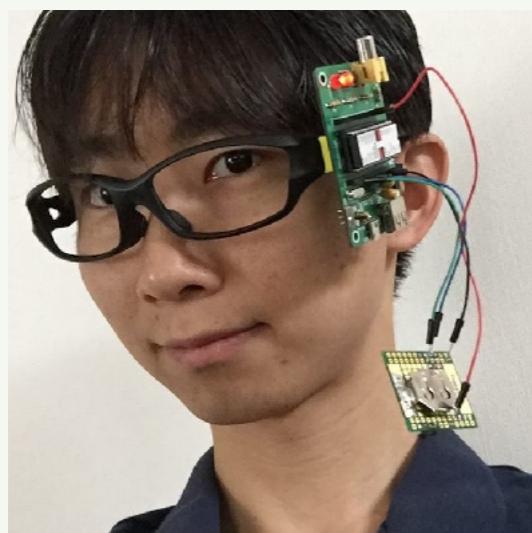
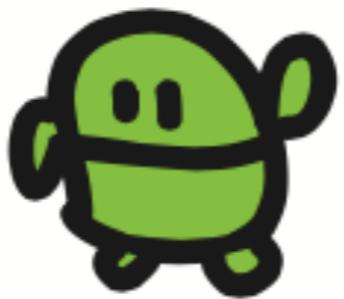
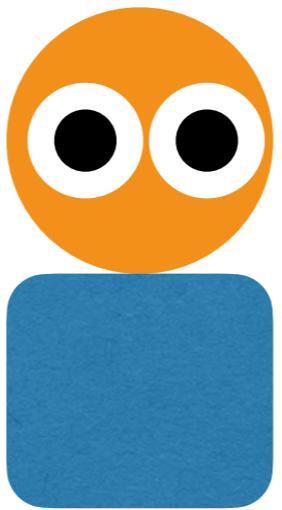


つくってまなぶ 楽しいプログラミング概論 ～計測と制御～

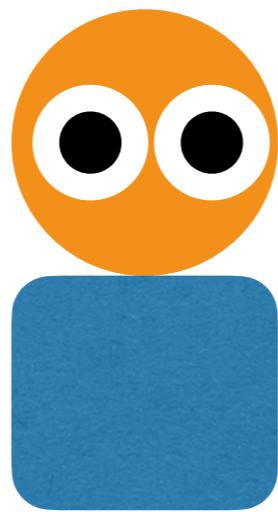


Code for FUKUI / jig.jp
福野泰介 @taisukef

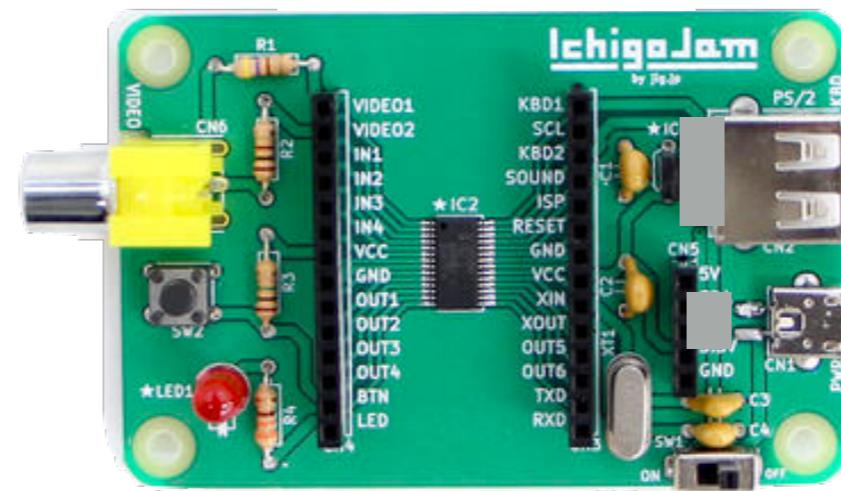
コンピューターと人



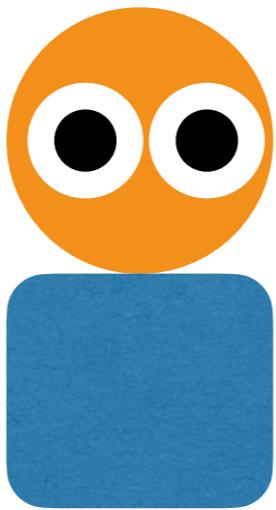
コンピューターと人



特技は



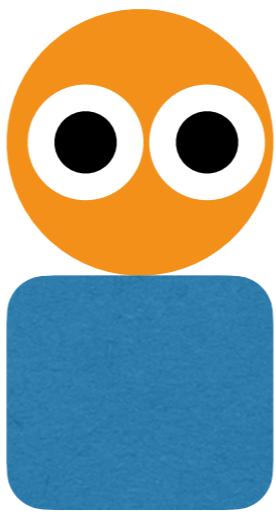
コンピューターと人



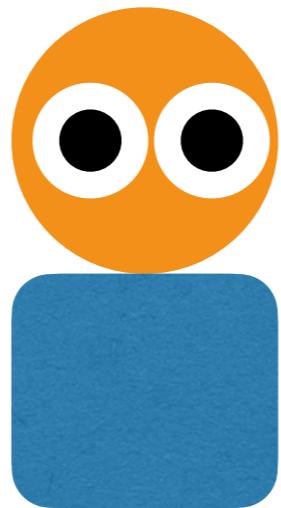
特技は
計算と記憶



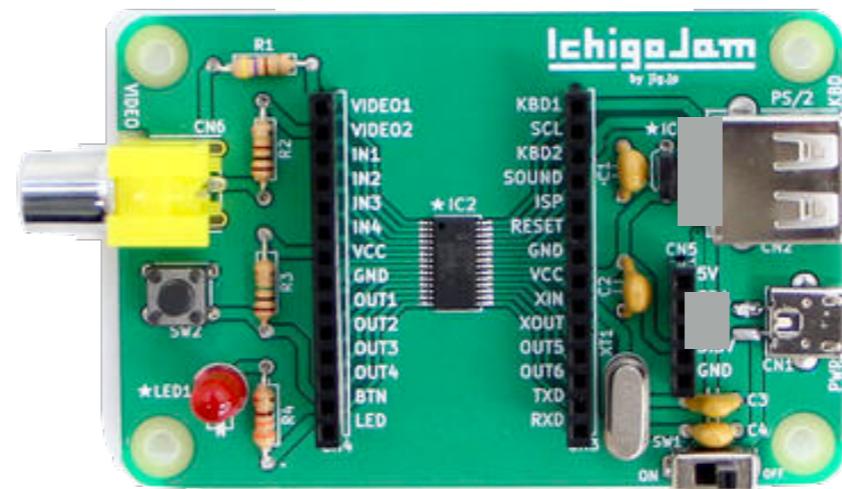
／－トきとろう！



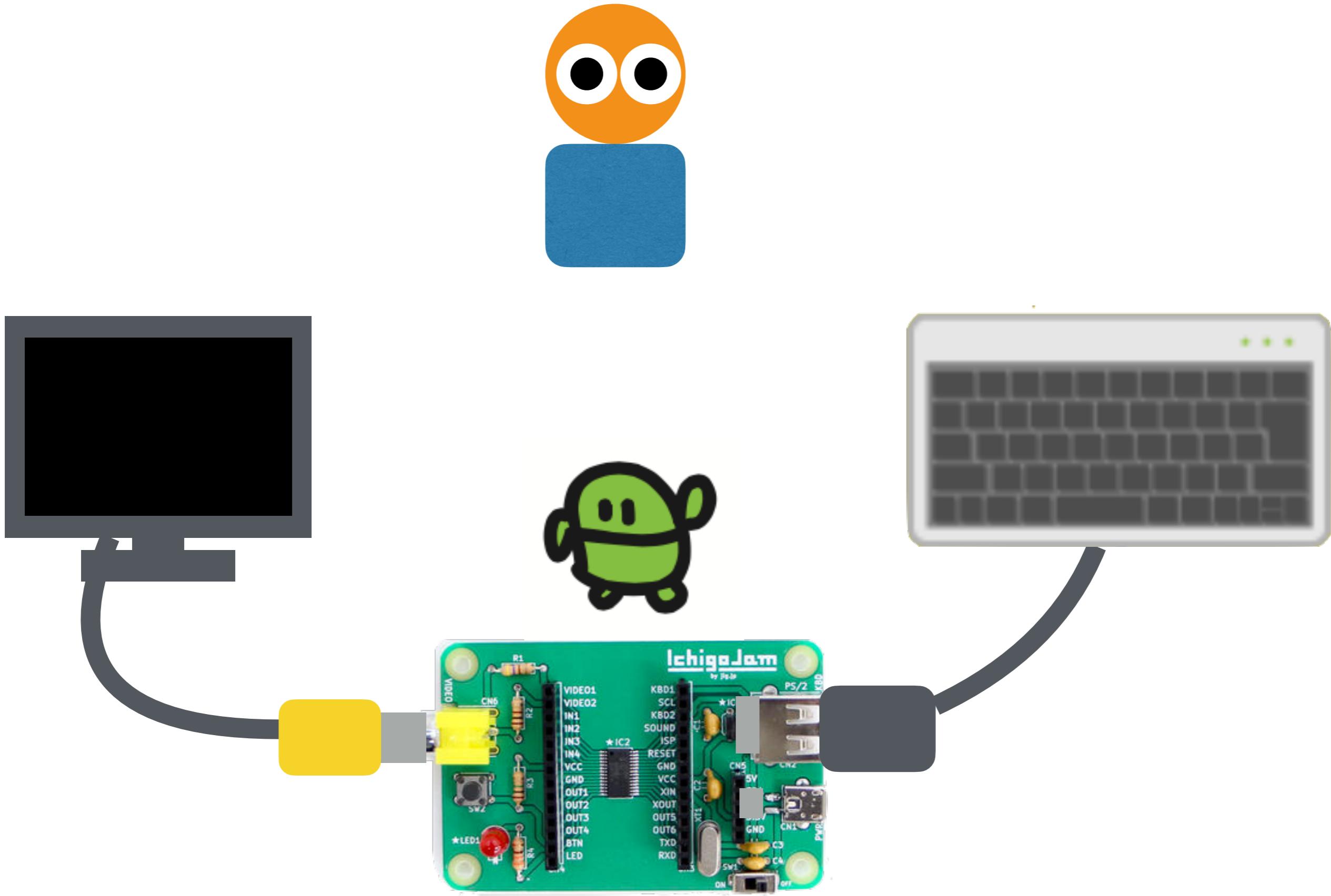
コンピューターと人



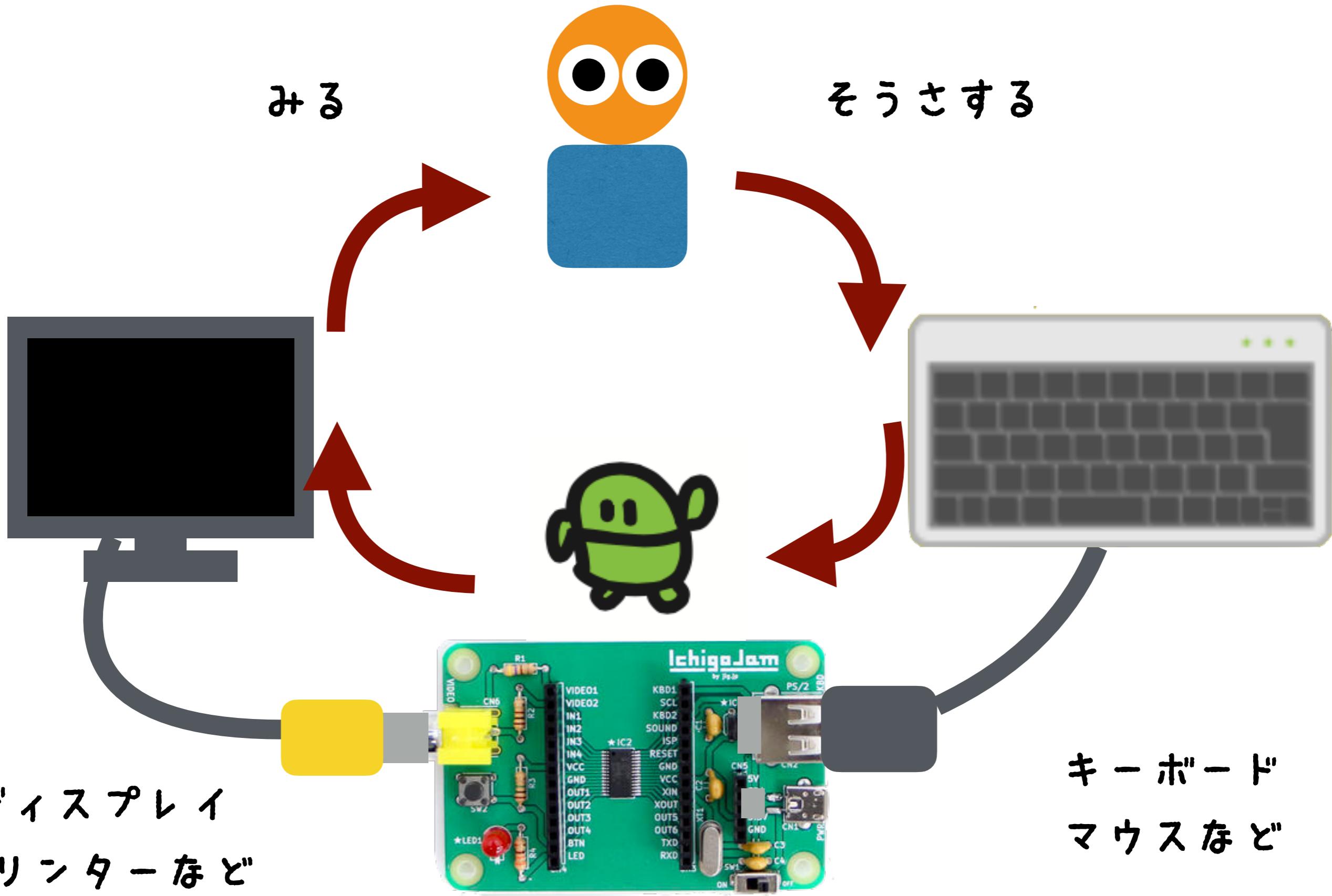
どうやって話す？



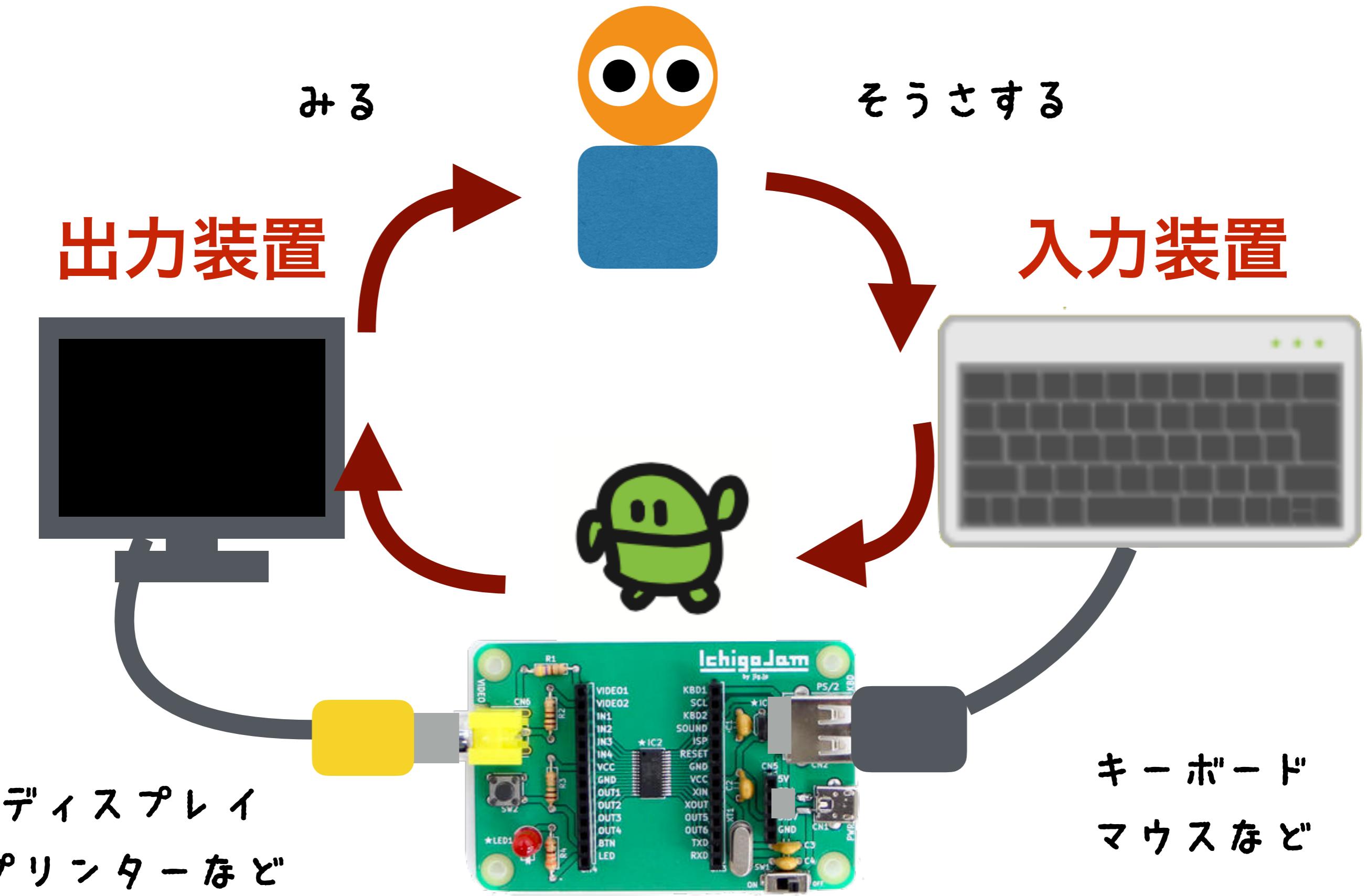
コンピューターと人



コンピューターと人



コンピューターと人



セットアップ！



ぎが いちごだけ
GIGA IchigoDake



+

くろもぶっく
Chromebook

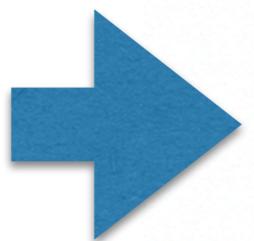
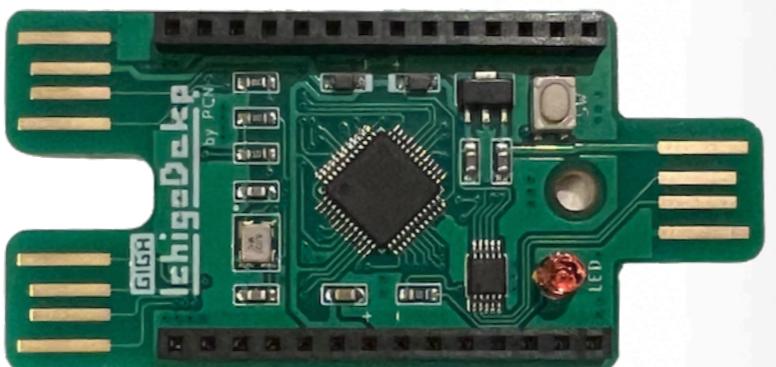


Dell Chromebook 3100 entry
<https://www.dell.com/ja-jp/shop/>

くろむぶっく

Chromebook

ぎが いちごだけ
GIGA IchigoDake



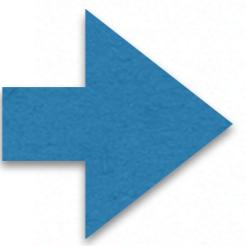
さす



くろむぶっく

Chromebook

ぎが いちごだけ
GIGA IchigoDake

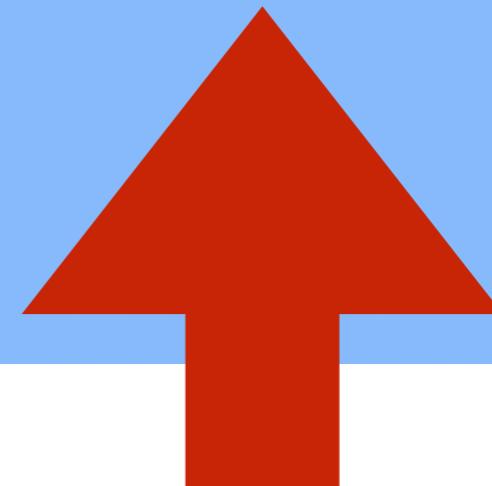
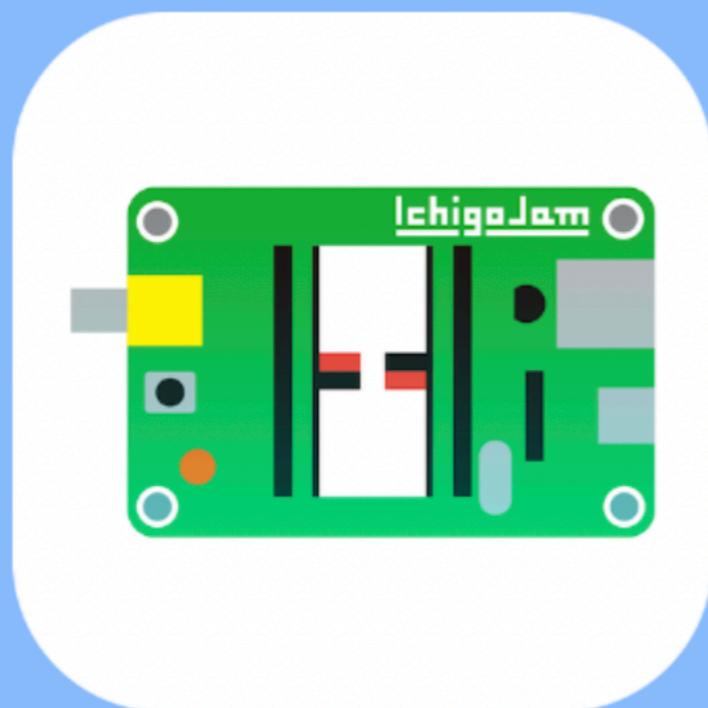


さす



ブラウザで開く

15j.app



<https://15j.app>

こちらをクリック

ブラウザで開く

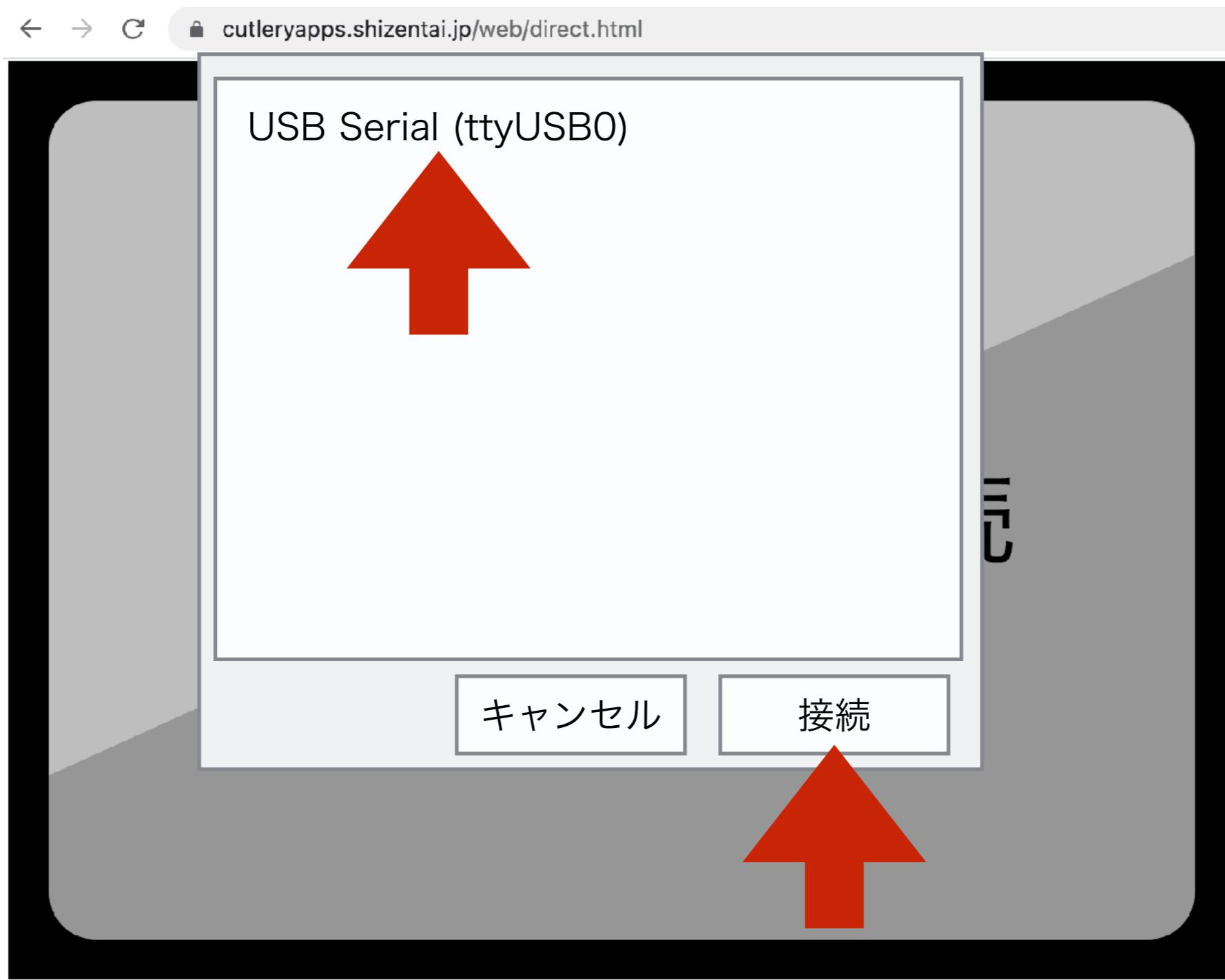
15j.app



CLS LOAD SAVE LIST RUN ?FREE() OUT0 VIDEO1 FILES SWITCH

ver 0.9.0

「Connect / 接続」を押して、
"USB Serial (ttyUSB0)" を選択して、接続



IchigoJam BASIC

OK



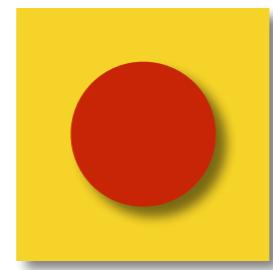
つながったら、ひとまず、エンター

? " H I ! " ■

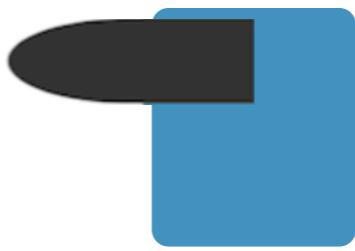
あいさつして、エンター



LED



ボタン



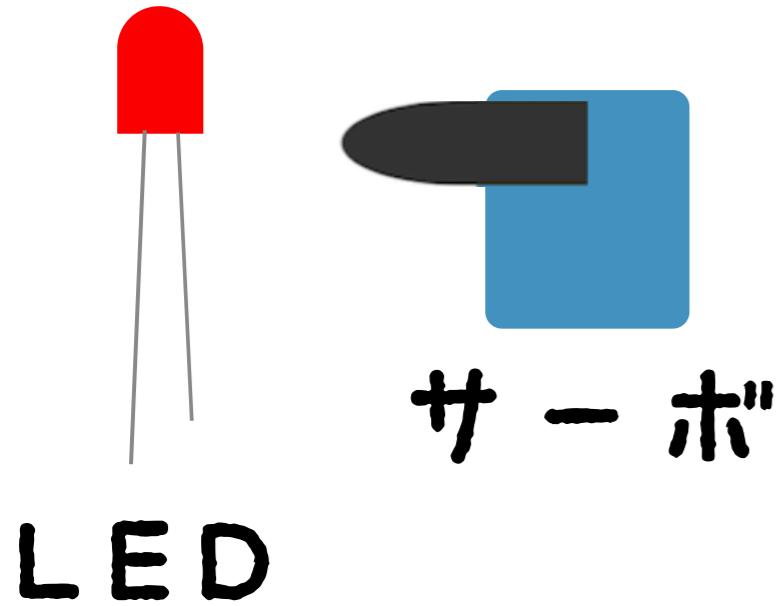
サーボ



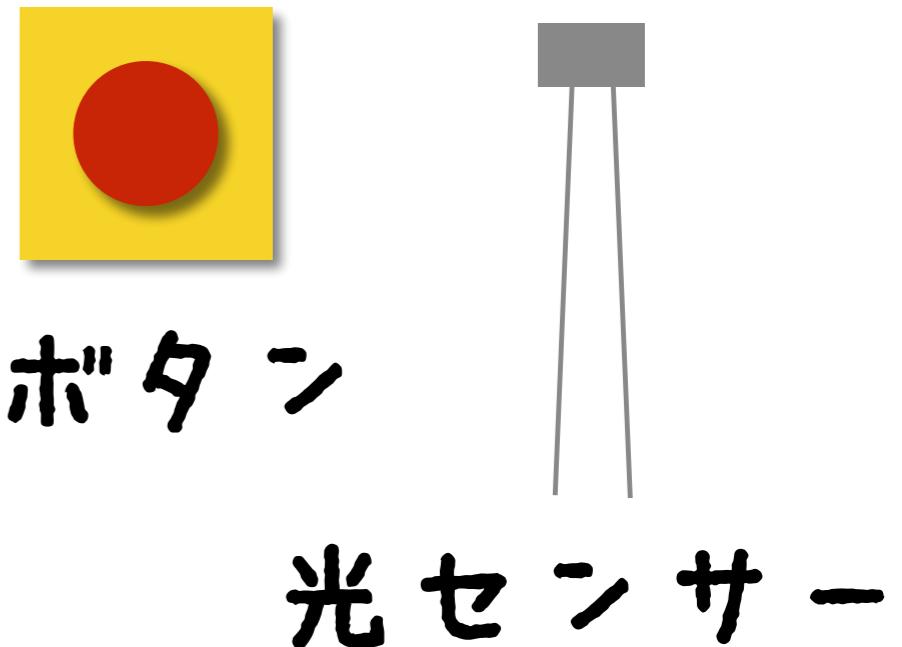
光センサー

人力か出力か？

出力装置

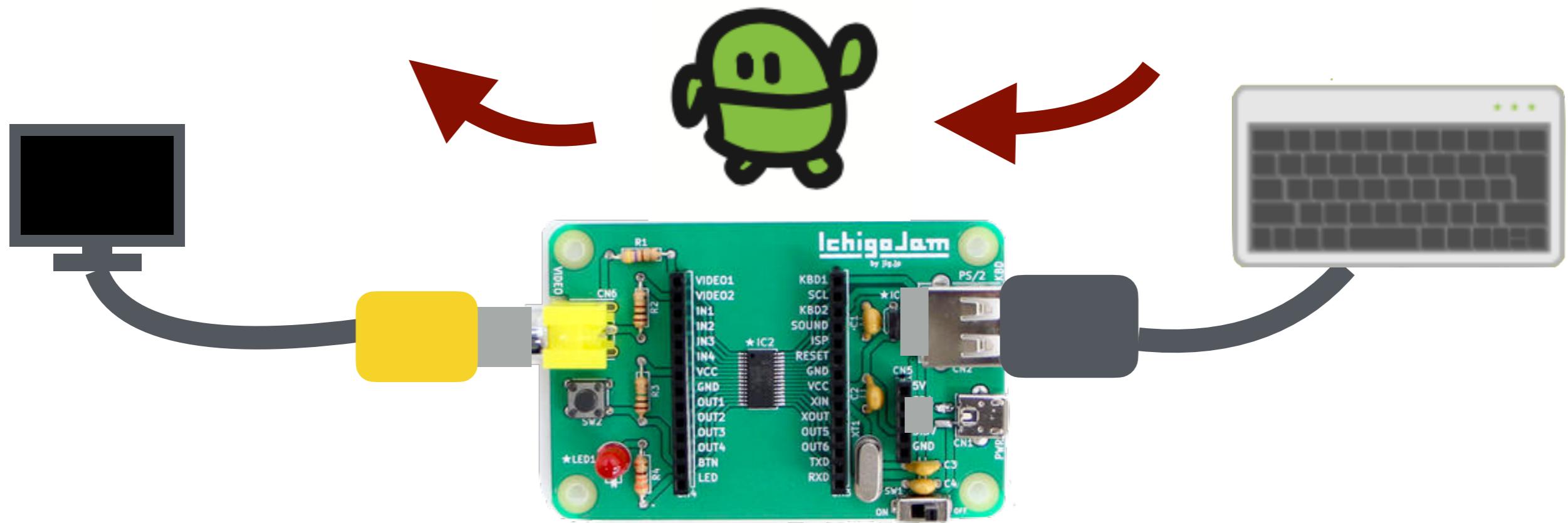


入力装置



制御

計測



出力装置を制御しよう





出力装置

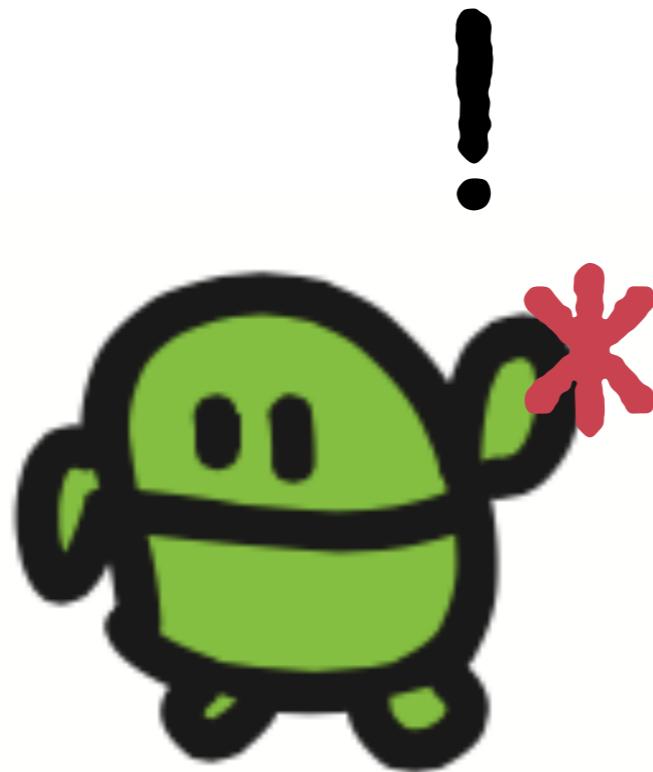
入力装置

处理装置

LED1

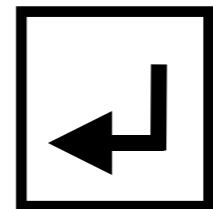


LED1 エンター

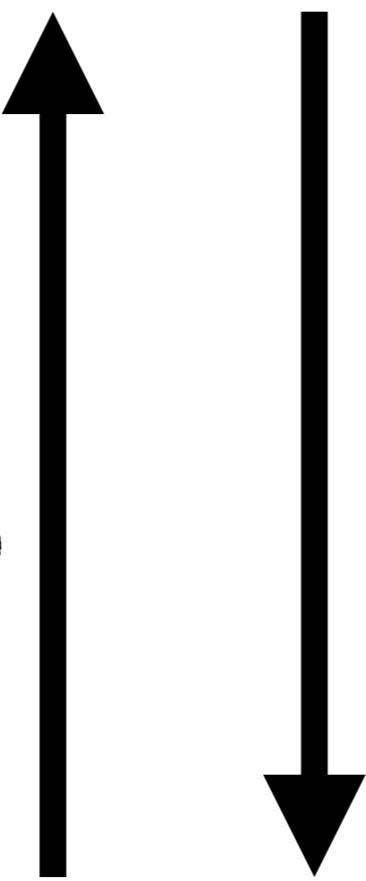


シリッテル！

LED1



(エルイーディー、ワン、エンター)

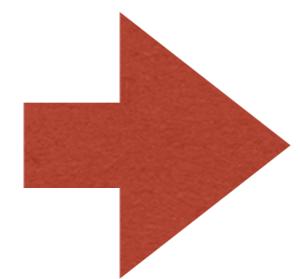
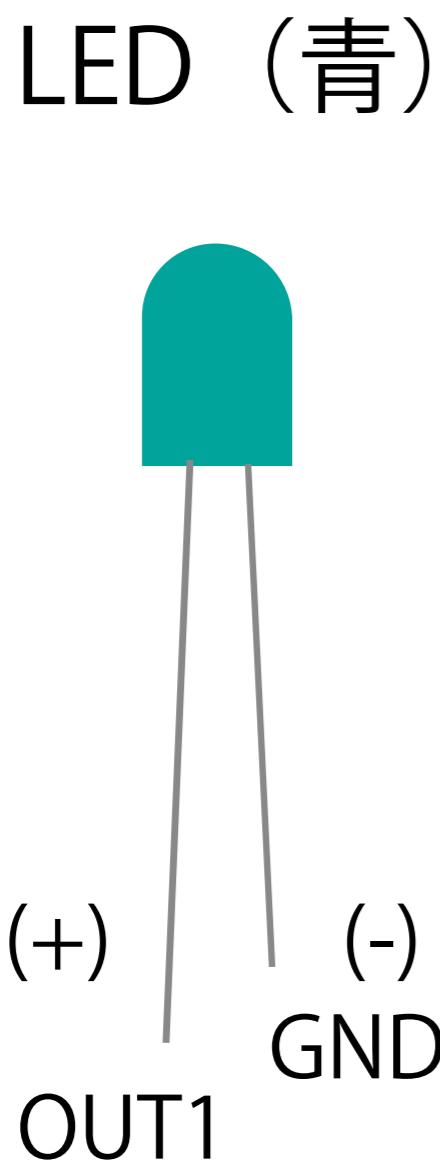


OK
(オーケー)

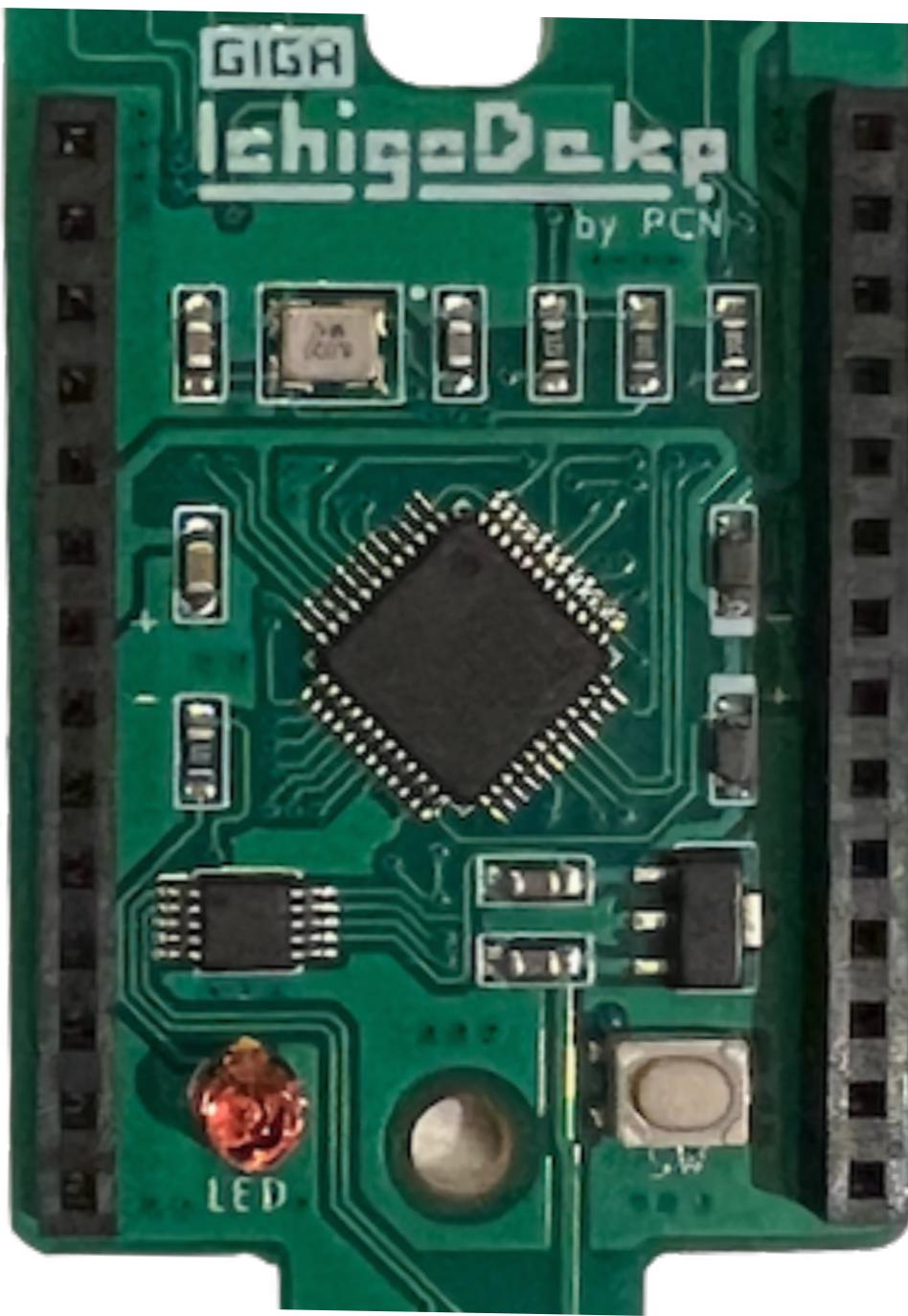
外部出力にチャレンジ



外部出力ポートにせつぞく

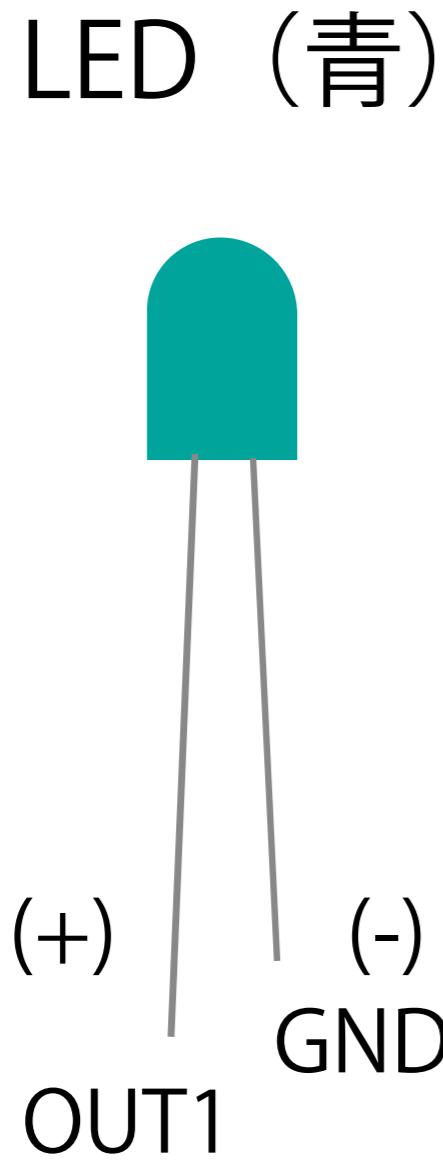


VIDEO1
VIDEO2
IN1
IN2
IN3
IN4
VCC
GND
OUT1
OUT2
OUT3
OUT4
BTN
LED

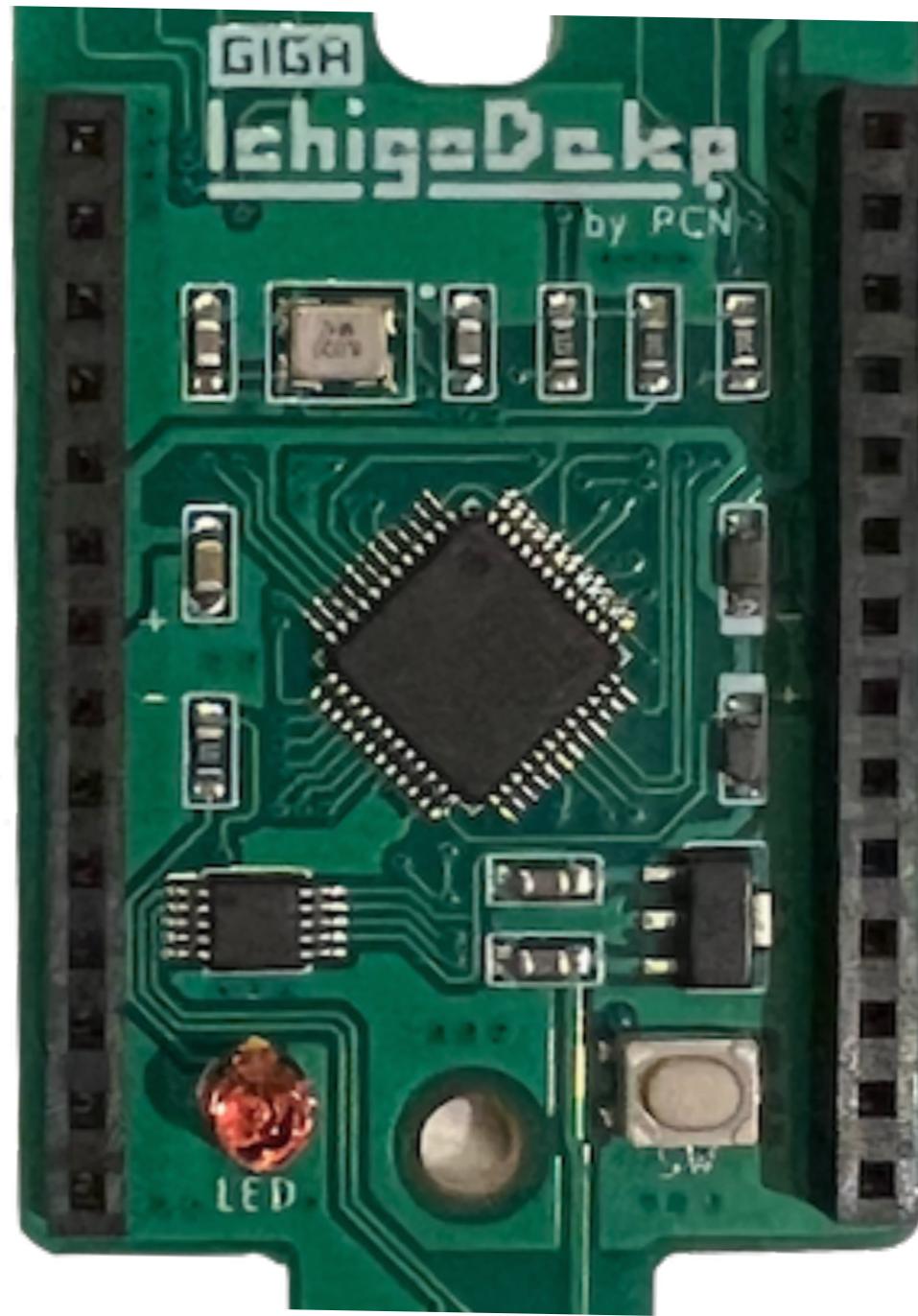


KBD1
NC
KBD2
SOUND
ISP
RESET
GND
VCC
XTAL
XTAL
OUT5
OUT6
TXD
RXD

外部出力ポートにせつぞく



VIDEO1
VIDEO2
IN1
IN2
IN3
IN4
VCC
GND
OUT1
OUT2
OUT3
OUT4
BTN
LED



KBD1
NC
KBD2
SOUND
ISP
RESET
GND
VCC
XTAL
XTAL
OUT5
OUT6
TXD
RXD

OUT1ポートに1を出力

OUT1, 1



OUT1ポートに0を出力

OUT1, 0

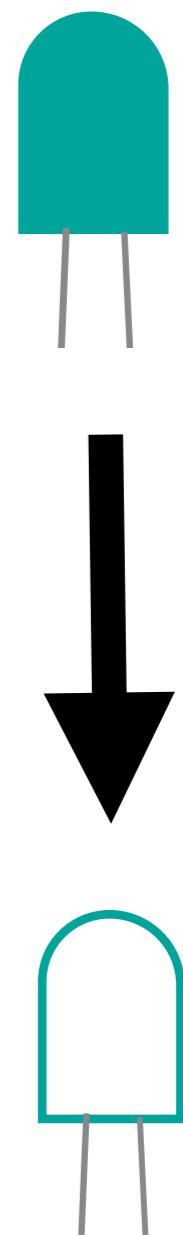


VIDEO1
VIDEO2
IN1
IN2
IN3
IN4
VCC
GND
OUT1
OUT2
OUT3
OUT4
BTN
LED



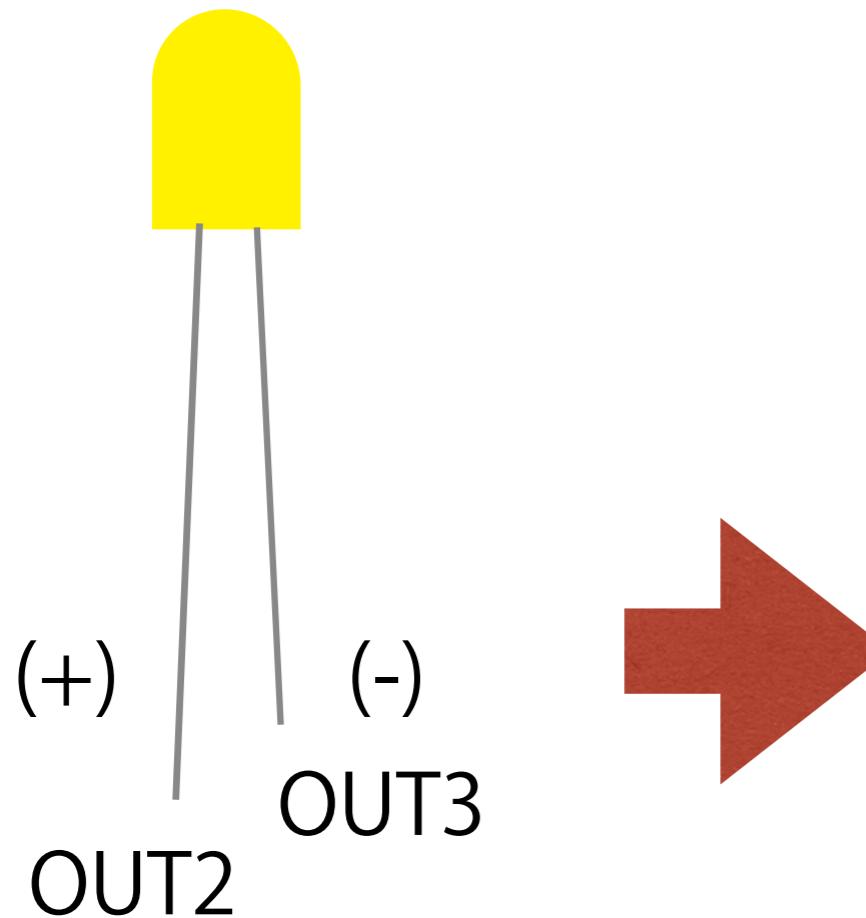
3秒間LEDが点灯するプログラム

```
10 OUT1,1  
20 WAIT180  
30 OUT1,0
```

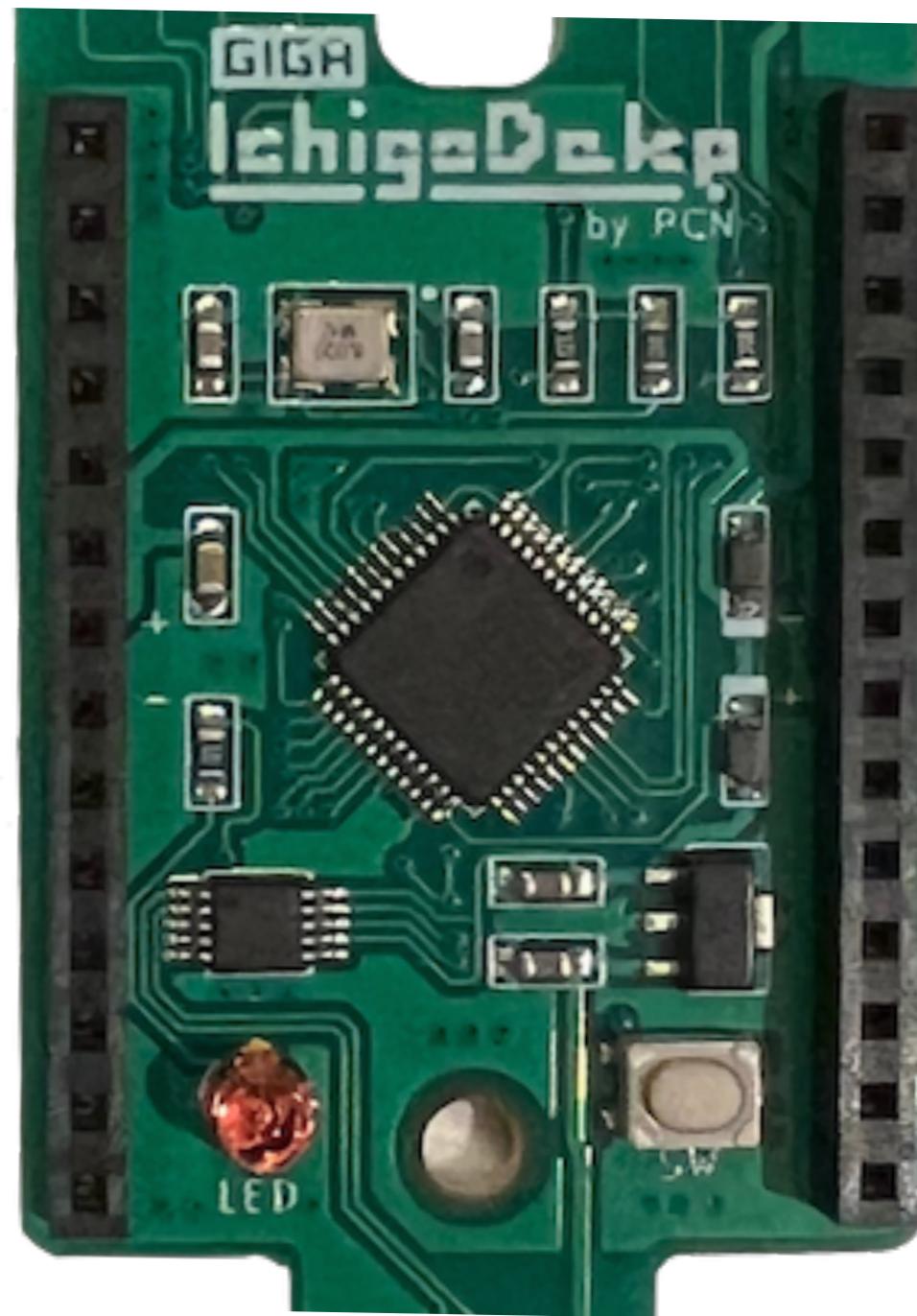


外部出力ポートにせつぞく

LED (黄)



VIDEO1
VIDEO2
IN1
IN2
IN3
IN4
VCC
GND
OUT1
OUT2
OUT3
OUT4
BTN
LED

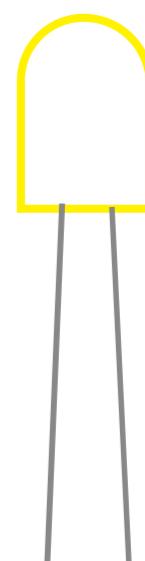


KBD1
NC
KBD2
SOUND
ISP
RESET
GND
VCC
XTAL
XTAL
OUT5
OUT6
TXD
RXD

OUT2 ポートに1を出力

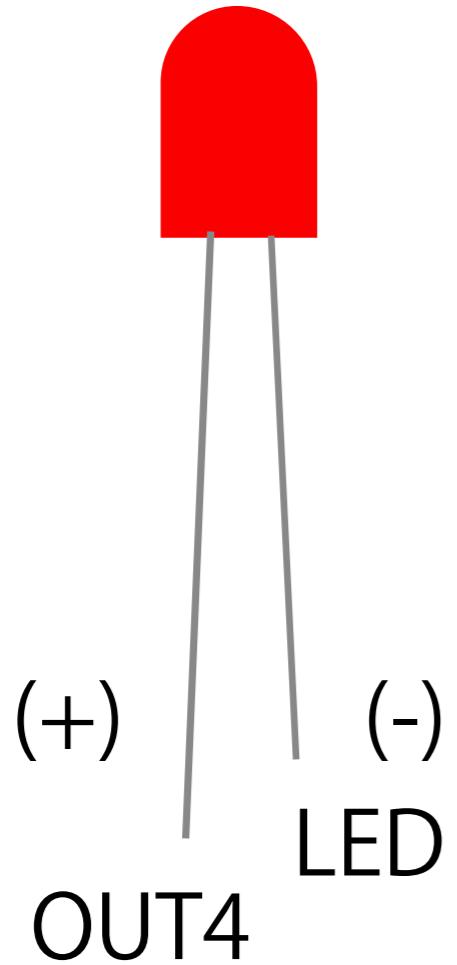


OUT2 ポートに0を出力

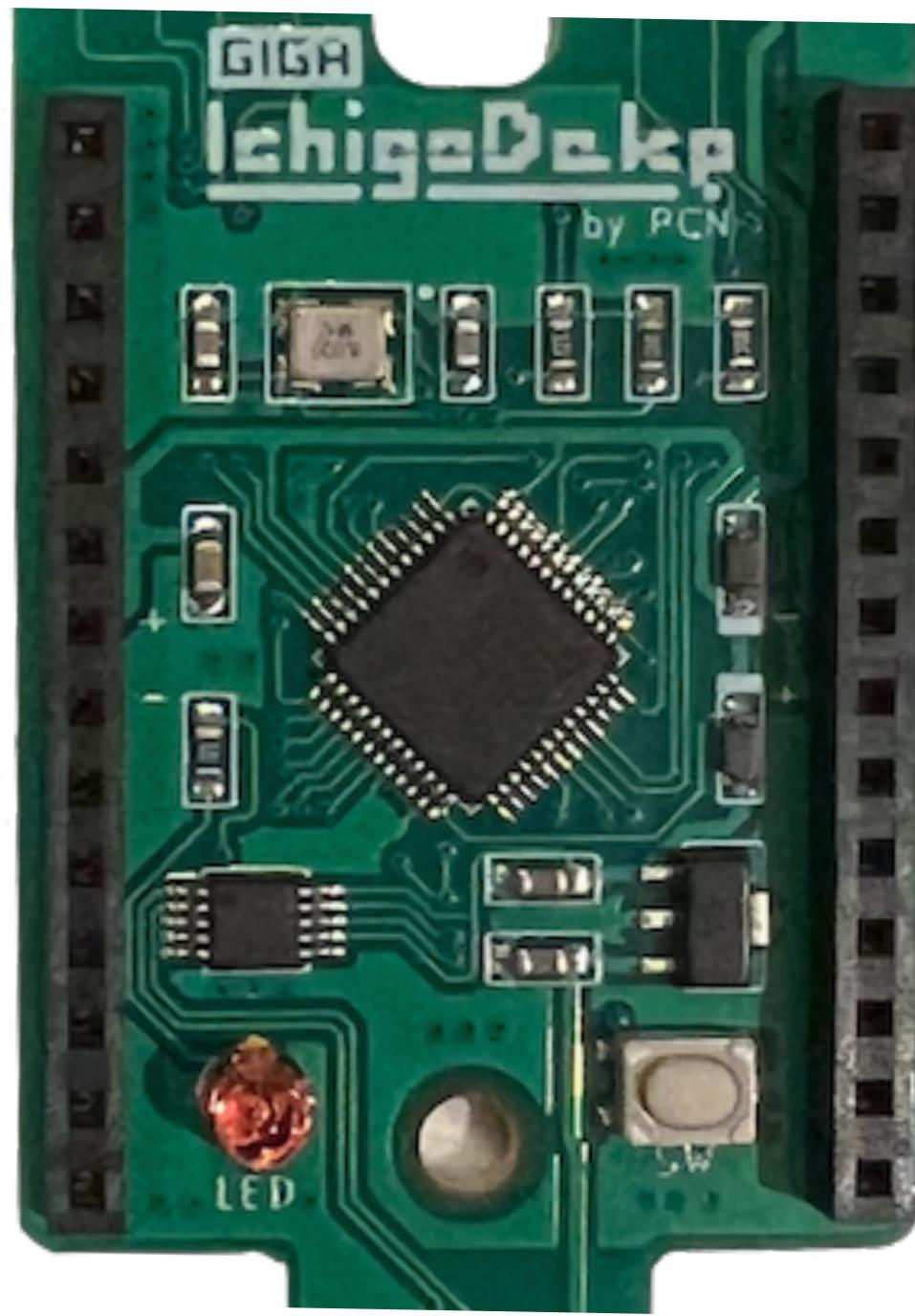


外部出力ポートにせつぞく

LED (赤)

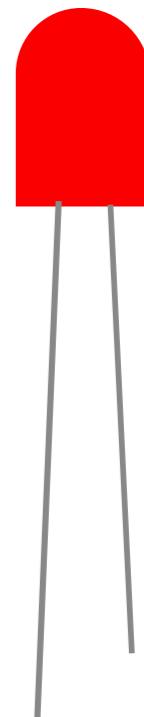
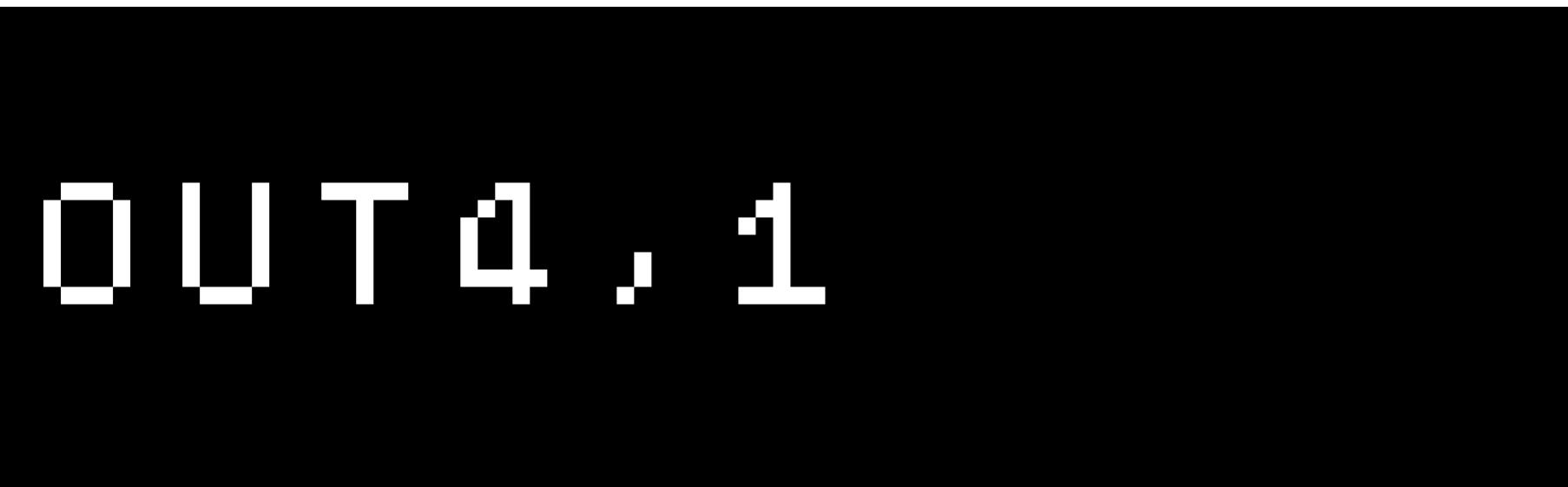


VIDEO1
VIDEO2
IN1
IN2
IN3
IN4
VCC
GND
OUT1
OUT2
OUT3
OUT4
BTN
LED

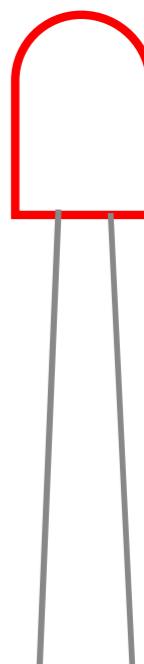


KBD1
NC
KBD2
SOUND
ISP
RESET
GND
VCC
XTAL
XTAL
OUT5
OUT6
TXD
RXD

OUT4 ポートに1を出力



OUT4 ポートに0を出力



じゅんにひかるプログラム

```
10 OUT1,1:WAIT60:OUT1,0  
20 OUT2,1:WAIT60:OUT2,0  
30 OUT4,1:WAIT60:OUT4,0  
40 GOTO10  
RUN
```



OUT1



OUT2

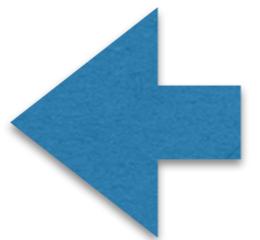
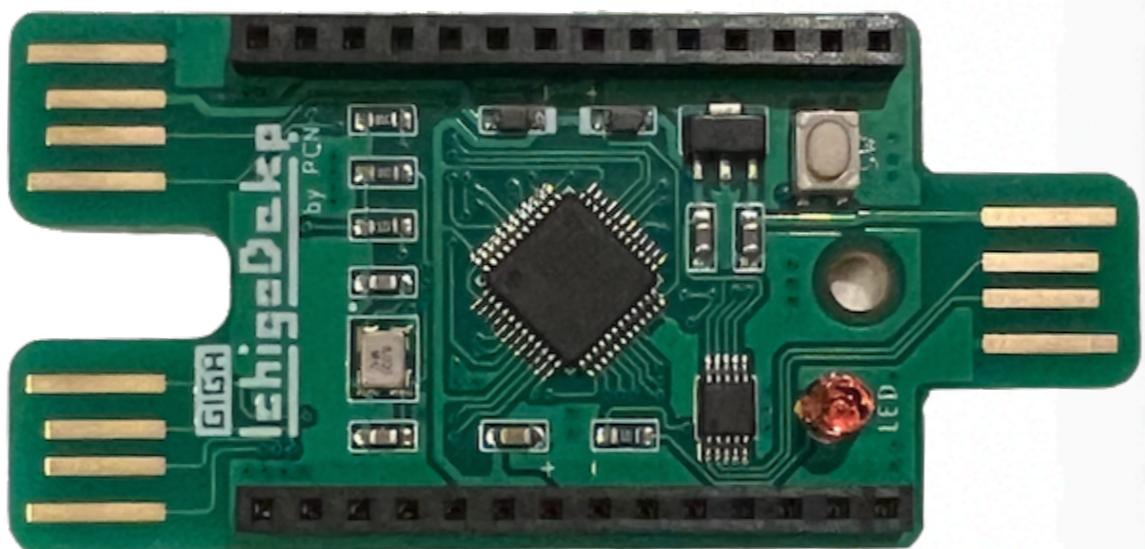


OUT4

うまくいったら
ESCで“とめてSAVEO

SAVEO

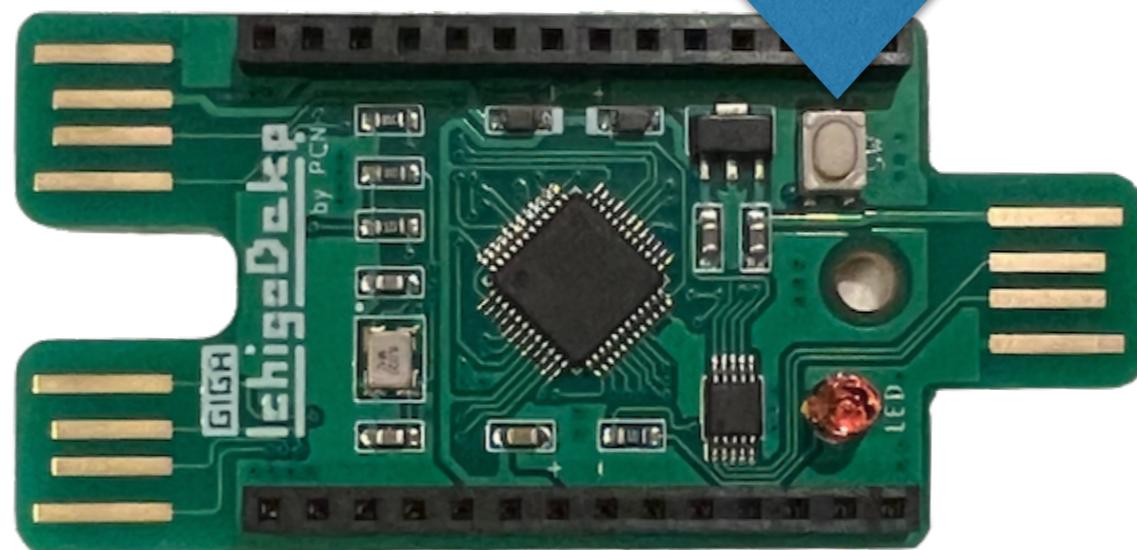
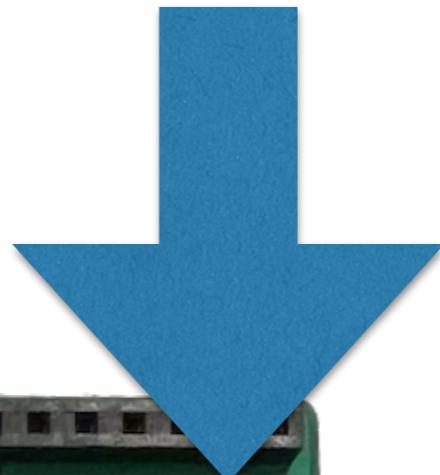
ONのままで"OK"



ぬ <



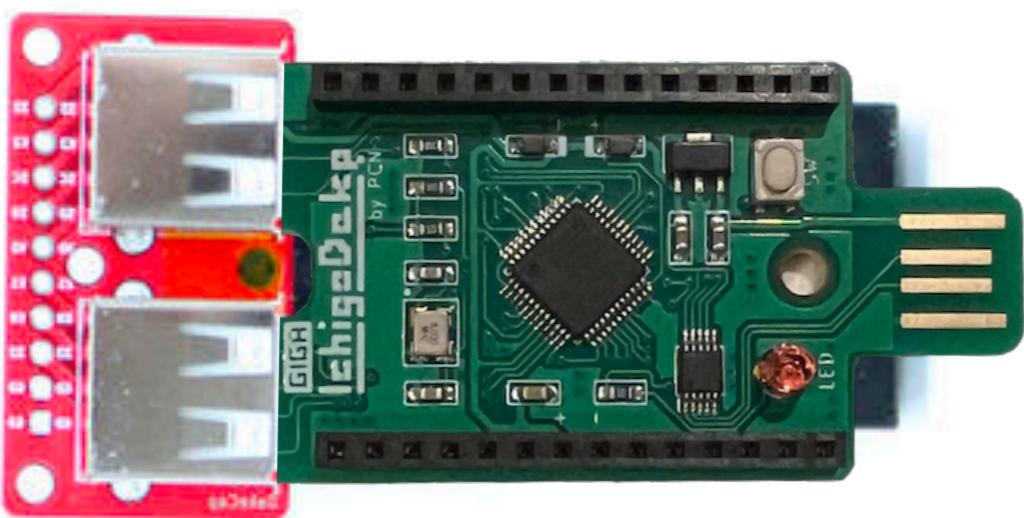
ボタン



DakeCap
(でんげんだけきばん)



GIGA IchigoDake
(コンピューター)



でんげんだけで、うごく！

ボタンを
おしながら
さす

マイシンごうづくりにチャレンジ！

```
10 OUT1,1:WAIT60:OUT1,0  
20 OUT2,1:WAIT60:OUT2,0  
30 OUT4,1:WAIT60:OUT4,0  
40 GOTO10  
RUN
```



OUT1



OUT2



OUT4

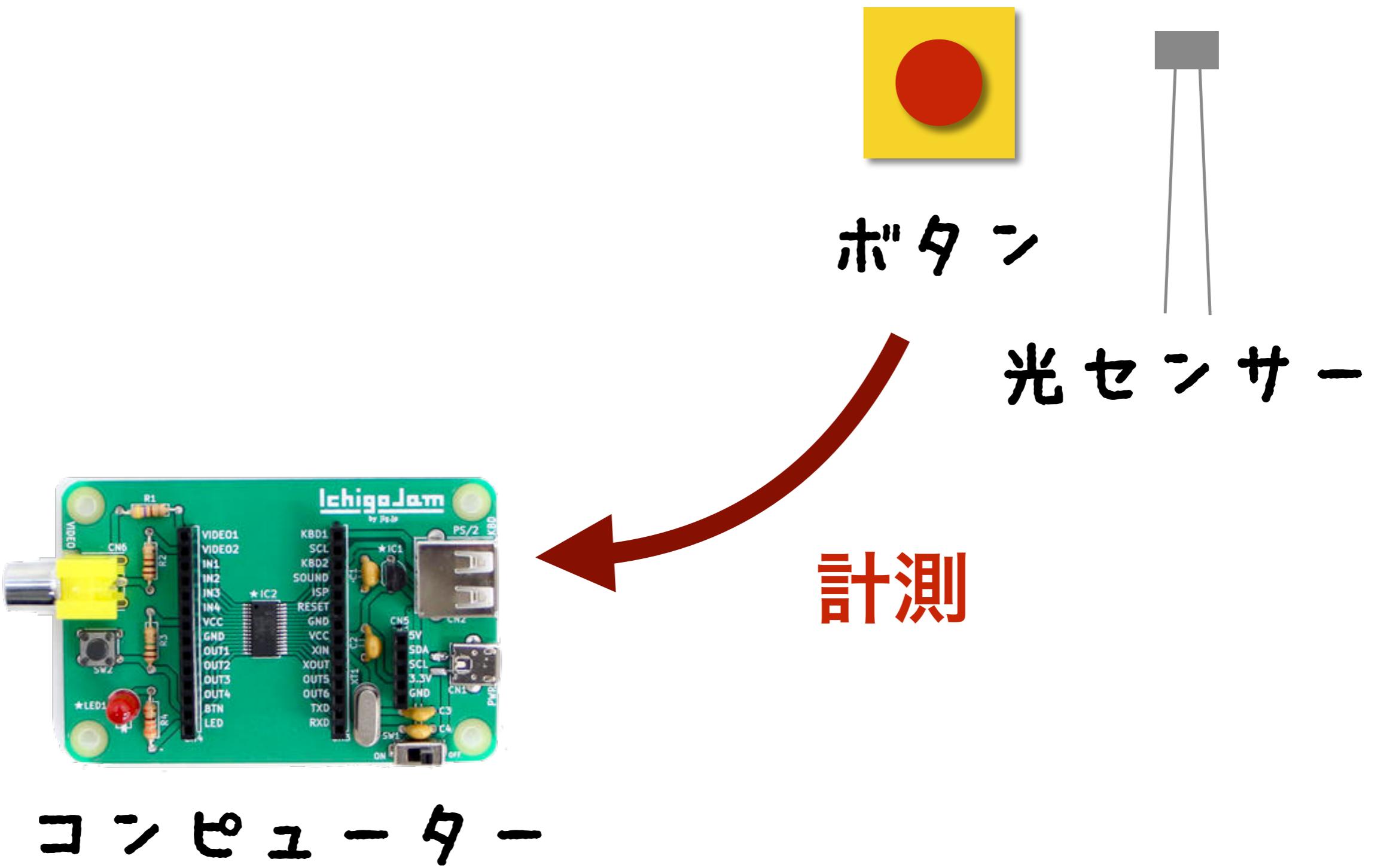
SAVE0

うまくいったら
ESCで“とめてSAVE0

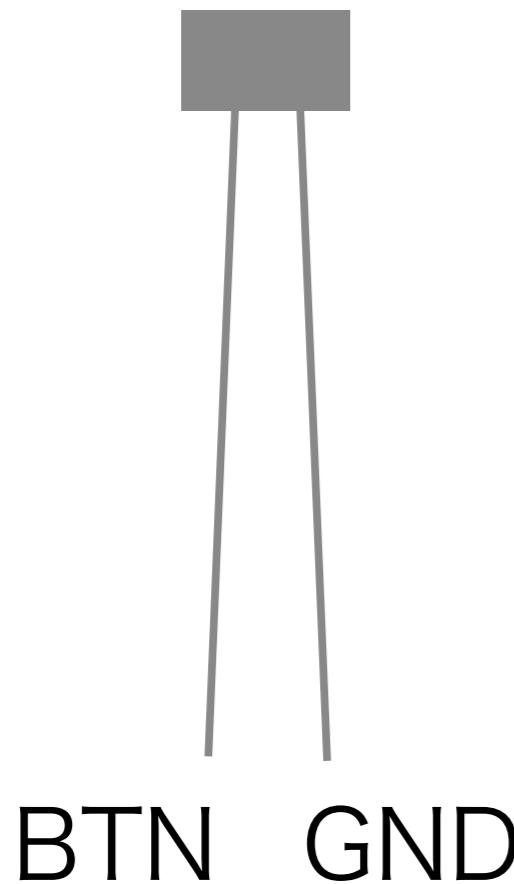
入力装置を計測しよう



入力装置

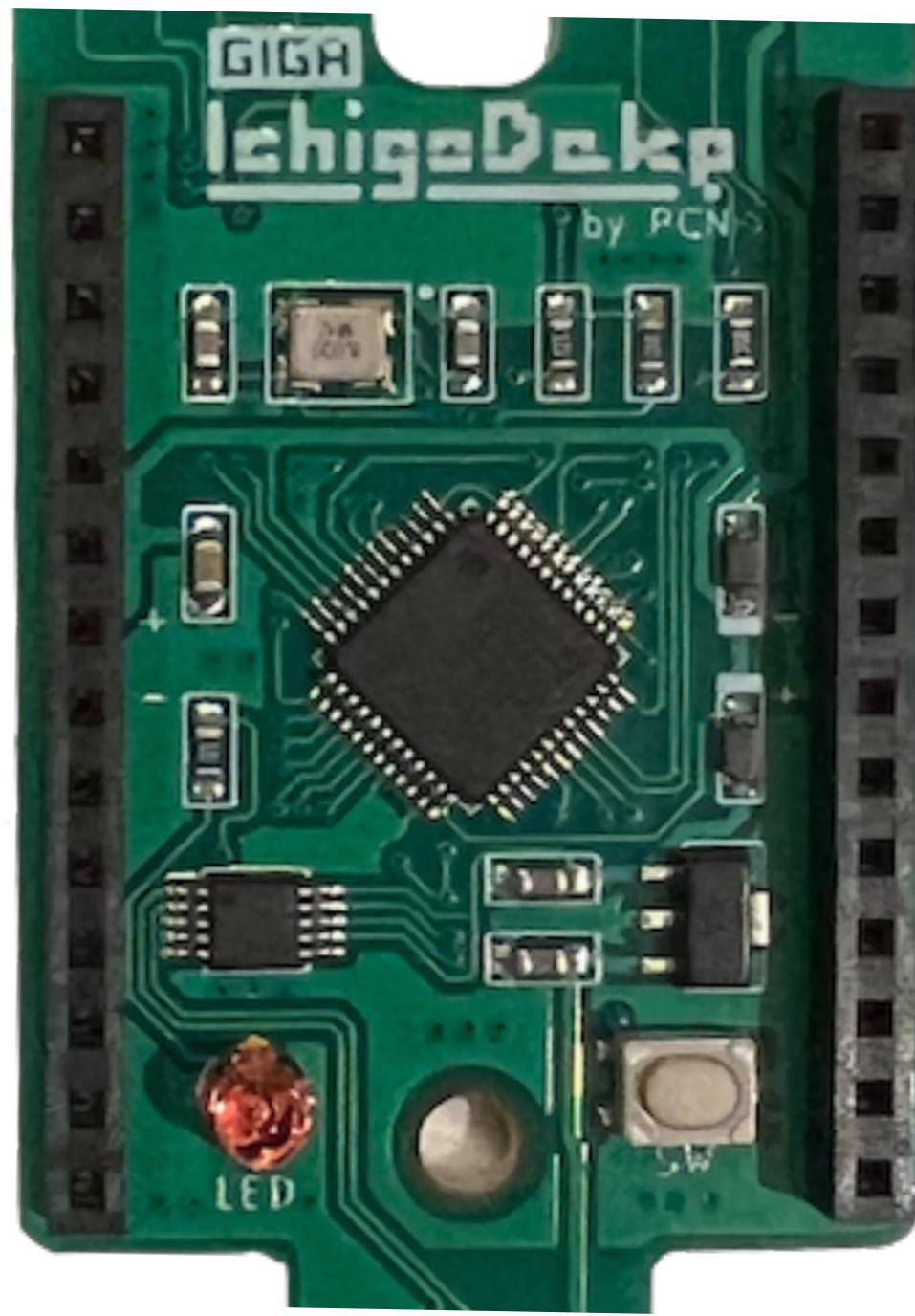


外部入力ポートにせつぞく



LEDは全部抜く

VIDEO1
VIDEO2
IN1
IN2
IN3
IN4
VCC
GND
OUT1
OUT2
OUT3
OUT4
BTN
LED



KBD1
NC
KBD2
SOUND
ISP
RESET
GND
VCC
XTAL
XTAL
OUT5
OUT6
TXD
RXD

ANA (アナログ)

```
i ?ANA():WAIT10:GOTO1  
RUN
```

どんな数がでる？

ででかくして、もういちど

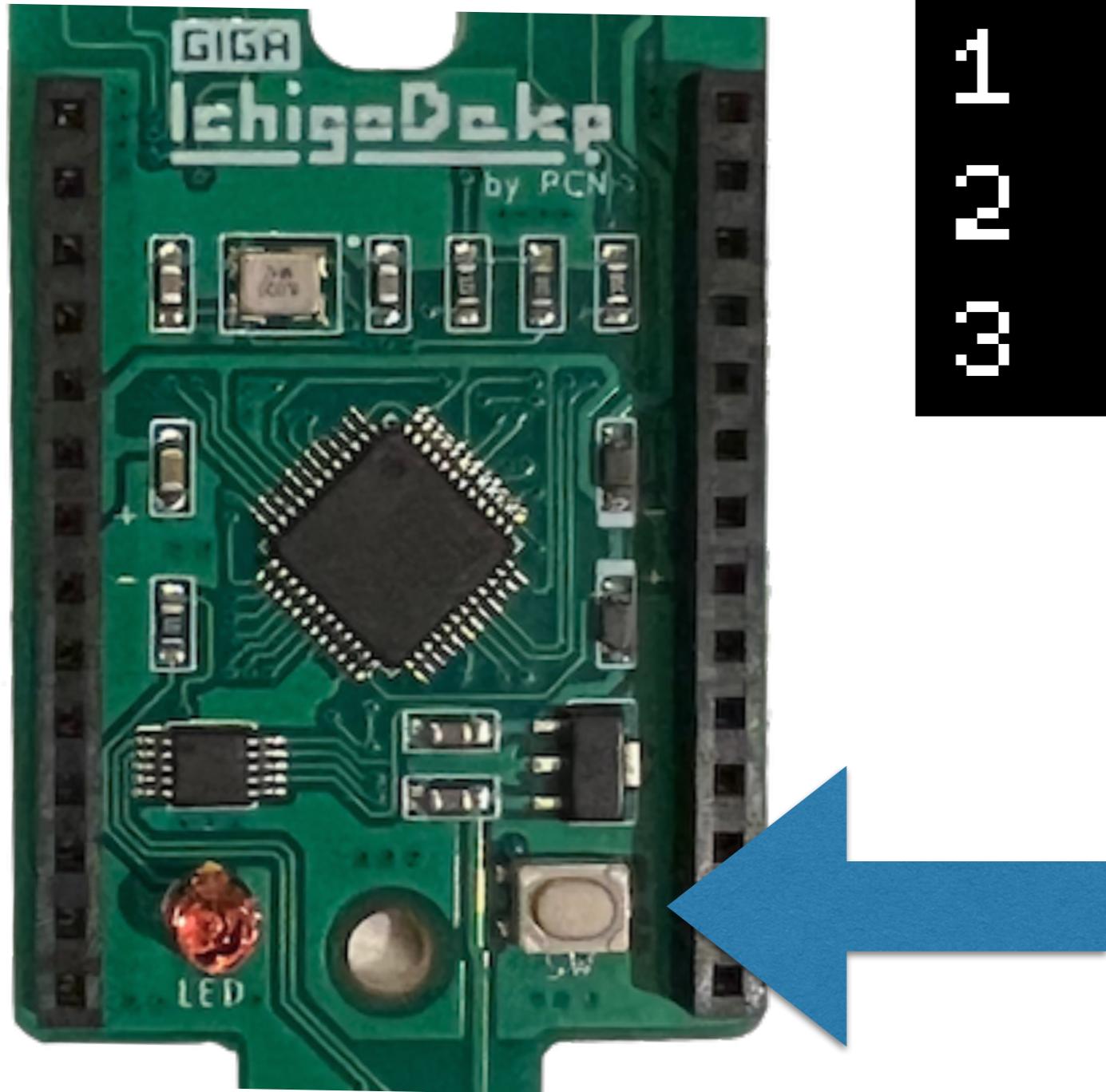
ANA (アナログ)

```
1 A=ANA():?A:WAIT10  
2 IF A>130 LED1:END  
3 GOTO 1
```

もし センサーのあたいが 0より大きいとき LED 点灯

くらいときにひかる！

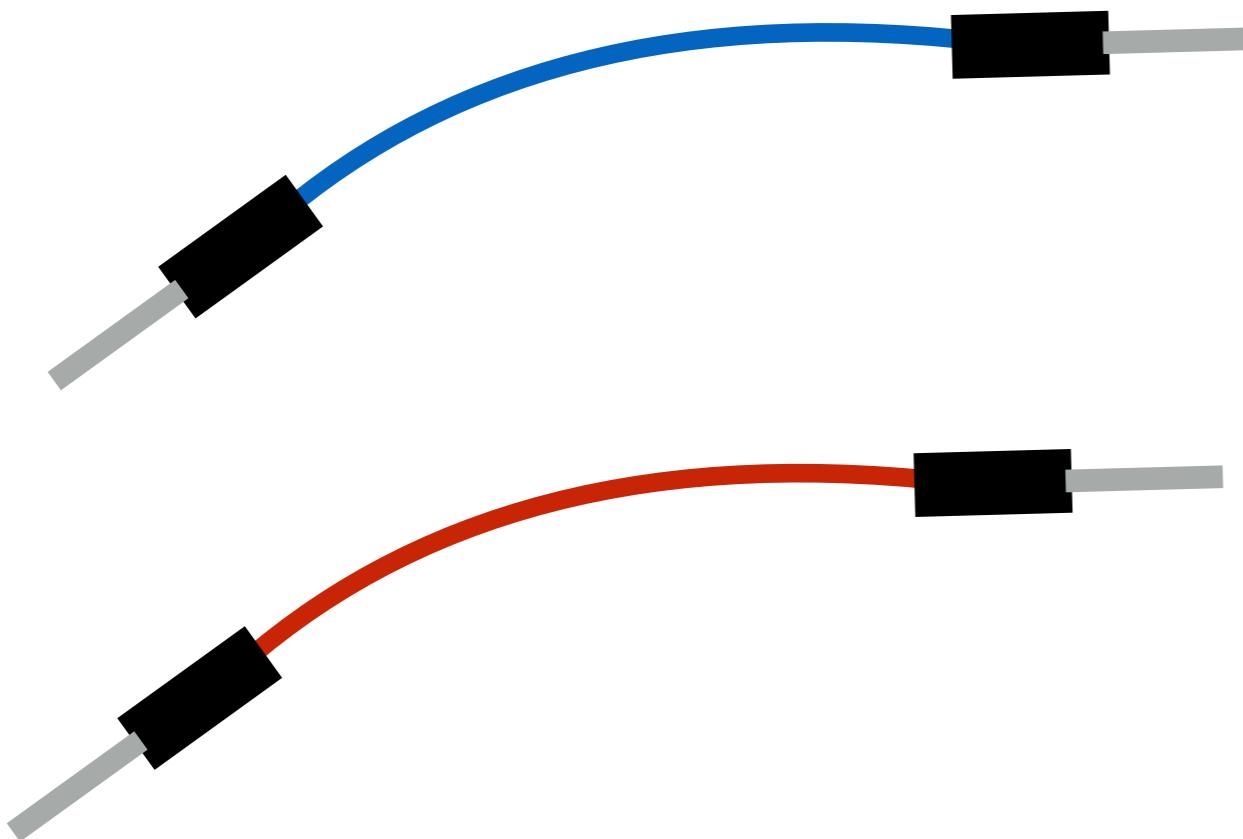
ボタンが入力されたかどうかのけいそく



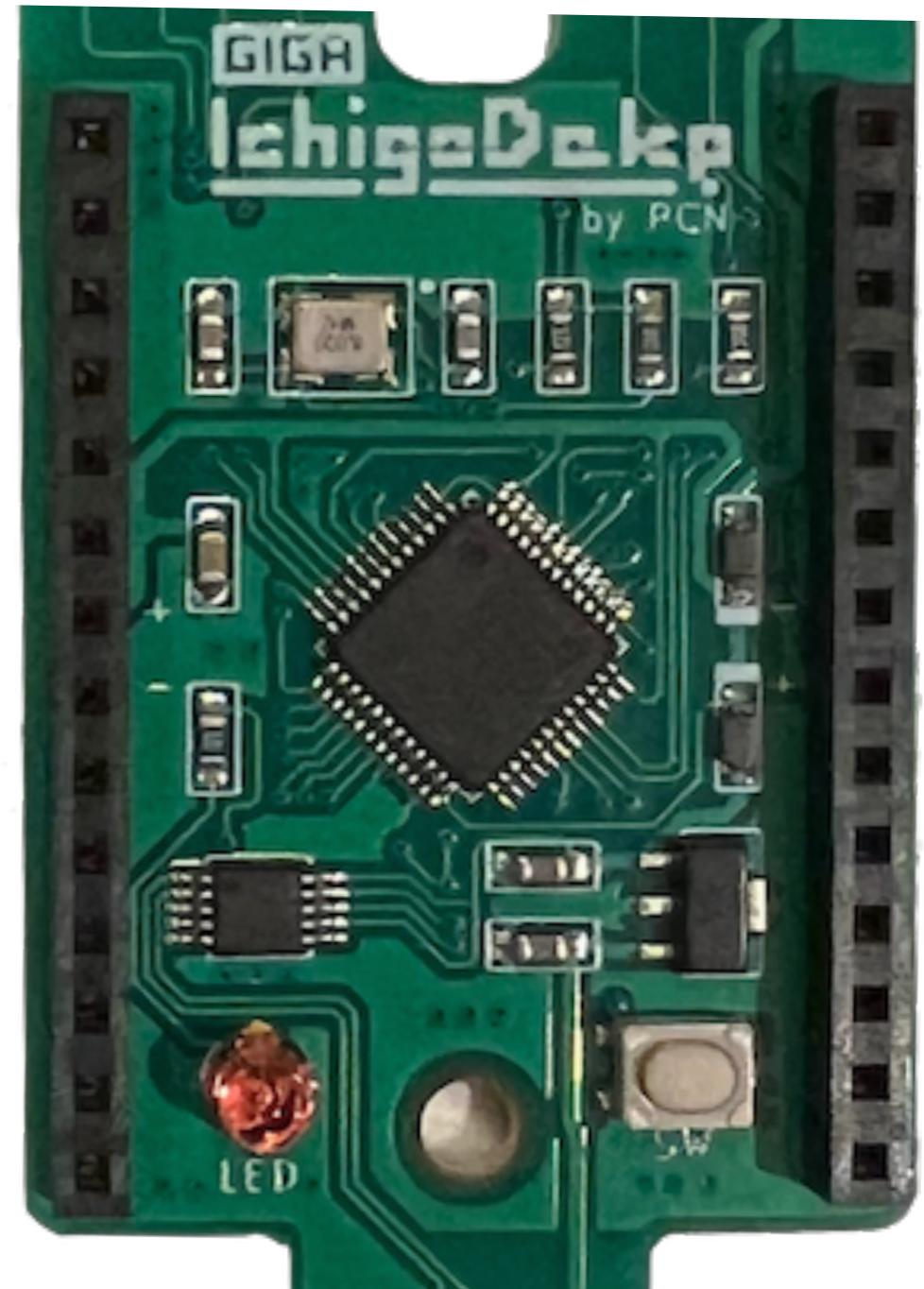
```
1 ?BTN()
2 WAIT10
3 GOT01
```

ジャンパー線で"ボタン"をつくる

こっち側を
くっつけたり
はなしたり



VIDEO1
VIDEO2
IN1
IN2
IN3
IN4
VCC
GND
OUT1
OUT2
OUT3
OUT4
BTN
LED



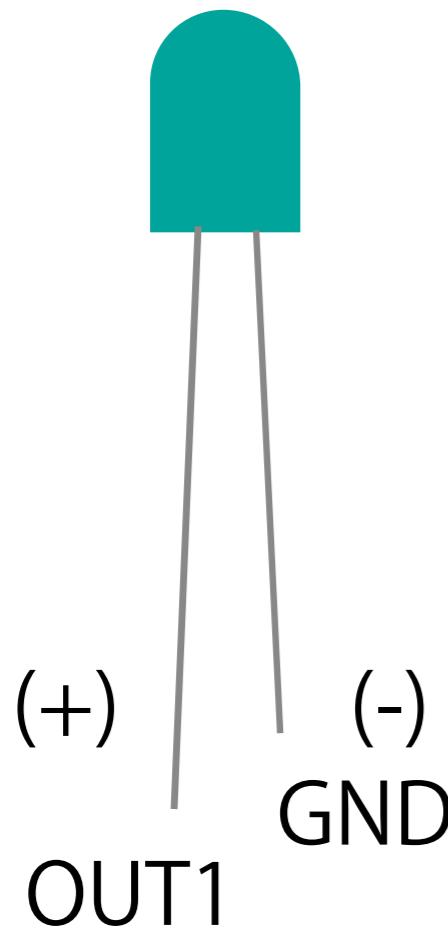
入力と出力
組み合わせてみよう



入力（ボタン）と出力（LED）

```
1 OUT1, BTN():WAIT10  
2 GOT01
```

LED (青)



VIDEO1
VIDEO2

IN1
IN2
IN3
IN4

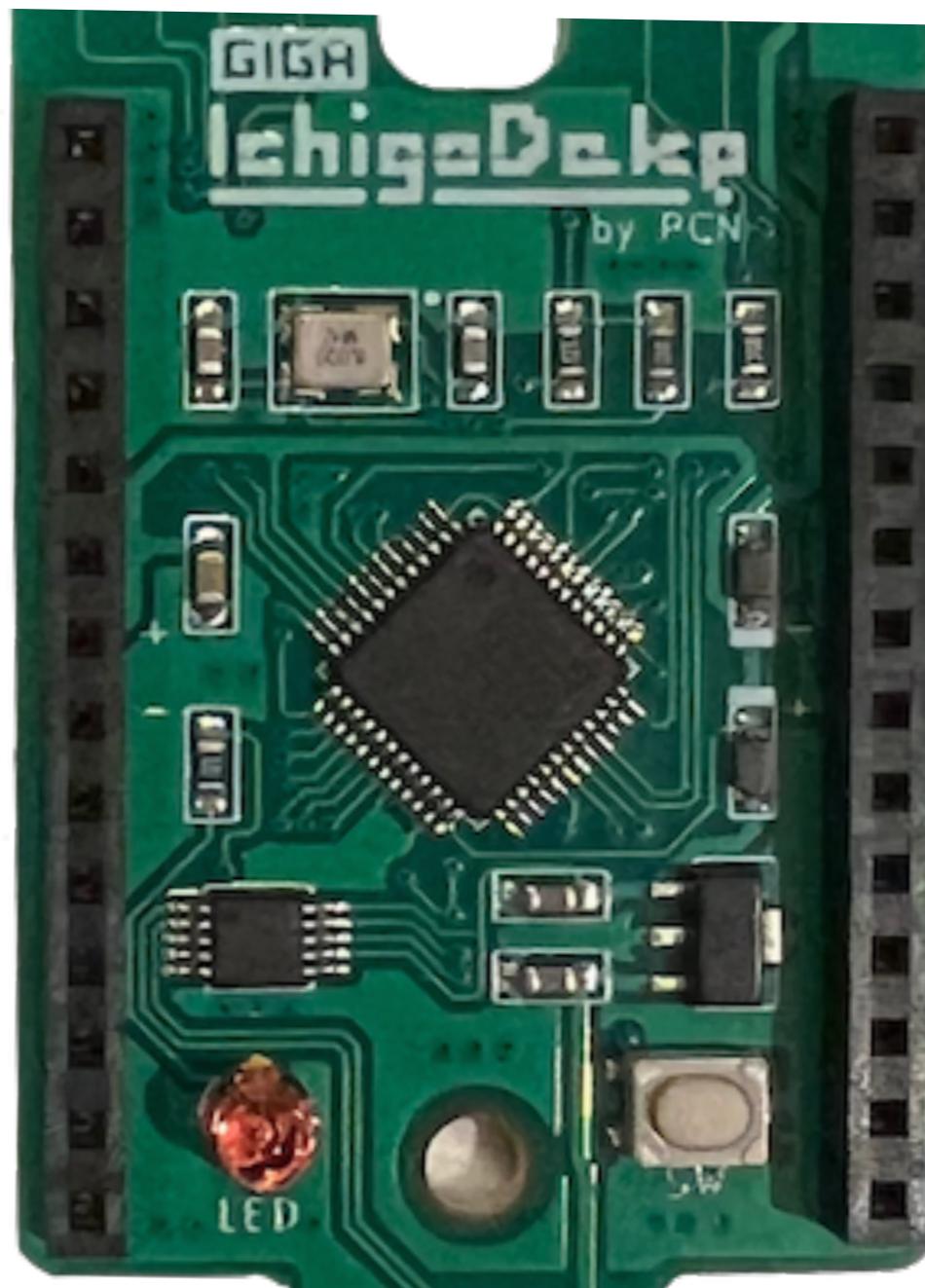
VCC

GND

OUT1
OUT2

OUT3
OUT4

BTN
LED

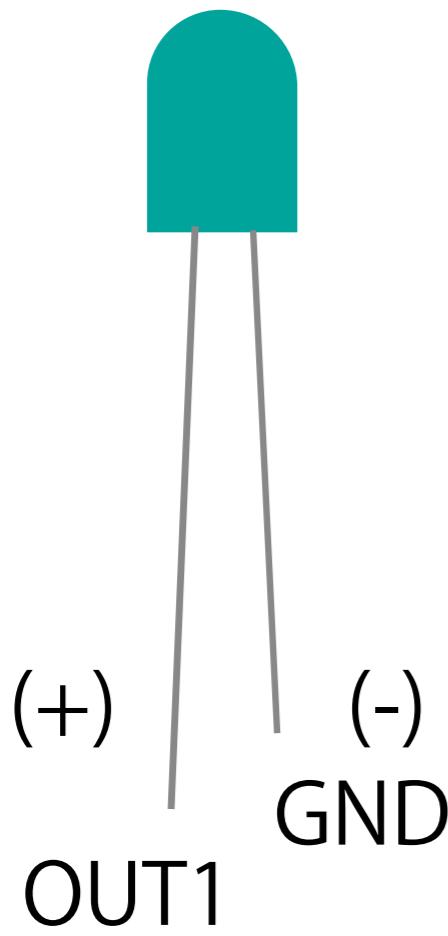


KBD1
NC
KBD2
SOUND
ISP
RESET
GND
VCC
XTAL
XTAL
OUT5
OUT6
TXD
RXD

入力（ボタン）と出力（LED）

```
1 OUT1,!BTN():WAIT10  
2 GOT01
```

LED (青)



VIDEO1
VIDEO2

IN1
IN2
IN3
IN4

VCC

GND

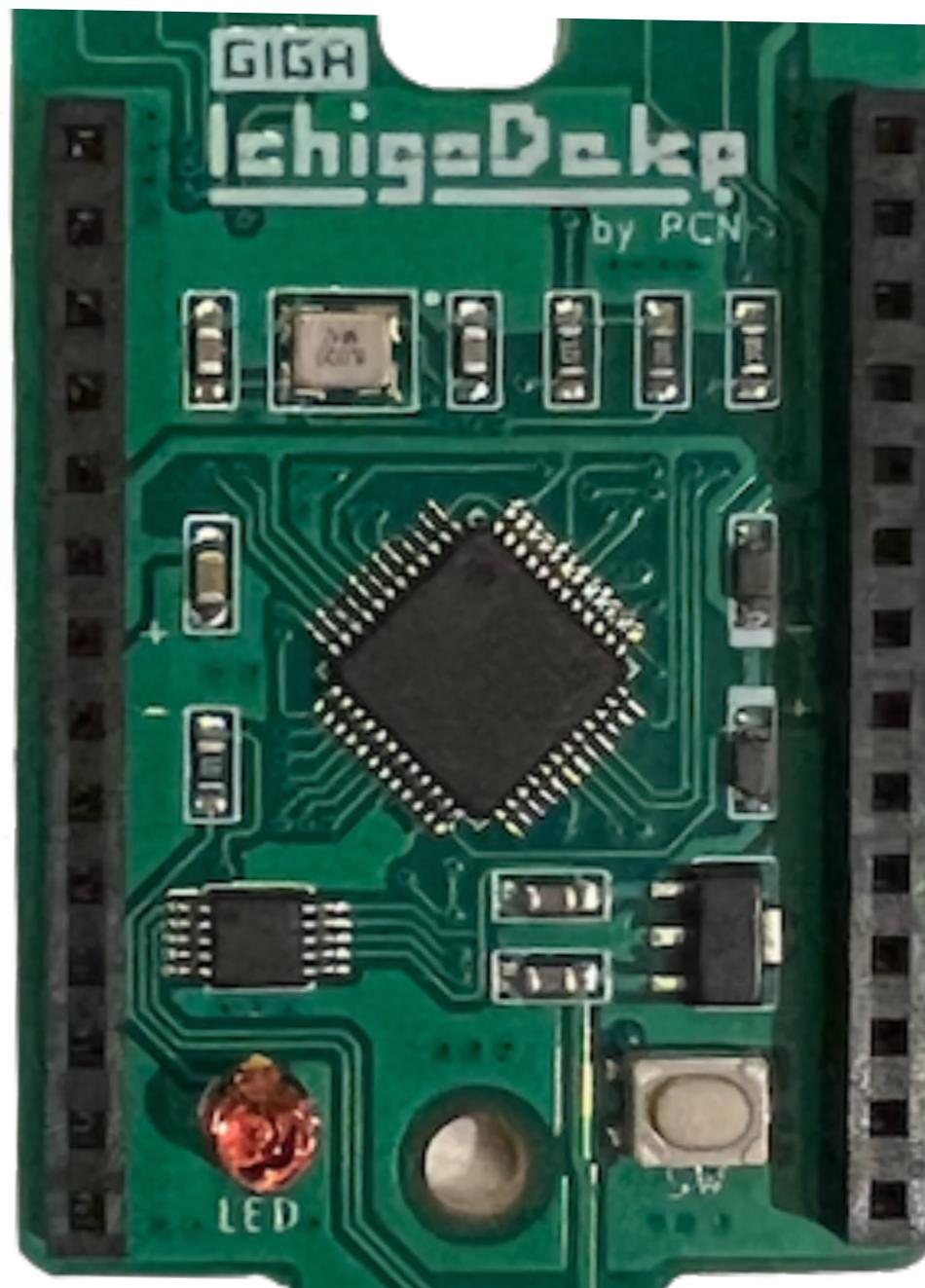
OUT1

OUT2
OUT3

OUT4

BTN

LED

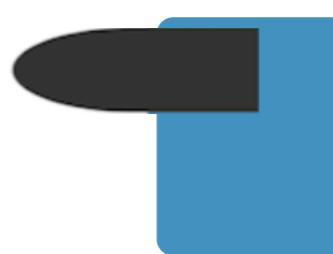
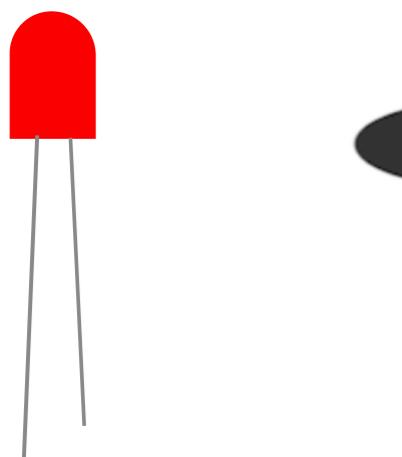


KBD1
NC
KBD2
SOUND
ISP
RESET
GND
VCC
XTAL
XTAL
OUT5
OUT6
TXD
RXD

ロボットかんせい



出力装置



LED

サーボ

処理装置



入力装置

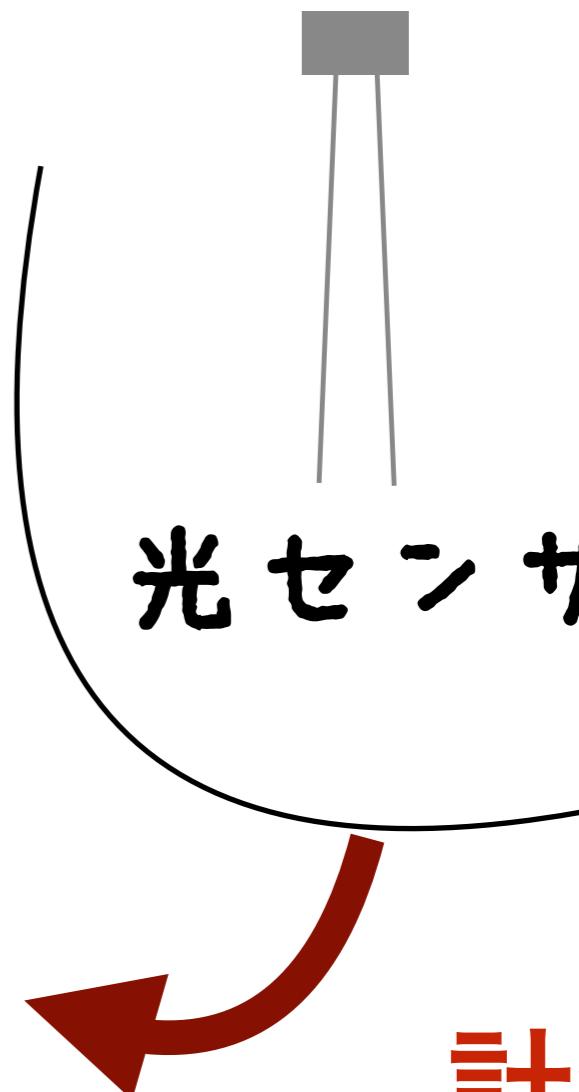
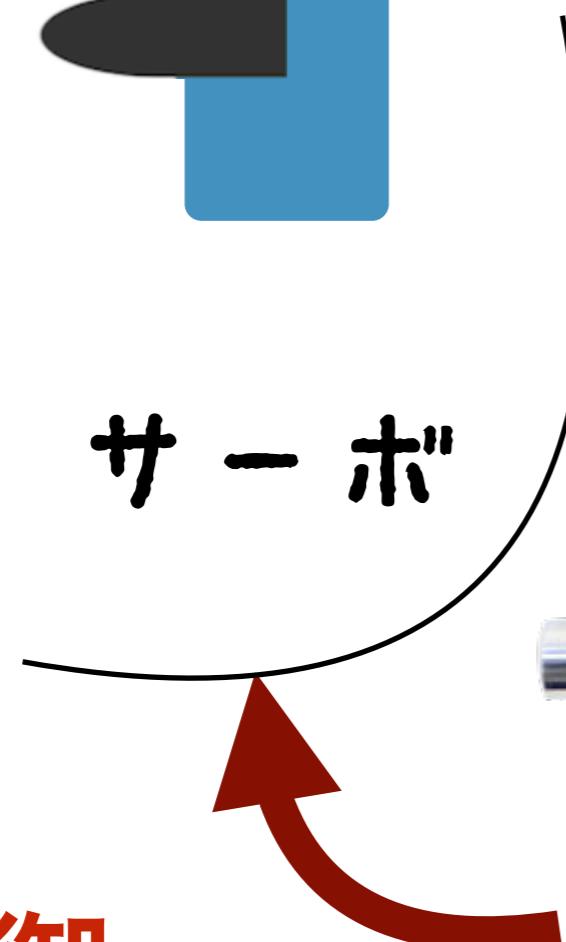


光センサー

制御

コンピューター

計測



みのまわりのロボット



パナソニック洗濯機



ぜんぶ、だれかが
プログラミングしたもの

コンピューターは
どこにいる？

