

**mruby/c: IoT system for**  
**🍷 SAKE brewery 🍷**

**HASUMI Hitoshi @hasumikin**

*Monstar Lab*

*SWEST21 ㊗️㊗️㊗️ 下呂温泉 水明館*

*Sep. 6, 2019*

# Me

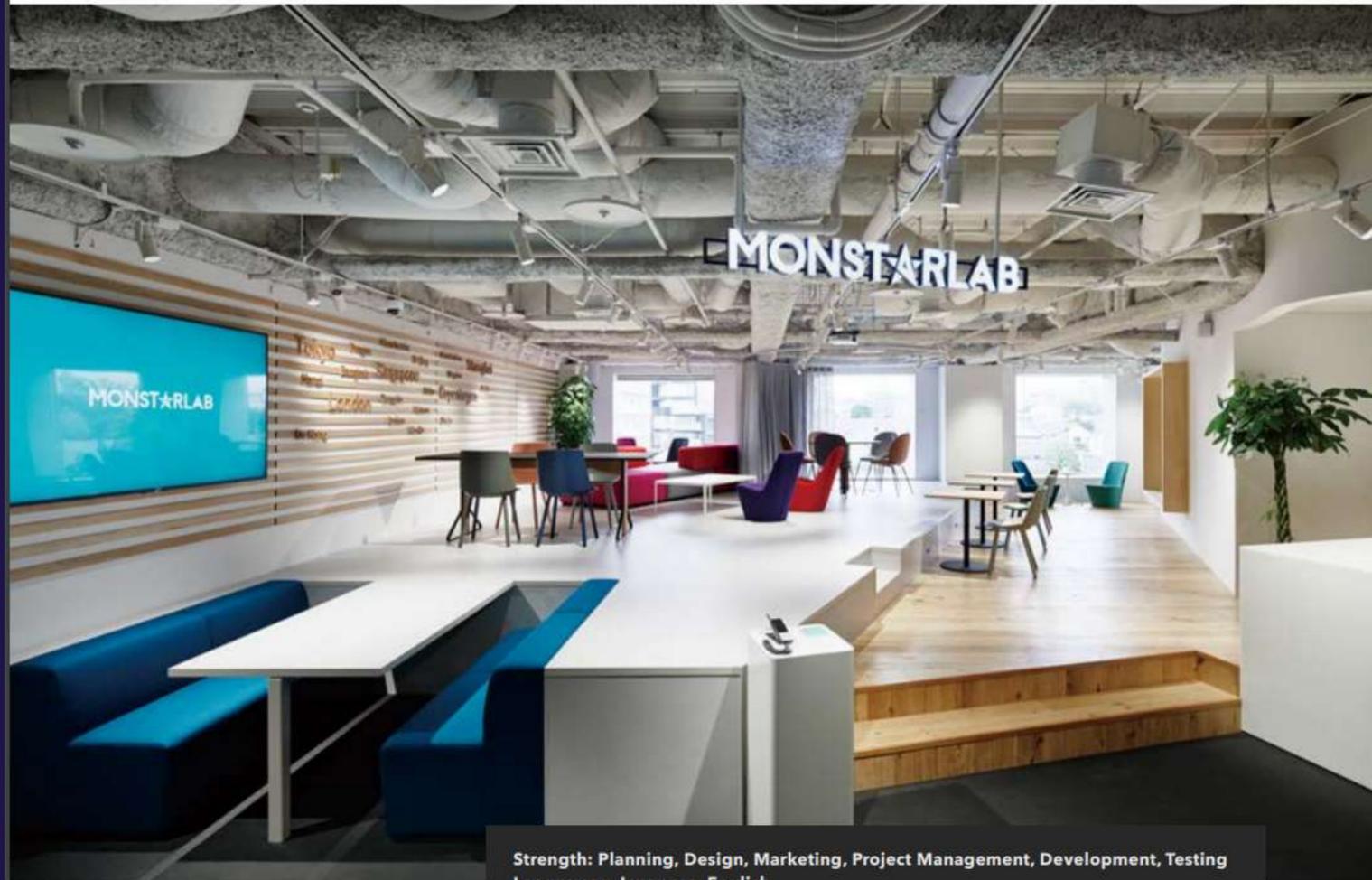
- ◉ HASUMI Hitoshi  
@hasumikin
- ◉ Matsue city,  
a holy place of Ruby
- ◉ Sake 🍶  
Soba 🍜  
Coffee ☕



The background is a solid teal color. On the left side, there are several white geometric shapes: a large triangle pointing downwards, a smaller triangle pointing upwards, and a larger triangle pointing downwards. The text 'MONSTARLAB GROUP' is positioned on the right side of the image.

**MONSTARLAB**  
GROUP

# Global Sourcing



Strength: Planning, Design, Marketing, Project Management, Development, Testing  
Languages: Japanese, English  
Development Languages: Ruby, Java, PHP, HTML/CSS, JavaScript, Swift, Objective C

# JAPAN

TOKYO/OSAKA/MATSUE/FUKUOKA



# VIETNAM

DANANG/HANOI



Strength: Mobile App Development (iOS,Android)  
Languages: Japanese, English, Vietnamese  
Development Languages: PHP, Java, Ruby, iOS,Android, Swift



Strength: Web Development  
Languages: English, Japanese, Bengali  
Development Languages: Java, PHP, JavaScript, Swift, Objective C

# BANGLADESH

DHAKA

# CHINA

BEIJING/SHANGHAI  
QINGDAO/CHENGDU



Strength: Game Development  
Languages: Japanese, English,Chinese  
Development Languages: Java, JavaScript, PHP, iOS, Android



CZECHREPUBLIC\_PRAQUE\_NODES



DENMARK\_COPENHAGEN\_NODES



PHILIPPINES\_CEBU

# ファッション



中学1年生 英語 通常学習編  
NEW HORIZEN (東京書店)

日本語に合う文になるように、適切な語を入れましよう。  
私は英語を勉強します。ジャックは日本語を勉強します。  
I study English.  
Jack studies Japanese.

0:45 5:00 x1.0 x1.4

**be動詞の文 (主語が this,that の時)**

学習済にする BOXに入れる 使い方

いつ学習済みにする?

確認テスト 問題をみる 解答をみる

この授業の前後の授業

前の授業 続きの授業

映像授業 My BOX Try IT履歴 メニュー

中学1年生 英語 通常学習編  
NEW HORIZEN (東京書店)

Unit 1 あいさつをしよう

シェイクして質問  
ここがわからない!

映像のことも、学校や塾のことも、シェイクすることで何でも質問できます。

be動詞の疑問文 (主語が this,this の時)

わからない 0

中学1年生 英語 通常学習編  
NEW HORIZEN (東京書店)

Unit 1 あいさつをしよう

まずは教科書を設定

教科書設定

- 英語 NEW HORIZEN 東京書店
- 標準 新しい数学 東京書店
- 新しい数学 (東京)
- 数学の世界 (東京書店)

始める

be動詞の疑問文 (主語が this,this の時)

わからない 0



教科書設定

- 英語 NEW HORIZEN 東京書店
- 数学 新しい数学 東京書店
- 標準
- 新しい数学 (東京書店)
- 数学の世界 (東京書店)
- 中学校 数学 (学校図書)
- 中学数学 (教育出版)
- 未来へ広がる数学 (啓林館)
- 中学校数学 (数研出版)
- 中学数学 (日本文教出版)
- 理科 新しい理科 東京書店
- 地理 新しい地理 東京書店
- 歴史 新しい歴史 東京書店
- 公民 新しい公民 東京書店
- 国語 新しい国語 東京書店

教科書設定の保存

英語: 三単現のsがわかりません。ど…

あなたの質問 2015/04/25/金 15:00  
三単現のsがわかりません。どうしてsがつくのですか? 三人称と二人称のちがいはなんですか?

トライさん 2015/04/25/金 15:00  
夜遅くの勉強お疲れ様です! 頑張っていますね。明日の12:00には回答できるようにしますね!

トライさん 2015/04/26/土 12:10  
この場合、駅は station か a station か the station のどれが適切ですか? 正解は、the station です。station は数えられる名詞 (=可算名詞) です。数えられる名詞は必ず a か the か -s をつけるものだ覚えておきましょう。

解決済み

授業一覧 My BOX 質問 学習状況 その他

[Matsue.rb](http://Matsue.rb)





- ◉ one of the best Japanese Sake brewery
- ◉ Asahi-shuzo and I make an IoT system using mruby/c

# Asahi-shuzo

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- ◉ 旭酒造(Asahi-shuzo), Yamaguchi: 瀬祭(Dassai). fruity, aromatic and sweet
- ◉ 朝日酒造(Asahi-shuzo), Niigata: 久保田(Kubota). clear, dry and sharp
- ◉ 朝日酒造(Asahi-shuzo), Fukui: ???
- ◉ 旭日酒造(Asahi-shuzo), Shimane: **十旭日(Juji-Asahi)**. tasteful, mature with years and good for お燗(warmed style)

# What is mruby/c?

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# What is mruby/c?

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- ④ [github.com/mruby/mruby](https://github.com/mruby/mruby)
- ④ yet another implementation of mruby
- ④ `/c` symbolizes compact, concurrent and capability
- ④ especially dedicated to one-chip microcontroller

# mruby and mruby/c



mruby	mruby/c
v1.0.0 in Jan 2014	v1.0 in Jan 2017
for general embedded software	for one-chip microcontroller
RAM < 400KB	RAM < 40KB

# About my IoT project

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- ④ IoT system for Asahi-shuzo
- ④ delivered to actual brew work in January 2018
- ④ devices post temperature of Sake materials in brewing, surrounding temperature and humidity to server
- ④ data is displayed on smartphone app

# About my IoT project



# What is "taking temperature" ?



what is "taking temperature" ?



# what is "taking temperature" ?



# 1st season (2017BY)

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1st season (2017BY)

---



before mruby/c

# 1st season (2017BY)



# 1st season (2017BY) architecture

---



- ④ sensortags -> (BLE) -> gateway
- ④ gateway -> (WiFi) -> router
- ④ router -> (3G) -> internet

# 1st season (2017BY) architecture



- ④ sensortags -> (BLE) -> gateway
- ④ gateway -> (WiFi) -> router
- ④ router -> (3G) -> internet

Having a stack of multiple wirelesses is so hard



# 1st season (2017BY) architecture



mruby/c



1st season (2017BY) architecture

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mruby/c

超えられない壁

# 1st season (2017BY) architecture

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- ④ a thick wall
  - ④ BLE couldn't through the wall
- ④ water everywhere
- ④ power suppply issue
  - ④ number of instrument should be minimized

# BY?

---



# BY?

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- ◉ Brewing Year, from July to June
- ◉ in Asahi-shuzo a BY work starts on November and finishes on April (depends on year)

# 2nd season (2018BY)

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2nd season (2018BY)

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A NEW HOPE

2nd season (2018BY)

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mruby/c

# 2nd season (2018BY) architecture

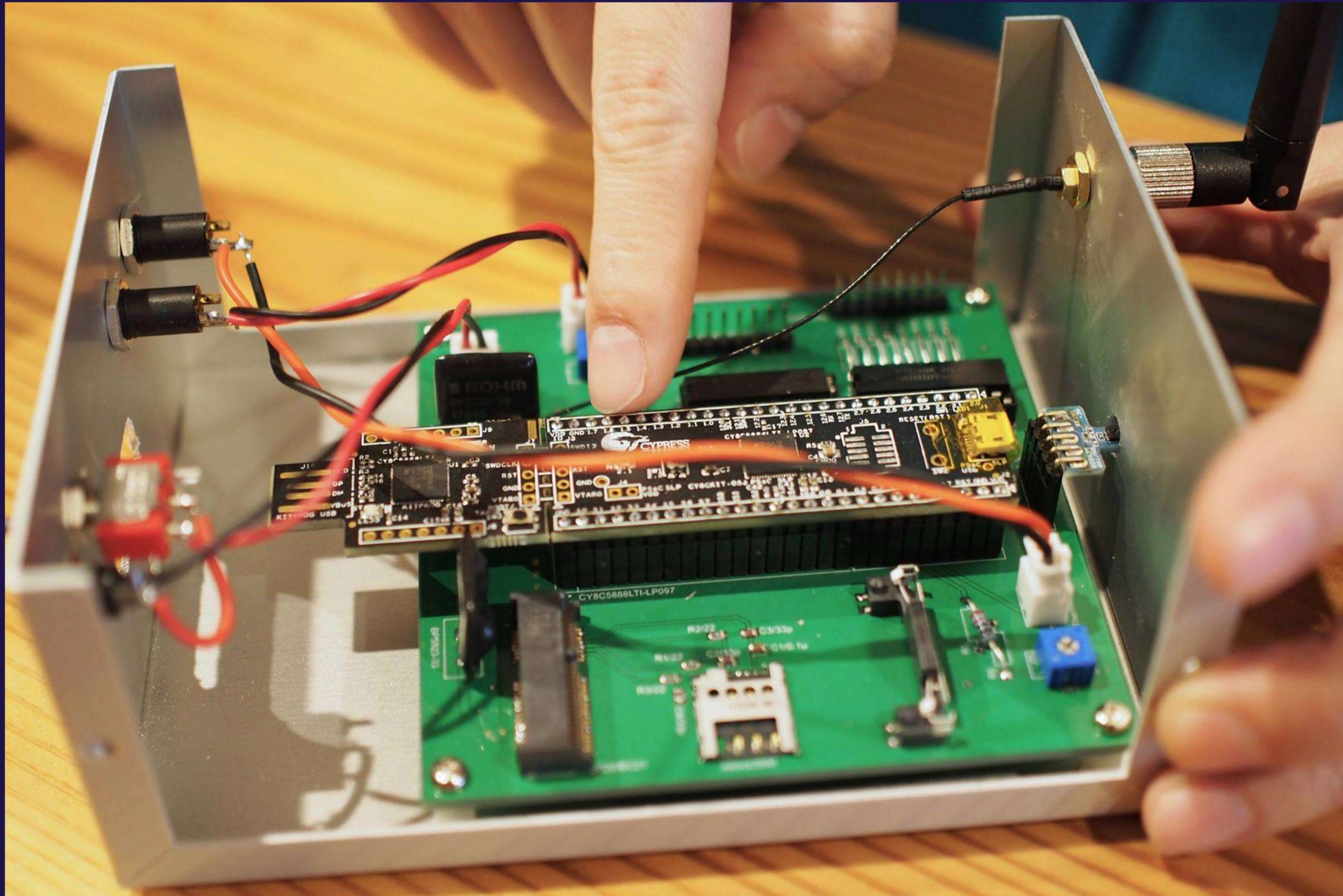
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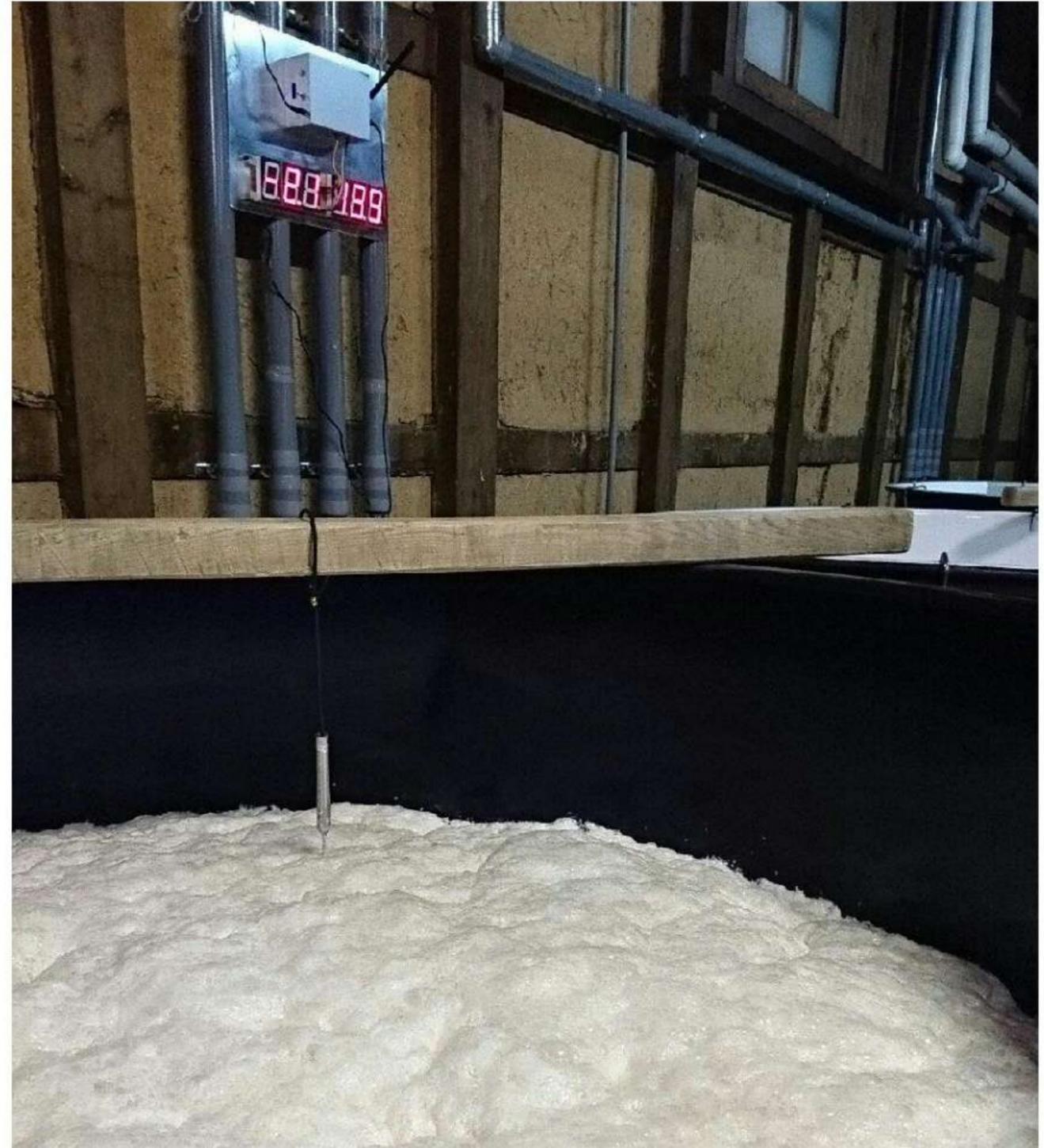
mruby/c

devices -> (3G)-> Internet

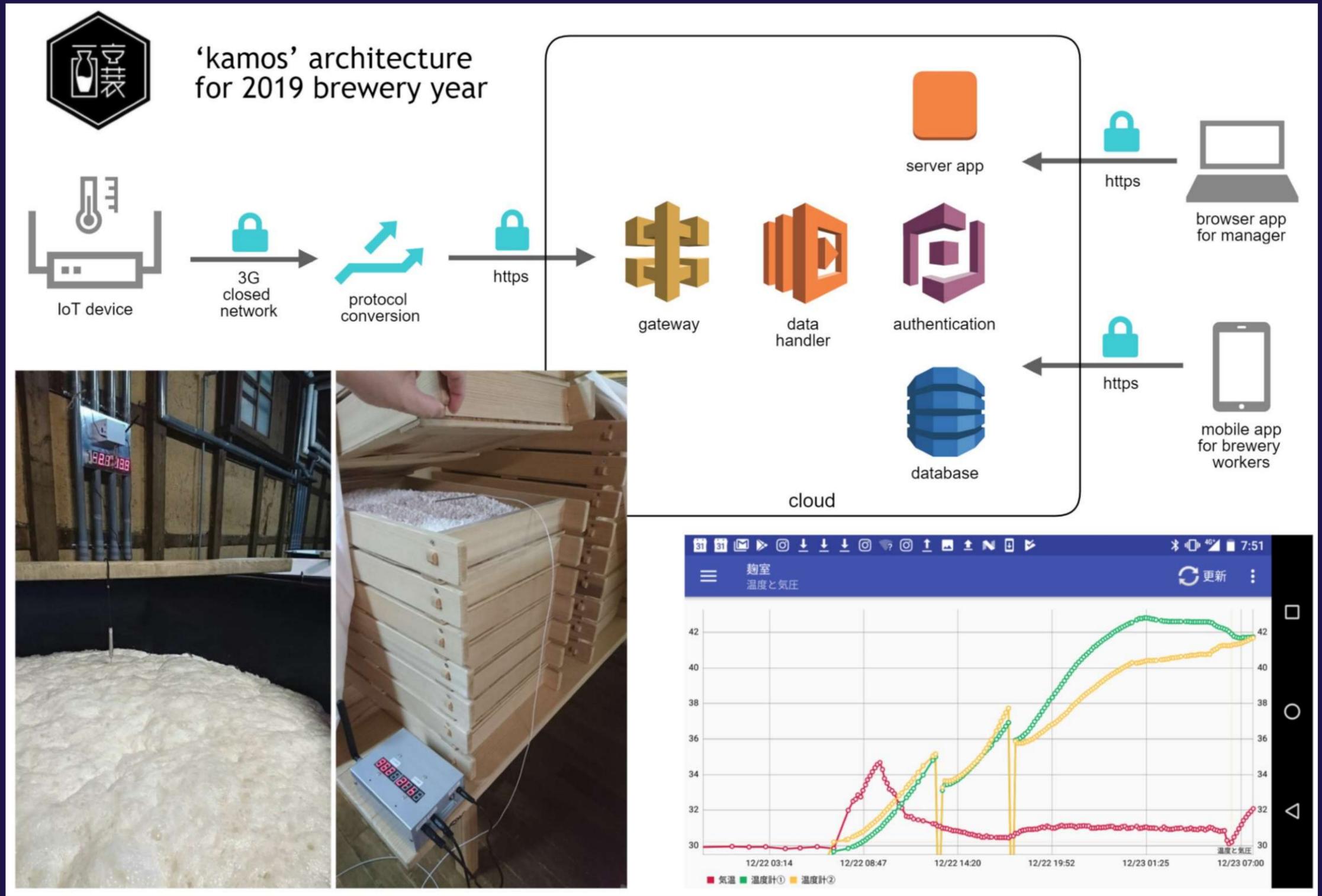
# 2nd season (2018BY) the device



# 2nd season (2018BY) architecture



# 2nd season (2018BY) architecture



# 2nd season (2018BY) mruby/c

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- ④ mruby/c does everything
  - ④ sensors - I2C, ADC
    - ④ Fixnum, Float, Math
  - ④ 7seg LED display - transistor array
    - ④ String, Mutex
  - ④ 3G communication module - UART
    - ④ String, flow control

# 2nd season (2018BY)

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## what were difficult about mruby/c?

- ⌚ we can neither do step execution nor look into appropriate memory address of mruby/c's variables
- ⌚ so many troubles in IoT
  - ⌚ hard to find why the application doesn't work well

# 2nd season (2018BY)

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## what were difficult about mruby/c?

- ⑨ mruby/c was growing
  - ⑨ bugs, lack of features, docs and examples

# 2nd season (2018BY)

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so, was mruby/c bad?

# 2nd season (2018BY)

---

## so, was mruby/c bad? - NO

- ⌚ IoT at work makes you hurry
  - ⌚ you have to go back and forth between dark 10°C storage cellar and humid 35°C manufacturing room
  - ⌚ you have to amend your firmware with your small laptop in 10 minutes
  - ⌚ you will thank Ruby's descriptiveness and agility



mruby/c

## **Firmware Programming with mruby/c**

HASUMI Hitoshi

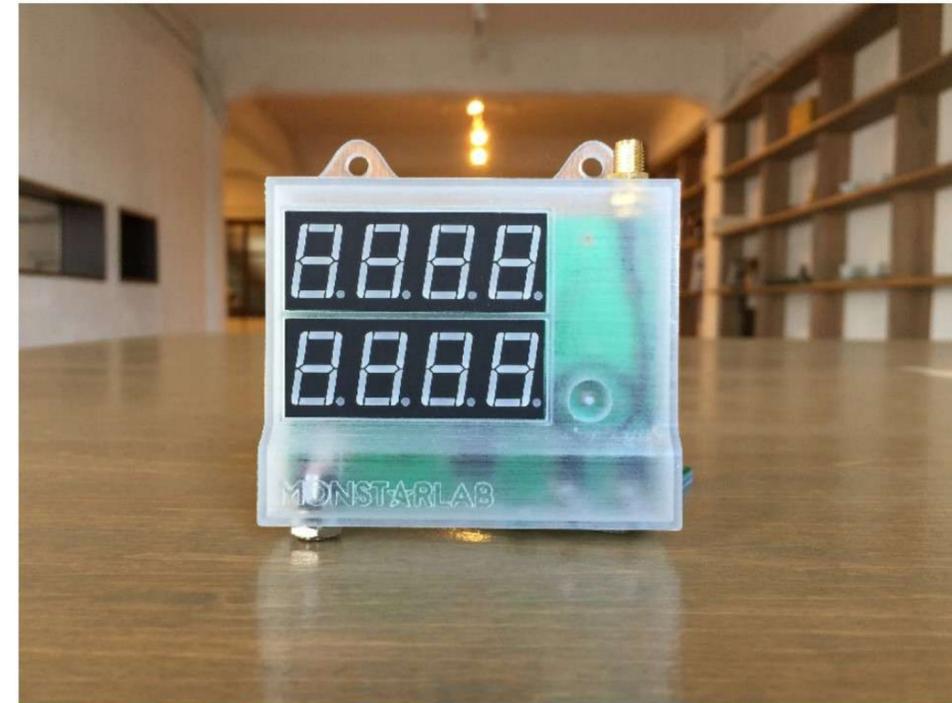
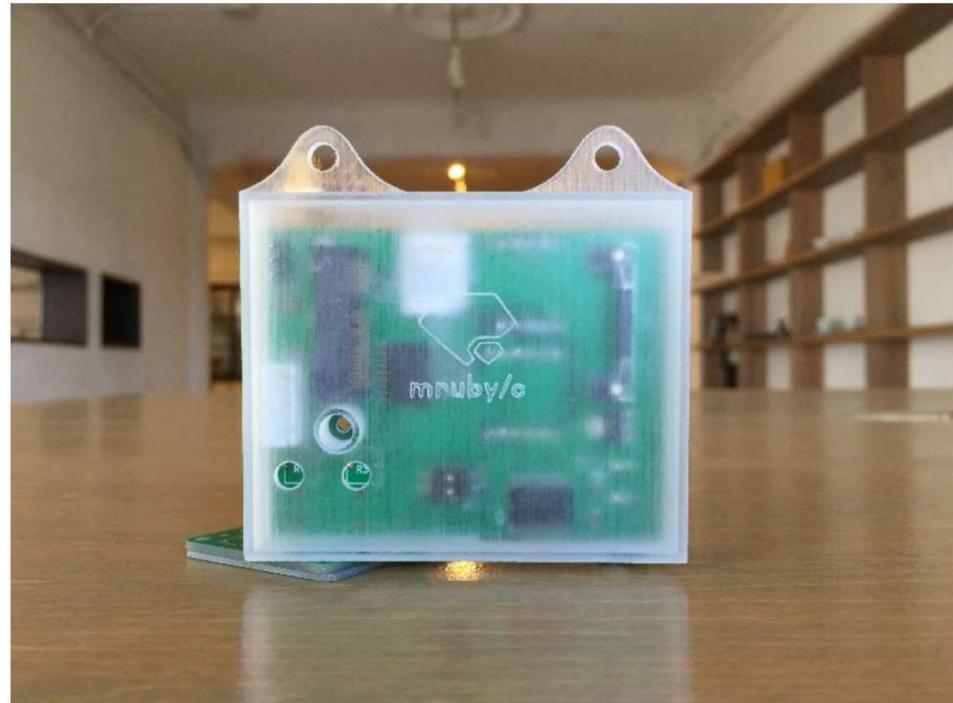
*Monstar Lab, Matsue office*

*2018/6/1*

RubyKaigi2018@Sendai International  
Center



# 3rd season (2019BY)



MONSTARLAB

# Practical mruby/c firmware development with CRuby

HASUMI Hitoshi @hasumikin

*RubyKaigi 2019*

*April 19, 2019*

Fukuoka International Congress Center



## mrubyc-test.gem - internal

- the gist is creating **test.rb** by `test code generator` implemented in CRuby

```
class Sample
  def hoge
    "fuga"
  end
end
```

```
class SampleTest < MrubycTestCase
  def some_case
    obj = Sample.new
    assert_equal obj.hoge, "fuga"
  end
end
```

```
SampleTest#some_case
  assertion : assert_equal
  result    : fuga
Finished
1 examples, 0 failures
```



# Technology stack of IoT (1/2)

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- ⑨ TCP/IP
- ⑨ cloud service
- ⑨ RDB and KVS
- ⑨ server programming
- ⑨ mobile programming
- ⑨ security
- ⑨ test

# Technology stack of IoT (2/2)

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- ⑨ high school physics electricity and transistor
- ⑨ microcontroller and peripherals like UART, I2C, ADC, etc.
- ⑨ circuit and PCB artwork
- ⑨ soldering and wiring
- ⑨ 3D CAD for housing
- ⑨ suppliers
- ⑨ firmware programming

# Summary

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- ⑨ mruby/c
- ⑨ mruby/c
- ⑨ mruby/c
- ⑨ mruby/c

# Summary

---

- ④ mruby/c is a Ruby for microcontroller
- ④ mruby/c
- ④ mruby/c
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# Summary

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- ⑨ mruby/c is a Ruby for microcontroller
- ⑨ mruby/c runs on Asahi-shuzo
- ⑨ mruby/c
- ⑨ mruby/c

# Summary

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- ⑨ mruby/c is a Ruby for microcontroller
- ⑨ mruby/c runs on Asahi-shuzo
- ⑨ mruby/c can be ensured by test
- ⑨ mruby/c

# Summary

---

- ⑨ mruby/c is a Ruby for microcontroller
- ⑨ mruby/c runs on Asahi-shuzo
- ⑨ mruby/c can be ensured by test
- ⑨ mruby/c is ready

Thank you!