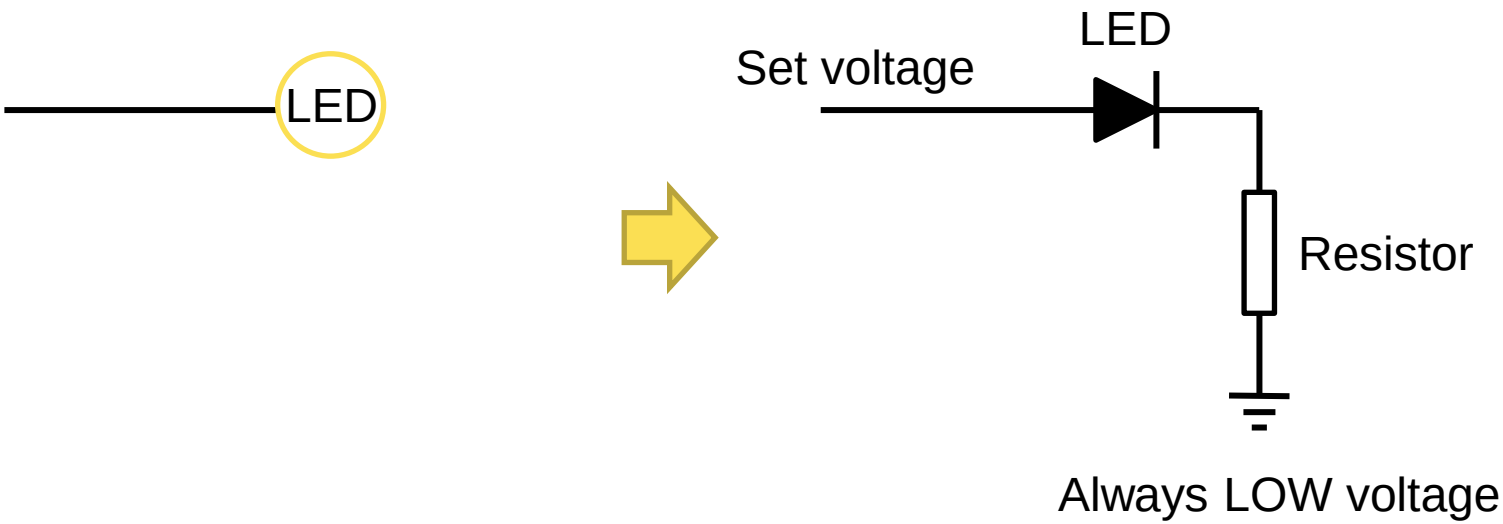


How LED works?

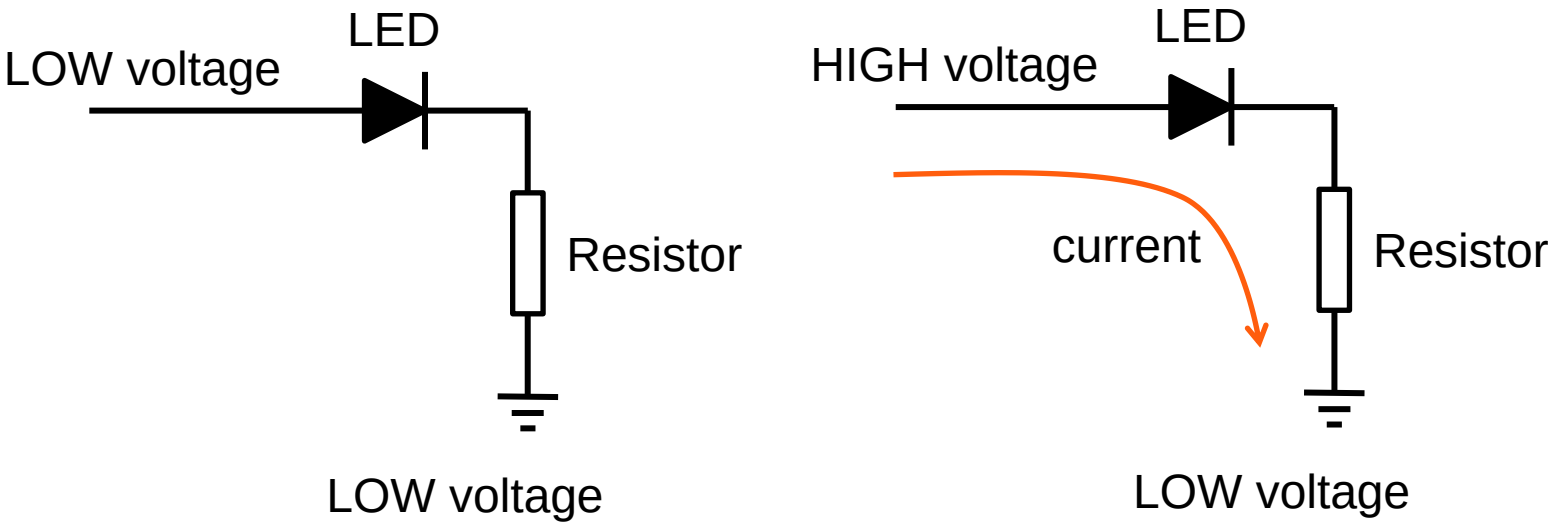
- LED: Convert current to light emitting



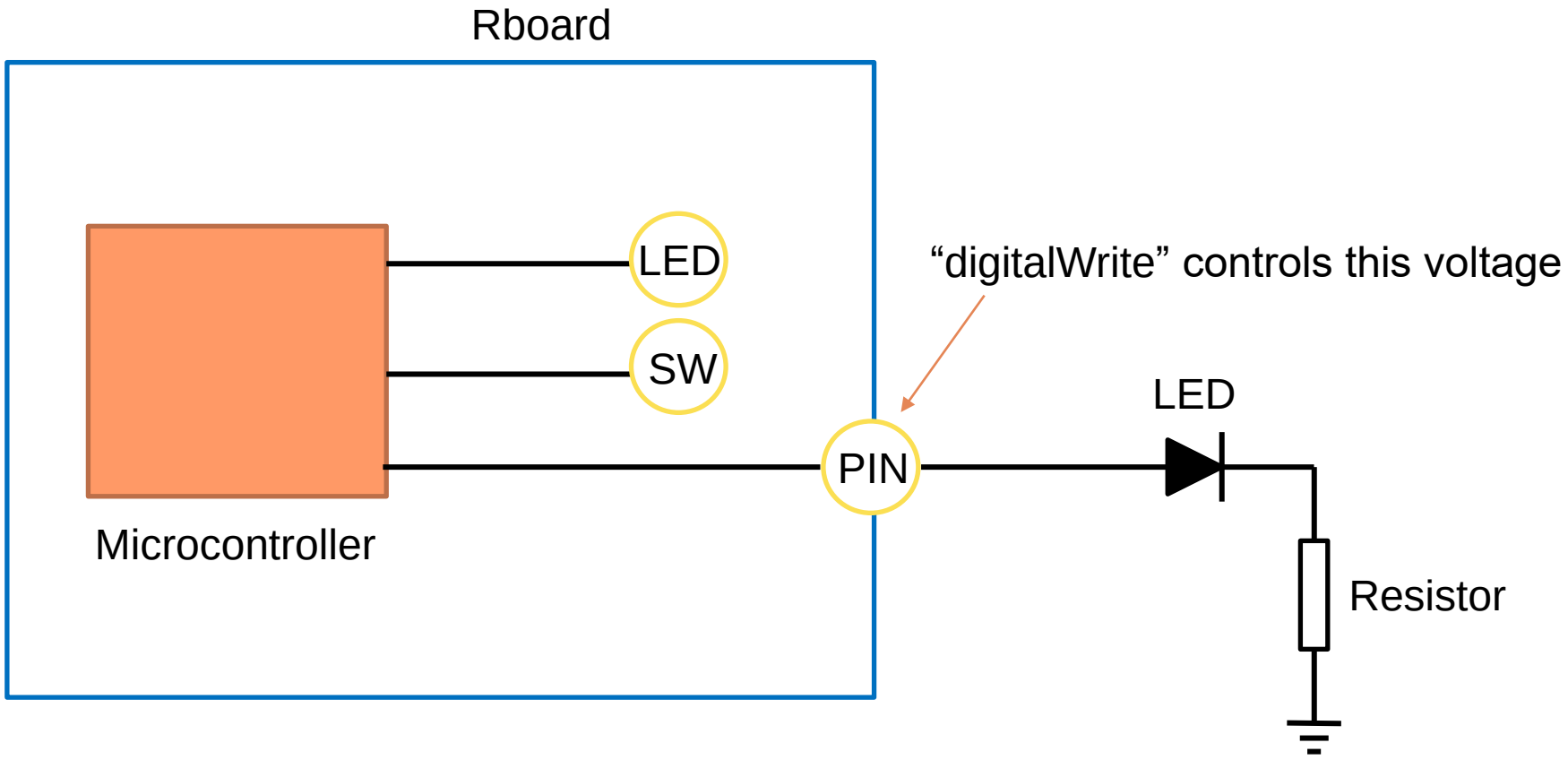
LED driving circuit



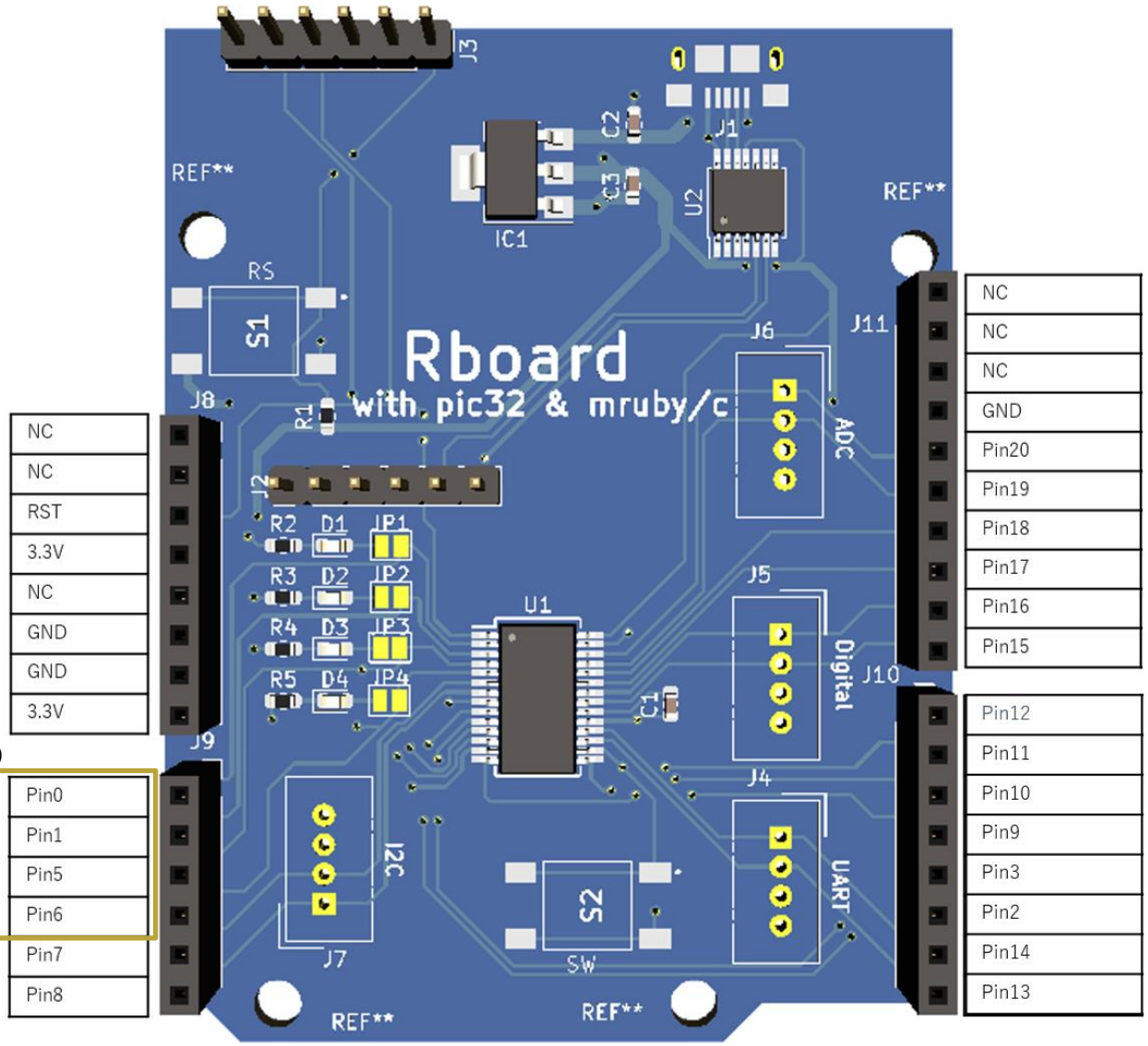
HIGH or LOW voltage



External LED driving circuit



Pins



Also connected to

LED1	Pin0
LED2	Pin1
LED3	Pin5
LED4	Pin6

Practice – Hardware implementation

Firstly, pick items

Jumper wires

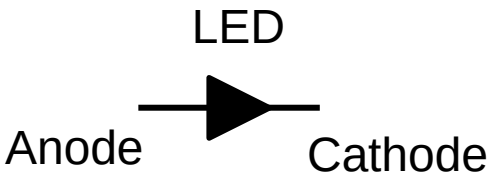
LED

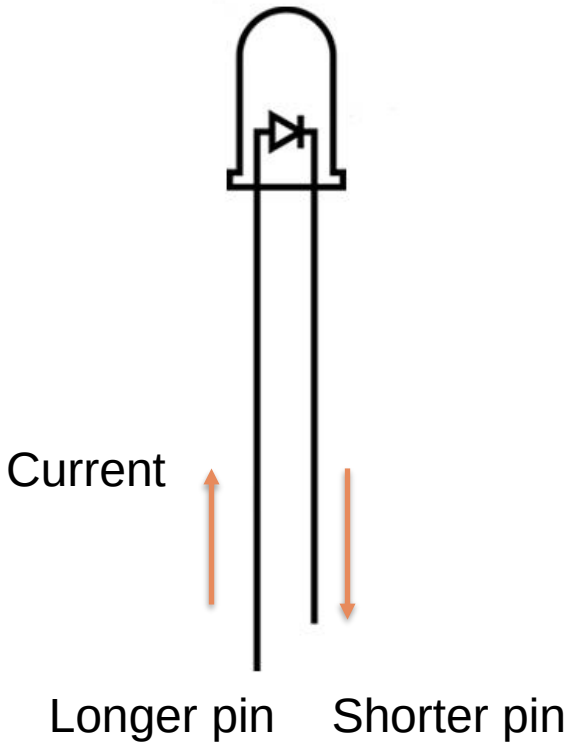
Different length

Resistor

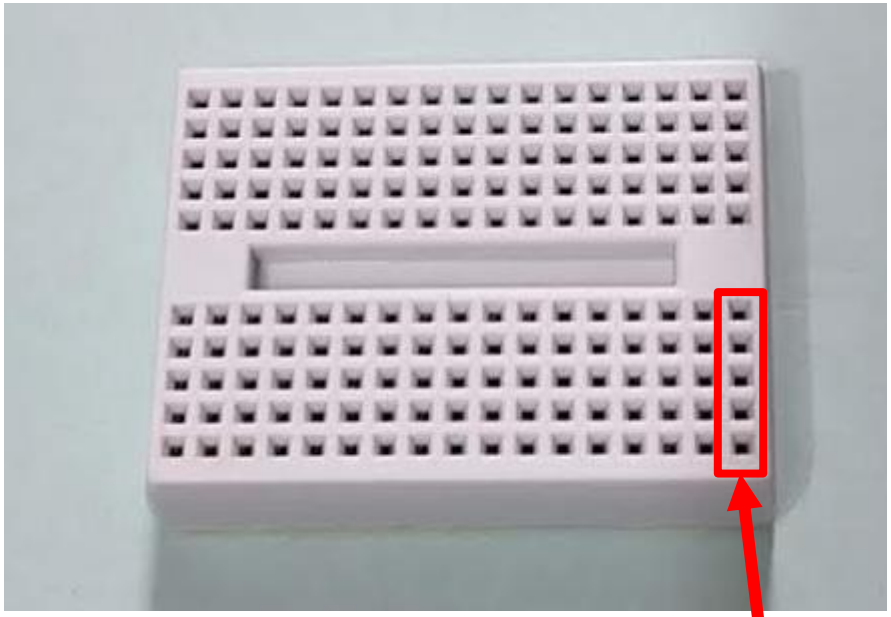
About LED

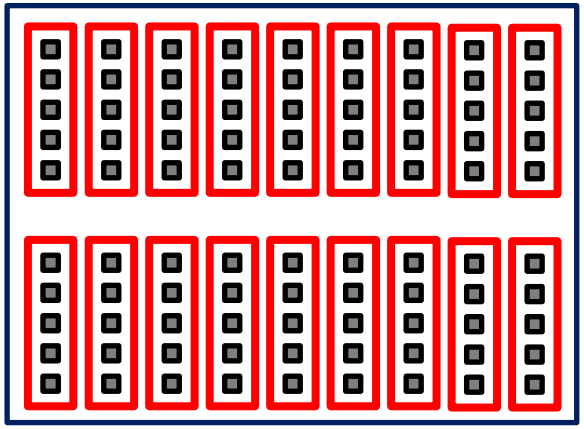
- Current flowing direction and pin length





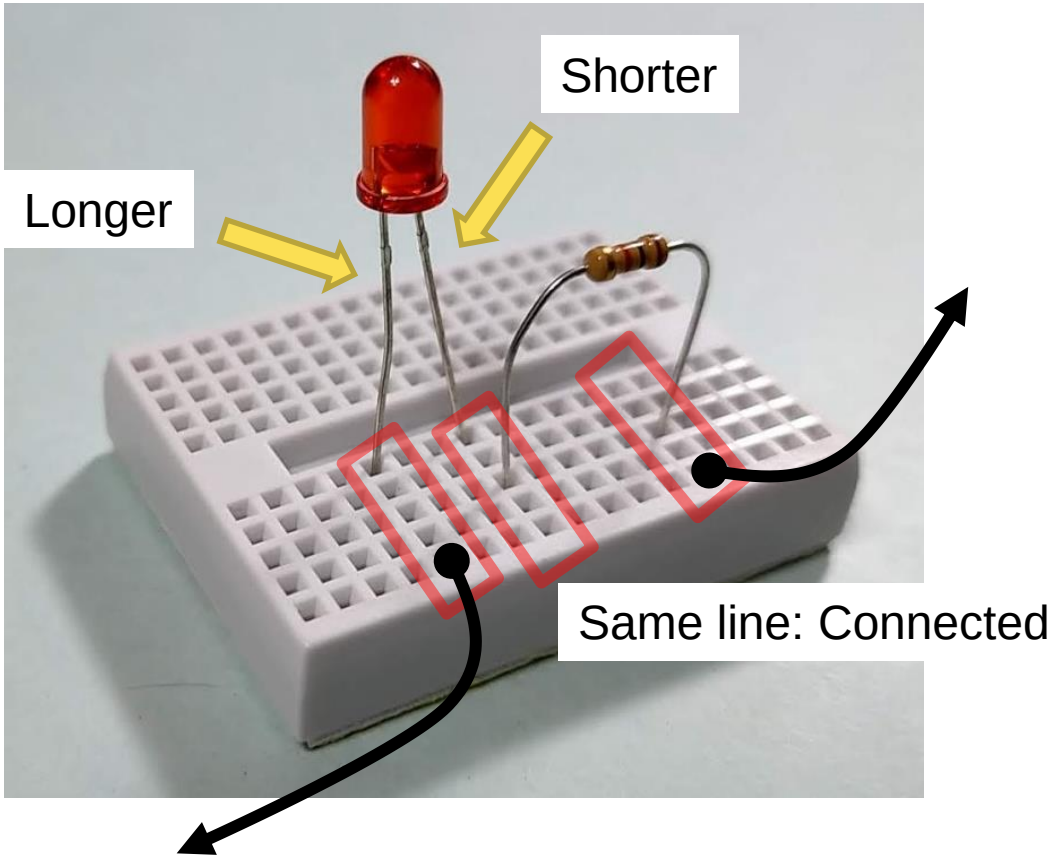
Bread board



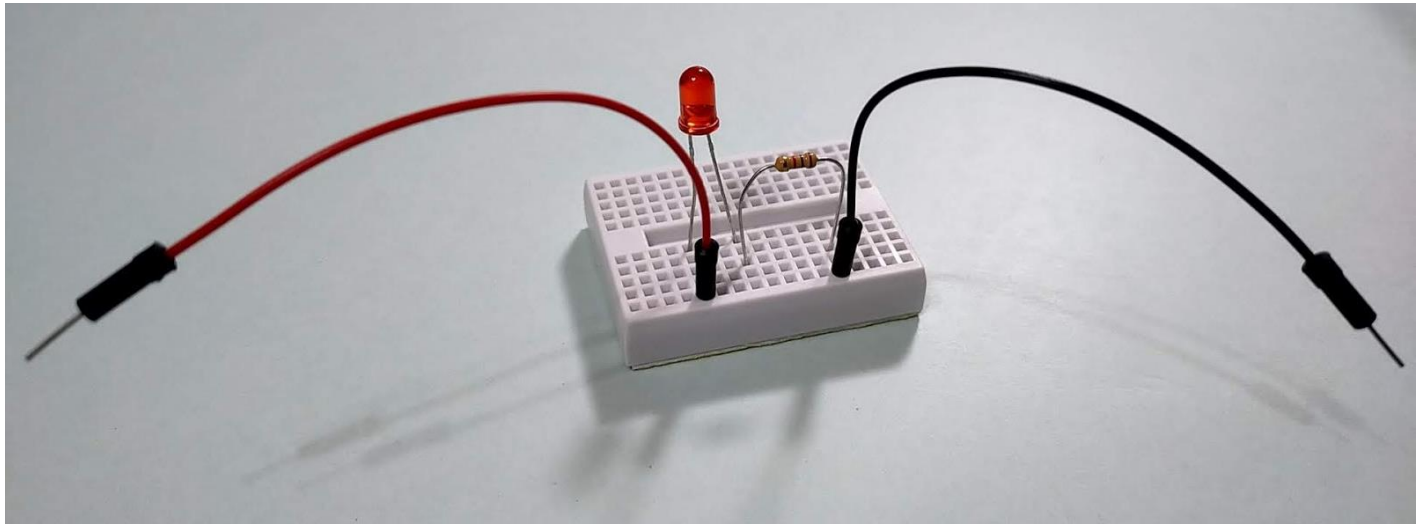


These five holes on a line
are connected.

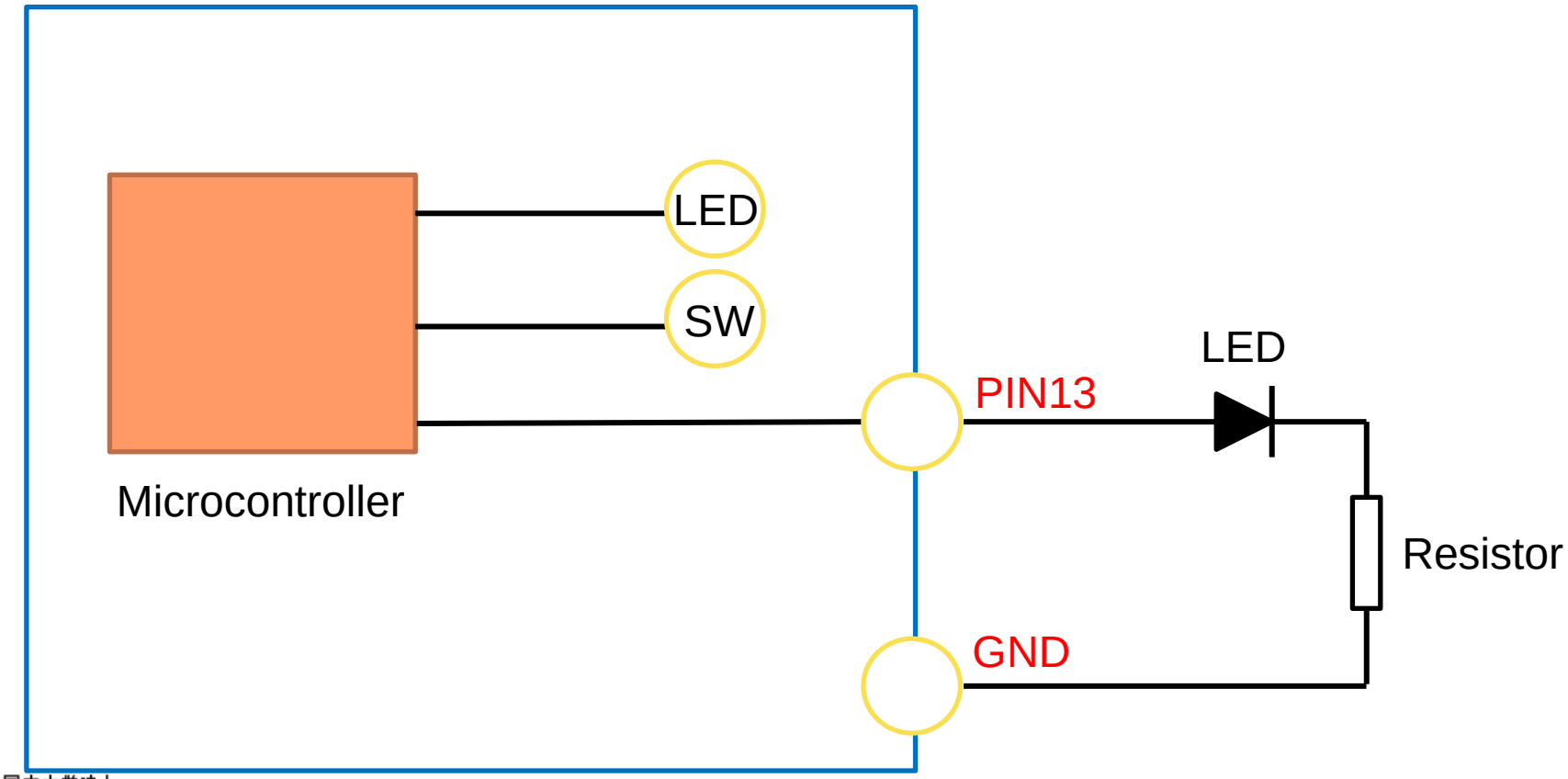
Implement LED circuit

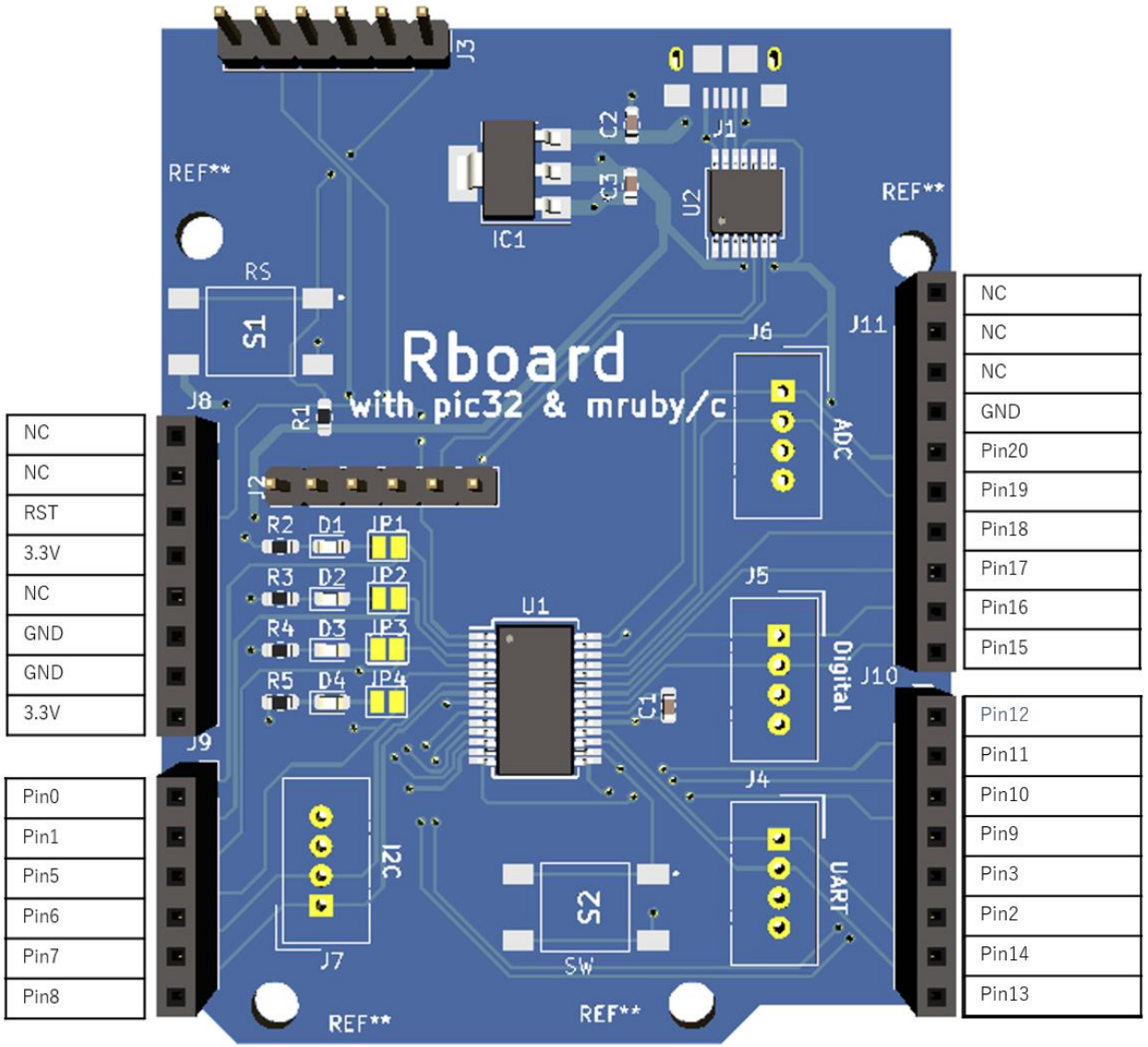


Add jumper wires

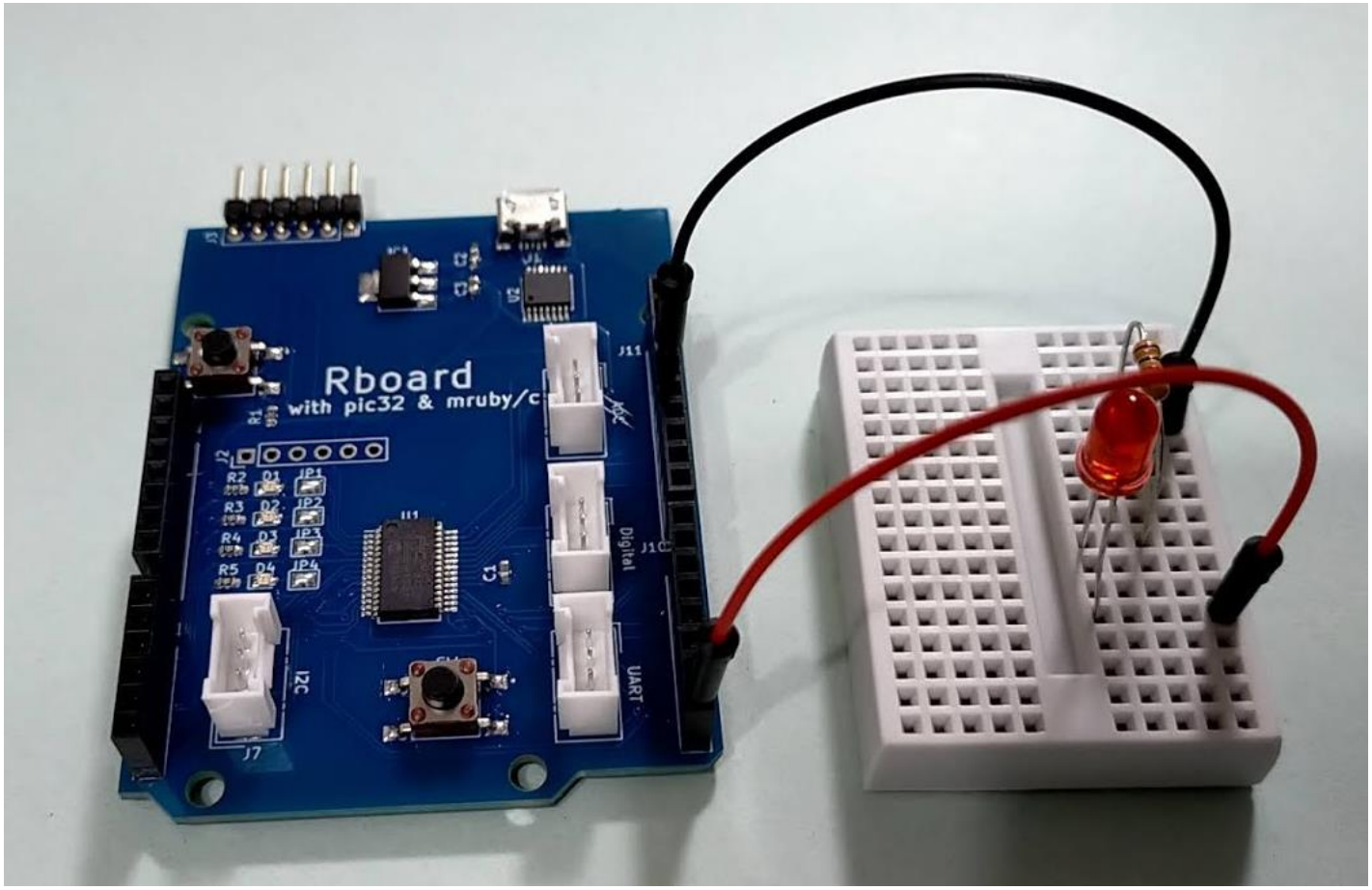


Connect to Rboard




Rboard
with pic32 & mruby/c
J8
NC
NC
RST
3.3V
NC
GND
GND
3.3V
J9
Pin0
Pin1
Pin5
Pin6
Pin7
Pin8
J11
NC
NC
NC
GND
Pin20
Pin19
Pin18
Pin17
Pin16
Pin15
J10
Pin12
Pin11
Pin10
Pin9
Pin3
Pin2
Pin14
Pin13
GND
4th pin from top
PIN13

Connect to Rboard

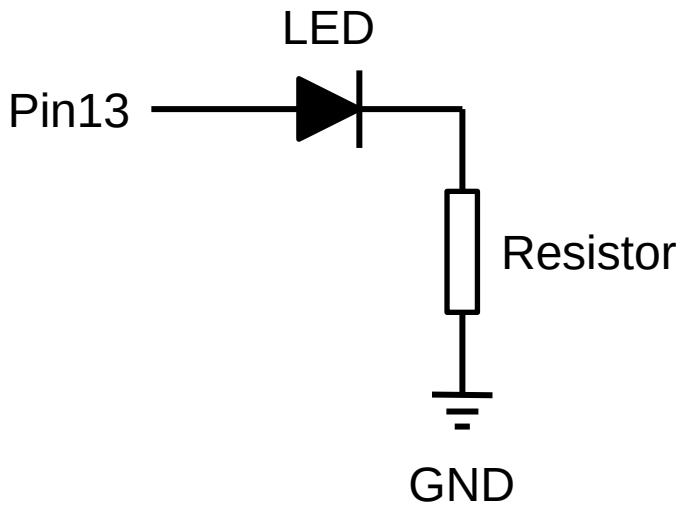


Practice – Software implementation

Almost same as SampleProgram

(sample)

```
pinMode(13,0)
while true
  digitalWrite(13, 1)
  sleep(0.5)
  digitalWrite(13,0)
  sleep(0.5)
end
```



Run your program

Exercises

Exercises

- Blink MORE LEDs
  - pinMode
  - digitalWrite