

前期 第7回 実験報告（実験日：R6年6月3日） 名列番号：38 氏名：宮里 孝希

第7回 Arduino マイコンのプログラミング基礎からD C モータの駆動まで

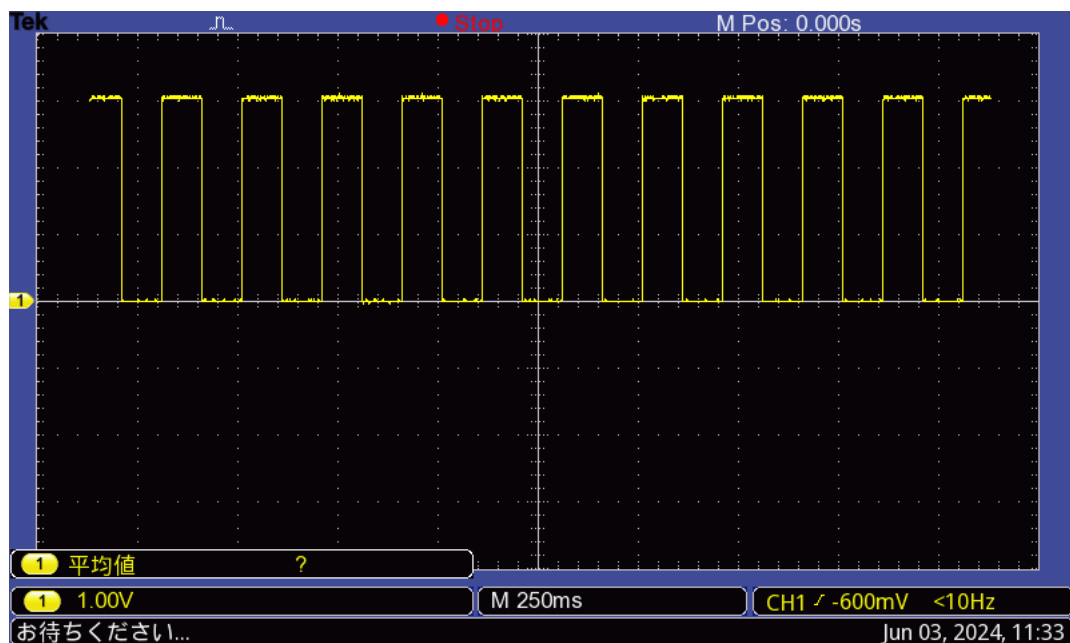
1. 実験手順 1
  - a. 0.1 秒間隔



```
shiro89dev.local:[0] 1:nvim* [2024-06-03(月) 13:48]
1 #include <Arduino.h>
2
3 const int ledPin = 3;
4
5 void setup() {
6   pinMode(ledPin, OUTPUT);
7 }
8
9 void loop() {
10  digitalWrite(ledPin, HIGH);
11  delay(100);
12  digitalWrite(ledPin, LOW);
13  delay(100);
14 }

src/main.cpp 13,12 全て
"src/main.cpp" 14L, 208B 書き込み

~/G/4D_Experiment/0603 on main +6 !2 ?8
28% 13 GB 20 kB↓ 3.1 kB↑
```



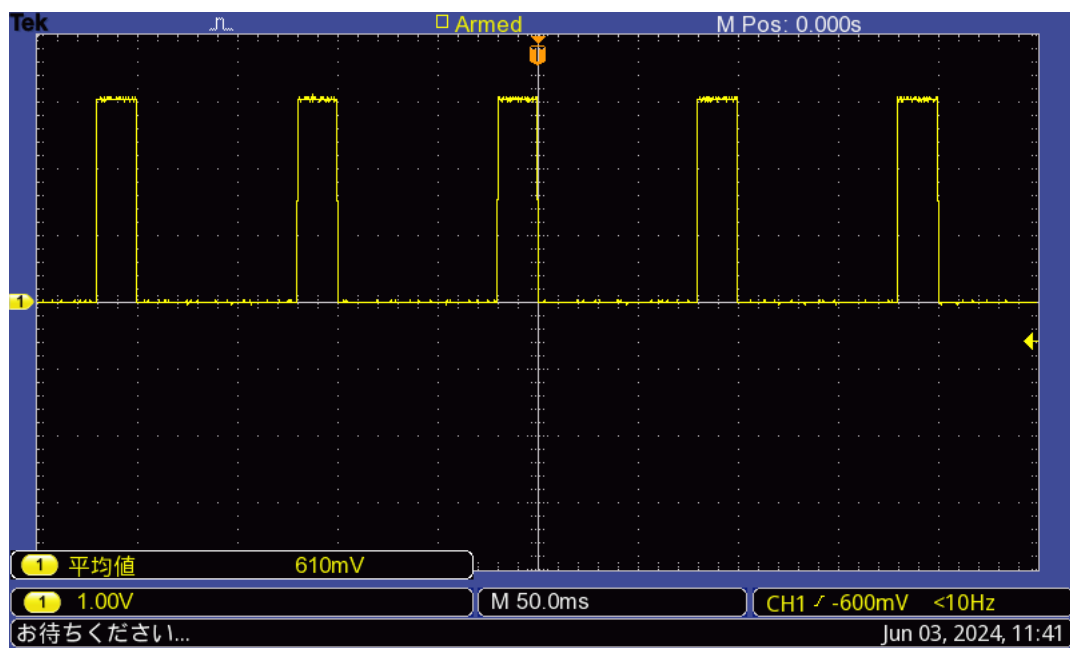
b. Duty 20:80

```
shiro89dev.local:[1] 1:zsh* [2024-06-03(月) 13:48]
1 #include <Arduino.h>
2
3 const int ledPin = 3;
4
5 void setup() {
6     pinMode(ledPin, OUTPUT);
7 }
8
9 void loop() {
10    digitalWrite(ledPin, HIGH);
11    delay(20);
12    digitalWrite(ledPin, LOW);
13    delay(80);
14 }
```

src/main.cpp 13,12 全て

~/G/4D\_Experiment/0603 on main +6 !2 ?8

Q~ 松平 24% 12 GB 7.2 kB↓ 0.0 kB↑



## 2. 実験手順 2

a. a を送ると b が送信される

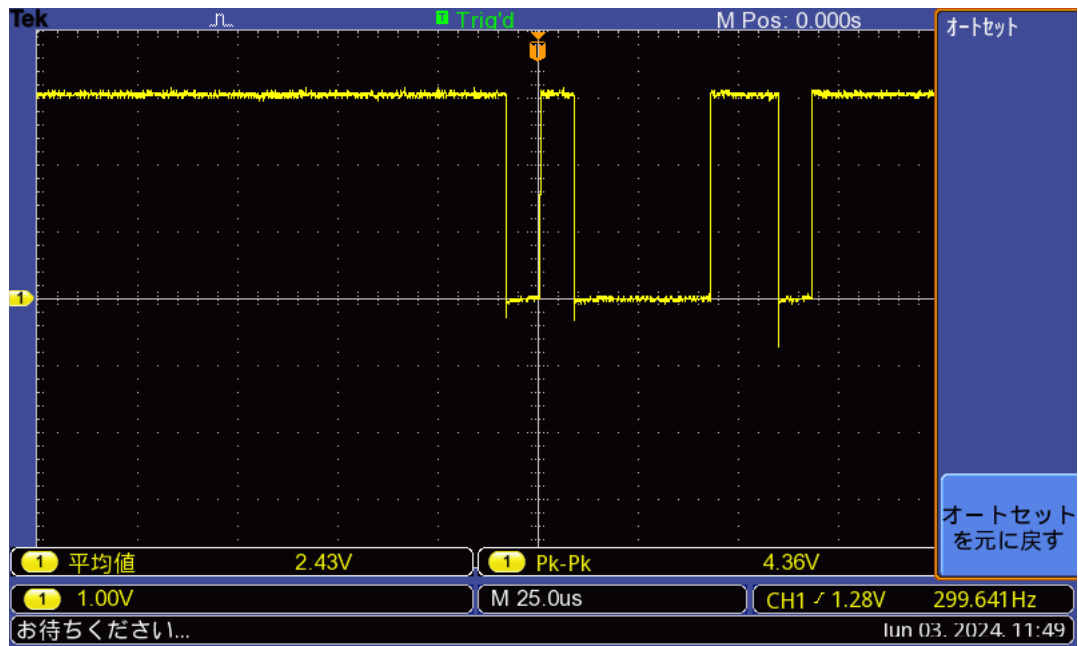
A screenshot of a terminal window with a dark background. At the top, there are three colored window control buttons (red, yellow, green) and the text "tmux". Below this, the terminal shows the file path "shiro89dev.local:[0]" on the left, "1:nvim\*" in the center, and the timestamp "[2024-06-03(月) 13:53]" on the right. The main area contains a C++ program for an Arduino Uno. The code is as follows:

```
1 #include <Arduino.h>
2
3 void setup() {
4     Serial.begin(115200);
5 }
6
7 void loop() {
8     if (!Serial.available()) {
9         return;
10    }
11
12    char input = Serial.read();
13    if (input == 'a') {
14        Serial.println("b");
15    }
16 }
```

The bottom of the terminal has a status bar. On the left, it says "src/main.cpp". In the center, it shows "13,23" and "全て". On the right, there are system metrics: "19%", "12 GB", "29 kB↓", and "7.2 kB↑".

[illegible]

b. 無限 a 送信



c. 文字 1 の送信で L E D 点灯, 0 で消灯

```
shiro89dev.local:[2] tmux 1:[tmux]* [2024-06-03(月) 13:59]
1 #include <Arduino.h>
2
3 const int ledPin = 3;
4
5 void setup() {
6   Serial.begin(115200);
7   pinMode(ledPin, OUTPUT);
8 }
9
10 void loop() {
11   static bool ledStatus = false;
12   digitalWrite(ledPin, ledStatus);
13
14   if (!Serial.available()) {
15     return;
16   }
17
18   switch (Serial.read()) {
19     case '0':
20       ledStatus = false;
21       break;
22     case '1':
23       ledStatus = true;
24       break;
25     default:
26       break;
27   }
28 }
```

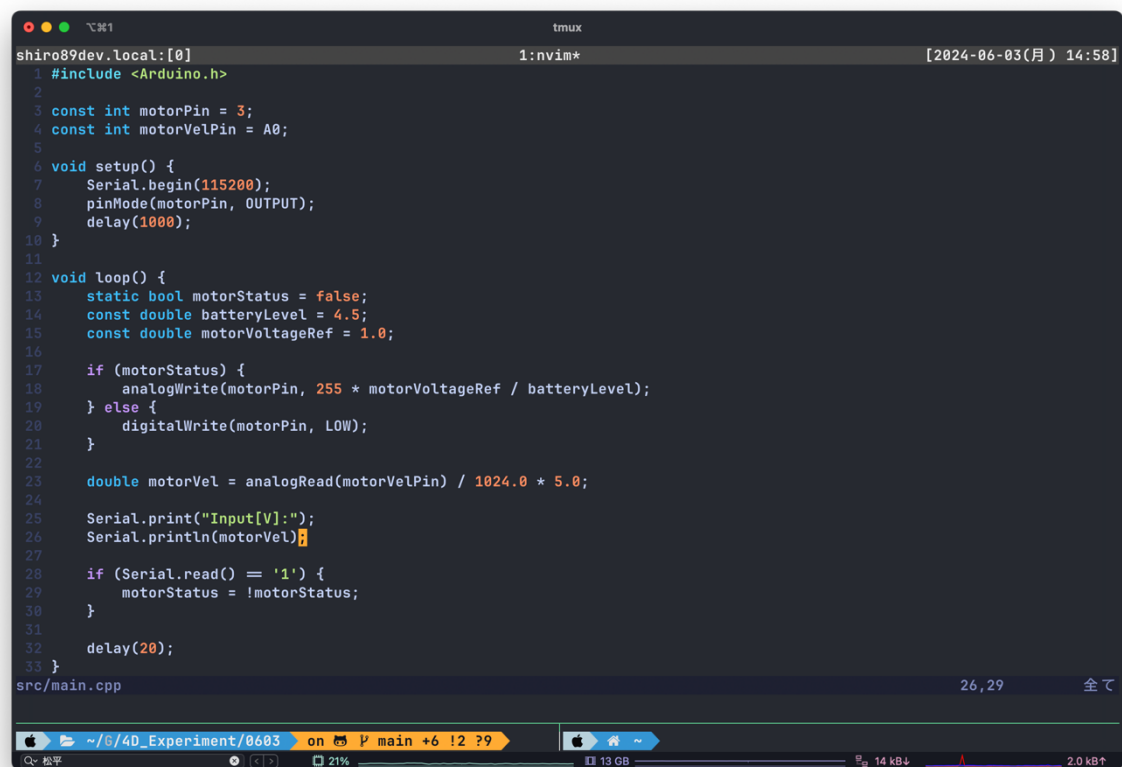
src/main.cpp 19,17 全て

~/4D\_Experiment/0603 on P main +6 !2 ?8

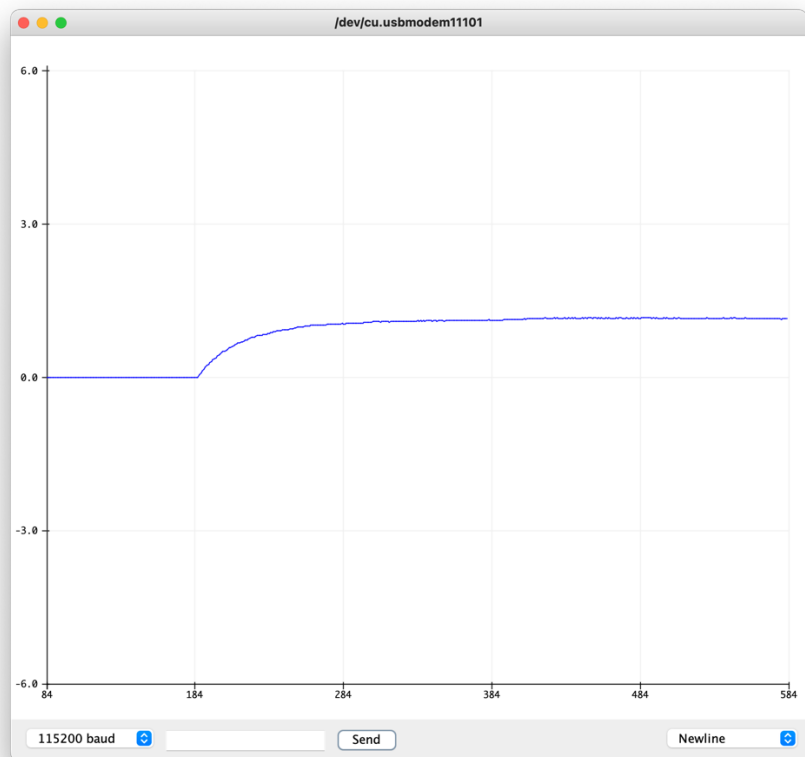
12 GB 20 kB↓ 6.2 kB↑

### 3. 実験手順 1

- a. 3 番 PWM 出力で DC モーター動作, A0 で計測



```
shiro89dev.local:[0] 1:nvim* [2024-06-03(月) 14:58]
1 #include <Arduino.h>
2
3 const int motorPin = 3;
4 const int motorVelPin = A0;
5
6 void setup() {
7   Serial.begin(115200);
8   pinMode(motorPin, OUTPUT);
9   delay(1000);
10 }
11
12 void loop() {
13   static bool motorStatus = false;
14   const double batteryLevel = 4.5;
15   const double motorVoltageRef = 1.0;
16
17   if (motorStatus) {
18     analogWrite(motorPin, 255 * motorVoltageRef / batteryLevel);
19   } else {
20     digitalWrite(motorPin, LOW);
21   }
22
23   double motorVel = analogRead(motorVelPin) / 1024.0 * 5.0;
24
25   Serial.print("Input[V]:");
26   Serial.println(motorVel);
27
28   if (Serial.read() == '1') {
29     motorStatus = !motorStatus;
30   }
31
32   delay(20);
33 }
src/main.cpp 26,29 全て
```



b. MsTimer2 版 (タイマーが干渉するため, motorPin を 5 に変更)

```
shiro89dev.local:[0] 1:nvim* [2024-06-03(月) 15:39]
1 #include <Arduino.h>
2 #include <MsTimer2.h>
3
4 const int motorPin = 5;
5 const int motorVelPin = A0;
6
7 volatile double motorVel = 0.0;
8 volatile bool motorStatus = false;
9
10 void interruptHandler() {
11     motorVel = analogRead(motorVelPin) / 1024.0 * 5.0;
12     Serial.print("Input[V]:");
13     Serial.println(motorVel);
14     if (Serial.read() == '1') {
15         motorStatus = !motorStatus;
16     }
17 }
18
19
20
21 void setup() {
22     Serial.begin(115200);
23     pinMode(motorPin, OUTPUT);
24     MsTimer2::set(20, interruptHandler);
25     MsTimer2::start();
26 }
27
28
29 void loop() {
30     const double batteryLevel = 4.5;
31     const double motorVoltageRef = 1.0;
32     if (motorStatus) {
33         analogWrite(motorPin, 255 * motorVoltageRef / batteryLevel);
34     } else {
35         digitalWrite(motorPin, LOW);
36     }
37 }
38 }
```

src/main.cpp 38L, 770B 書込み 38.1 全て

