



Physics 524  
Survey of Instrumentation and Laboratory Techniques  
2023

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Unit 7: Debugging

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### ***Goal for this unit***

- Figuring out what's wrong with Things That Are Broken

### ***Heh heh***

Let's do this like some kind of perverse TV game show. I'll try to stump you; raise your hand when you think you've spotted the problem(s) with the various circuits and code fragments.

**Snake #1**

What's wrong with this program?

```
"""
I attempt (incorrectly!) to sum the numbers from 1 to 5.
The correct result is 15, of course. What's wrong with my code?

This file is p524_7_01.py
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October 14, 2023
"""

sum = 0

for i in range(1, 5):
    sum = sum + i

print("The answer is ", sum)
```

Please raise your hand when you figure it out, but don't give away the answer.

**Snake #2**

What's wrong with this one?

```
"""
I attempt to do an element-by-element sum of two arrays.
I expect the answer to be [5, 7, 9] but it's not!
What's wrong with my code?

This file is p524_7_02.py
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"""

a = [1, 2, 3]
b = [4, 5, 6]
c = a + b
print(a, b, c)
```

Please raise your hand when you figure it out, but don't give away the answer.

**Snake #3**

...and this one?

```
"""
I once again attempt (incorrectly) to do an element-by-element sum of
two arrays. Why aren't cc and dd identical?'

This file is p524_7_03.py
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"""

import numpy as np

a = [1, 2, 3]
b = [4, 5, 6]
aa = np.array(a)
bb = np.array(b)
cc = np.array(a + b)
dd = np.array(aa + bb)
print(cc, dd)
```

**Snake #4**

...and this one?

```
"""
Why doesn't the following return 36 as its answer?

This file is p524_7_04.py
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"""

print("6^2 = ", 6^2)
```

**Snake #5**

...and this one?

```
"""
Why won't this compile?

This file is p524_7_05.py
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University of Illinois
October 14, 2023
"""
print(sin(0.5))
```

***Snake #6***

...and this one?

```

"""
Why won't this execute properly?

This file is p524_7_06.py
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University of Illinois
October 14, 2023
"""
MyArray = [1, 2, 3, 4]
print("array element 1 is ", MyArray[1])
print("array element 2 is ", MyArray[2])
print("array element 3 is ", MyArray[3])
print("array element 4 is ", MyArray[4])

```

***Snake #7***

...and this one?

```

"""
Why won't this compile?

This file is p524_7_07.py
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"""
for i in range(0, 10)
    print(i)

```

***Pablonic folly #8***

What's wrong with this Arduino IDE program?

```

/*
this file is p524_7_08.ino. Why won't it compile?

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*/
a = 3;

void setup() {
    Serial.begin(115200);
    while(!Serial) {}
}

void loop() {
    Serial.println(a);
} (i)

```

***Pablonic folly #9***

...and this one?

```
    /*
    this file is p524_7_09.ino. Why won't it compile?

    George Gollin
    University of Illinois
    October 15, 2023
    */
    int a = 3;

    void setup() {
        Serial.begin(115200);
        while(!Serial) {}
        Serial.println(a);
    }
```

***Pablonic folly #10***

...and this one?

```
    /*
    this file is p524_7_10.ino. Why won't it compile?

    George Gollin
    University of Illinois
    October 15, 2023
    */
    int a = 3;

    void setup() {
        Serial.begin(115200);
        while(!Serial) {}
    }

    void loop() {
        Serial.println(a)
    }
```

***Pablonic folly #11***

...and this one?

```
/*
this file is p524_7_11.ino. Why won't it compile?

George Gollin
University of Illinois
October 15, 2023
*/
int i;

void setup() {
  Serial.begin(115200);
  while(!Serial) {}
  for(i in range(0,10)) {Serial.println(a);}
}

void loop() {
}
```

***Pablonic folly #12***

...and this one?

```
/*
this file is p524_7_12.ino. Why won't it compile?

George Gollin
University of Illinois
October 15, 2023
*/
int a = 3;

void setup() {
  Serial.begin(115200);
  while(!Serial) {}
  for(int i = 0, i < 10, i++){Serial.println(a);}
}

void loop() {
}
```

***Pablonic folly #13***

What value is printed on the serial monitor, and why?

```

/*
this file is p524_7_13.ino. What value is printed on the serial
monitor, and why?

George Gollin
University of Illinois
October 15, 2023
*/
int i = 3;

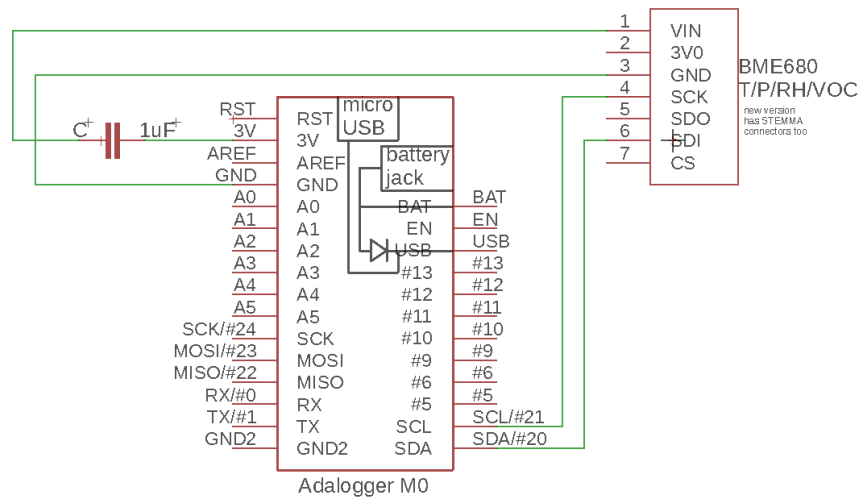
void setup() {
  Serial.begin(115200);
  while(!Serial) {}
  int i = 8;
}

void loop() {
  Serial.println(i);
  delay(1000);
}

```

***Electronic irritations #14***

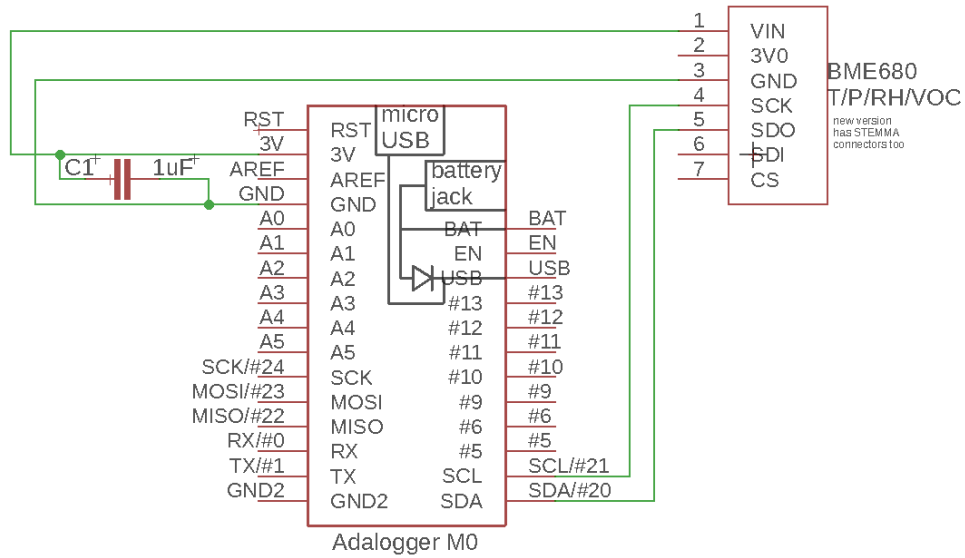
What is wrong with this circuit?





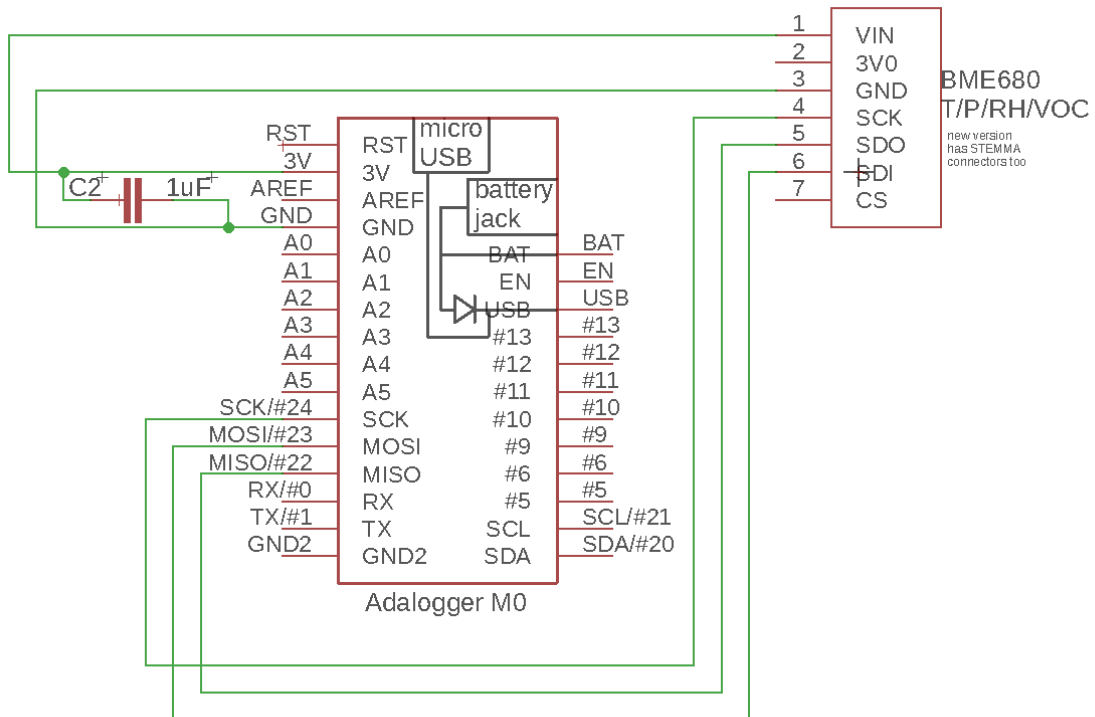
**Electronic irritations #15**

...and with this one?



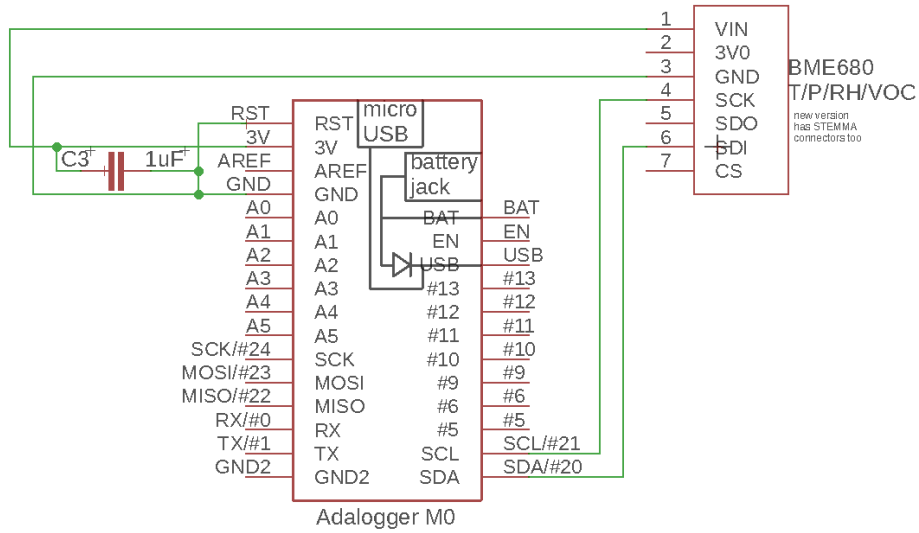
**Electronic irritations #16**

...and this one?



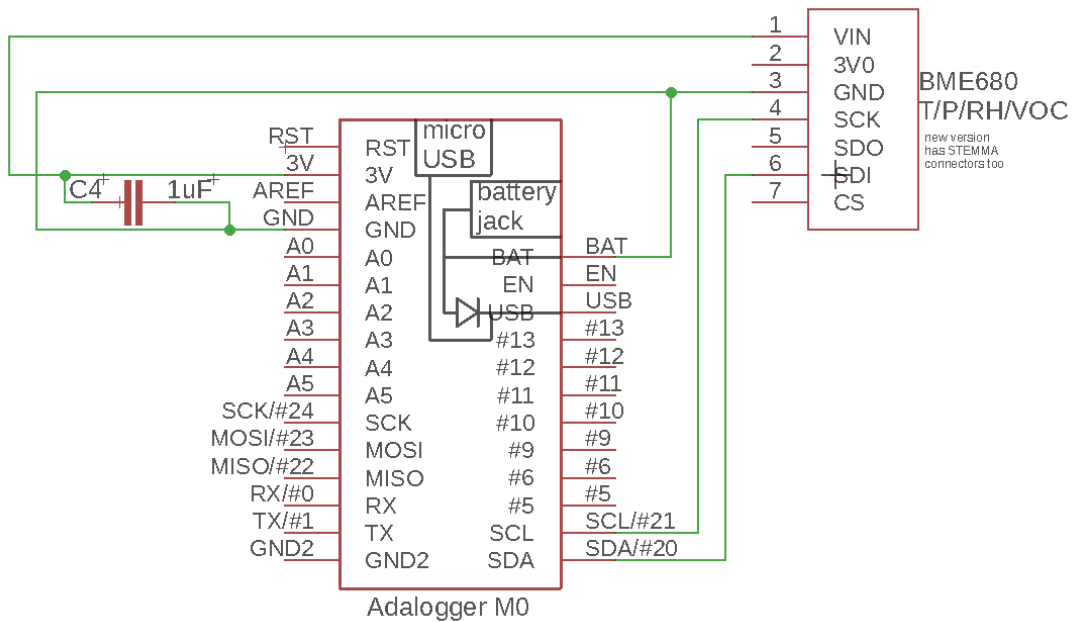
**Electronic irritations #17**

...and this?



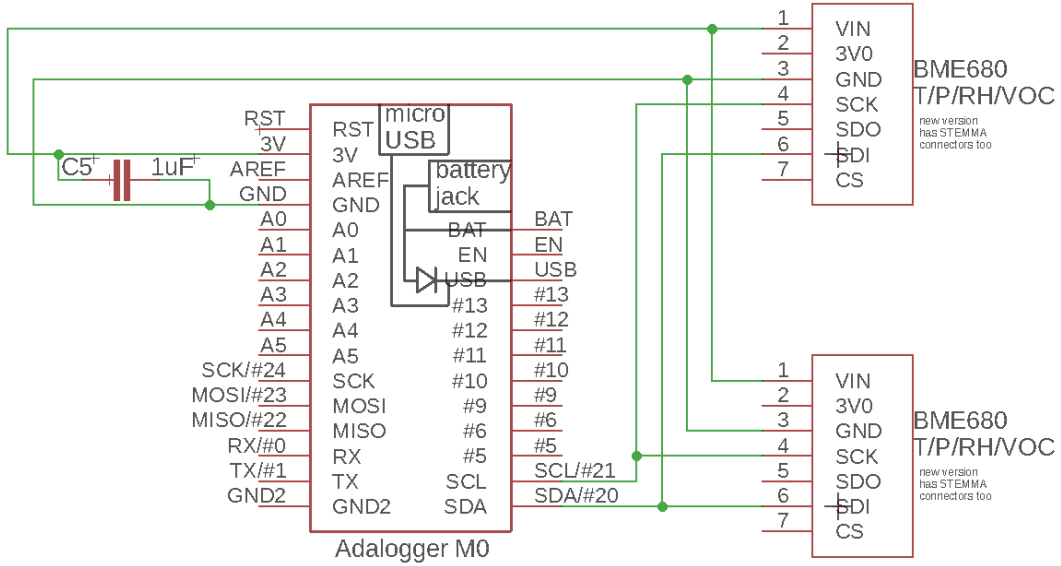
**Electronic irritations #18**

...and this?



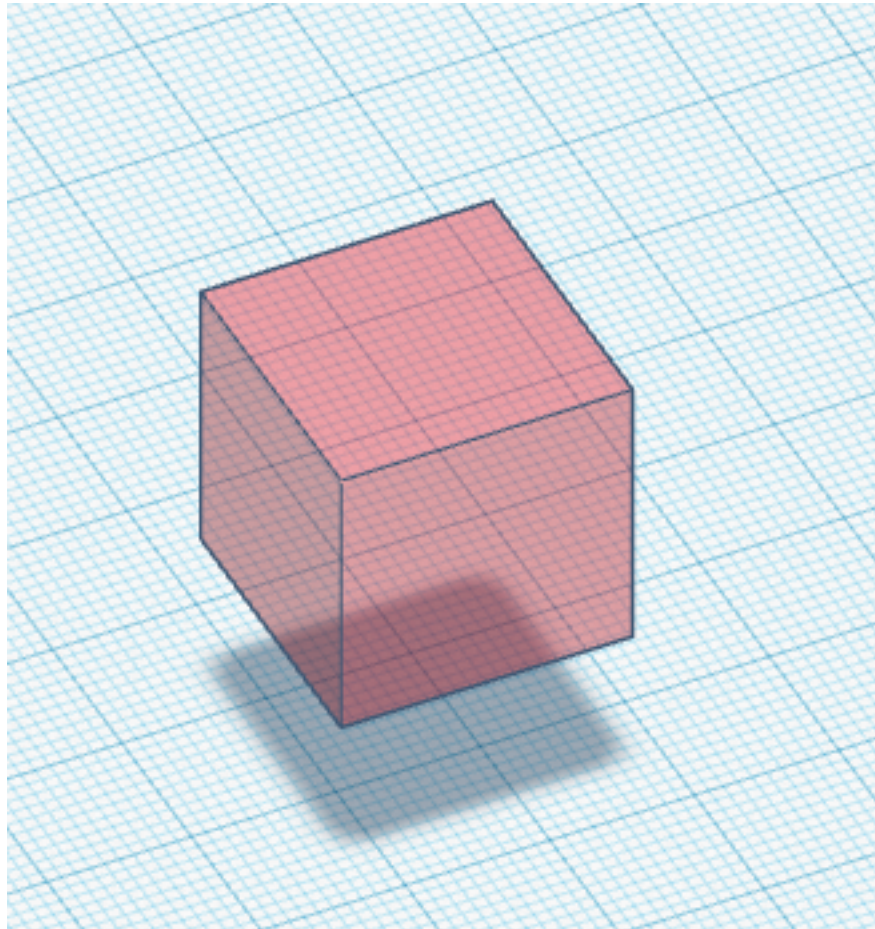
**Electronic irritations #19**

...and this?



***Tinkercad spaghetti, no doubt #20***

What's wrong with this 3D model?

***Homework***

None, but please finish getting your projects breadboarded!



In case you're curious:

Here's Pablo.



... and here's some Ultimaker spaghetti!

