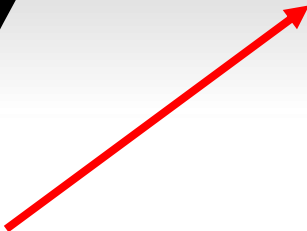




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ARDUINO STEAM ACADEMY



Art without Engineering is dreaming. Engineering without Art is calculating.

- Steven K. Roberts



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ARDUINO DEBUGGING

Developing A Process For Finding Errors And Fixing Them FAST

Why Is It Called “Debugging”?

What Useful Tools Could You Use To Debug Your Code?



MOTH IN THE MACHINE: DEBUGGING THE ORIGINS OF 'BUG'




9/9

0800 Antam started
 1000 " stopped - antam ✓
 1300 (032) MP - MC ~~1.952647000~~ { 1.2700 9.037 847 025
 (033) PRO 2 2.130476415 } 9.037 846 995 conch
 conch 2.130676415 } 4.615925059 (-2)

Relays 6-2 in 033 failed special speed test
 in relay .. 11.000 test.

Relays changed

1100 Started Cosine Tapc (Sine check)
 1525 Started Multi + Adder Test.

1545  Relay #70 Panel F
 (moth) in relay.

First actual case of bug being found.

~~1630~~ 1630 Antam started.
 1700 closed down.

Relay 3376

“Debugging” Attributed to Admiral Grace Hopper in the 1940s, but the term "bug" in the meaning of technical error dates back at least to 1878 and Thomas Edison



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DEBUGGING IS A METHODOICAL PROCESS OF:



- Finding and reducing the number of bugs, or defects, in a computer program or a piece of electronic hardware, making it behave as expected.
- Debugging tends to be harder when various subsystems are tightly coupled, as changes in one may cause bugs to emerge in another.
- "games are the worst to debug"... Why?
- Spaghetti code?



DEBUG SKETCH

<https://github.com/jimTheSTEAMClown/rubeGoldbergWorkshop>

Defines Variables. →

```
16 // =====  
17 // define variables that will be used in the sketch  
18 const int arduinoBoardLED = 13; // LED on pin 13  
19
```

Setup Function

This is stuff that runs one time

```
20 // =====  
21 // The setup routine runs once when you load the sketch or press reset:  
22 // This is where you define pin directions  
23 void setup()  
24 {  
25  
26     Serial.begin(9600); // Use Serial Monitor to debug  
27     Serial.println("Beginning of Setup");  
28     // initialize the digital pin as an output.  
29     Serial.println("Setting I/O pin Status and Direction");  
30     pinMode(arduinoBoardLED, OUTPUT);  
31  
32     // This only runs one time  
33     Serial.println("Printing something in the Setup Function");  
34     Serial.print("The pin the LED is connected to: "); // this prints text, but no line feed or return  
35     Serial.println(arduinoBoardLED); // this prints a Var and a line feed and return  
36     Serial.println("Setup Complete");  
37 }  
38
```

Main Loop

```
39 // =====  
40 // the "main" loop routine runs over and over again forever:  
41 void loop()  
42 {  
43     //Set the LED pin to HIGH. This provides 5 volts to the LED and turns it on  
44     digitalWrite(arduinoBoardLED, HIGH);  
45     delay(250); //Wait for a second  
46     //Set the LED pin to LOW. This turns it off  
47     digitalWrite(arduinoBoardLED, LOW);  
48     delay(250); //Wait for a second  
49     Serial.print(".");  
50 }
```

jimTheSTEAMClown committed on GitHub Update steamClass_DebugOneTimeInLoop

README.md	Update README.md
steamClass_BLINK	Update steamClass_BLINK
steamClass_BLINK_WithComments	Create steamClass_BLINK_WithComments
steamClass_Debug	Create steamClass_Debug
steamClass_DebugOneTimeInLoop	Update steamClass_DebugOneTimeInLoop

Search for “_STEAMClown”
Then select
“debugOneTimeInLoop”

jimTheSTEAMClown Create debugOneTimeInLoop

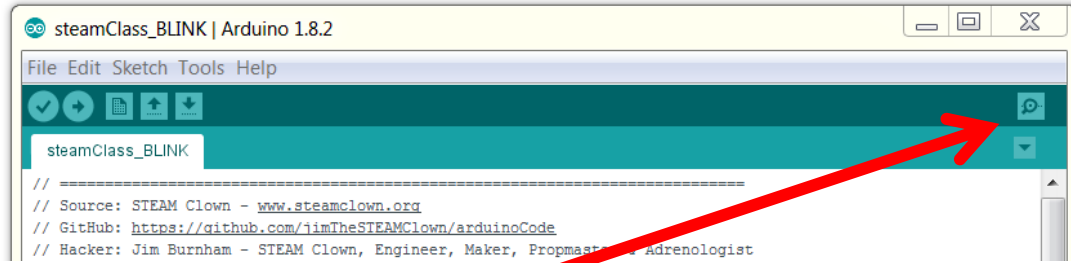
- LICENSE
- README.md
- debugOneTimeInLoop_STEAMClown**



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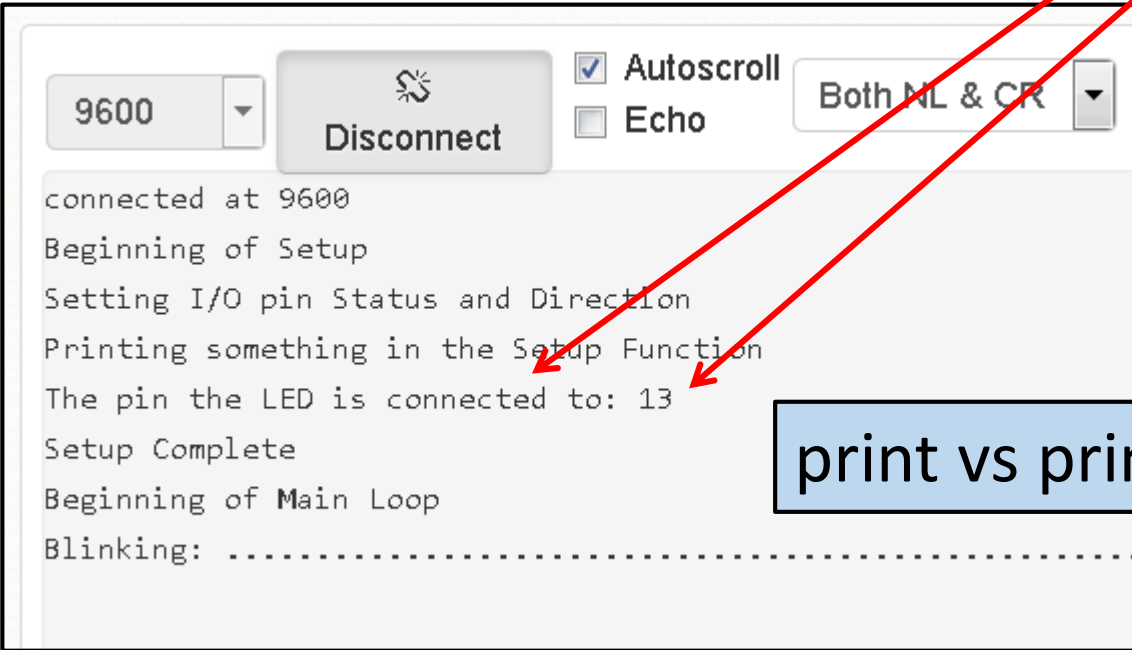
DEBUGGING



Serial Monitor

- Setup → Serial.begin(9600)
- Loop → Serial.println(variable or text string);

```
18 // =====
19 // The setup routine runs once when you load the sketch or press reset:
20 // This is where you define pin directions
21 void setup()
22 {
23
24   Serial.begin(9600);           // Use Serial Monitor to debug
25   Serial.println("Beginning of Setup");
26   // initialize the digital pin as an output.
27   pinMode(arduinoBoardLED, OUTPUT);
28
29   // This only runs one time
30   Serial.println("Printing something in the Setup Function");
31   Serial.print("The pin the LED is connected to: "); // this prints text, but no line feed
32   Serial.println(arduinoBoardLED); // this prints a Var and a line feed and return
33   Serial.println("Setup Complete");
34 }
35
36 // =====
37 // the "main" loop routine runs over and over again forever:
38 void loop()
39 {
40
41   if (firstTimeThroughLoopVar == 0) // only does this one time
42   {
43     Serial.println("Beginning of Main Loop");
44     Serial.print("Blinking: ");
45     firstTimeThroughLoopVar = 1; // set so next time through the loop this is skipped
46   }
47
48   //Set the LED pin to HIGH. This provides 5 volts to the LED and turns it on
49   digitalWrite(arduinoBoardLED, HIGH);
50   delay(250); //Wait for a second
```



print vs println

- You can Do a Lot with a Blinking LED!!!
- Comments Are Bug Prevention... Why?





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APPENDIX



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REFERENCE SLIDES



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IS IT POSSIBLE TO GET HELP?

- Git Hub – See [Steam Clown's Files](#)
- <http://www.arduino.cc/> ← Official Arduino Site
- <http://www.arduinobook.com/>
- Google Is Your Friend...
 - Google [Arduino Getting Started](#)
 - Google [Arduino Tutorials](#)
 - Google [Arduino Sketches](#)
- PDF books
 - [Arduino Programmers Notebook](#)
 - [Arduino in a Nutshell](#)
 - [Introduction to Arduino - A piece of cake!](#)
- YouTube
 - [Arduino: Your First Arduino Sketch](#)
 - [Tutorial 01 for Arduino: Getting Acquainted with Arduino](#)

