**Level 1: Understanding the Blink Example**

**Level 2: Using External Documentation**

2. There is a setup function, within that setup function there is the pinMode method which is using the Constant = LED\_BUILTIN and setting it as an OUTPUT, meaning that, that pin (usually pin 13 for the built in led) as an OUTPUT. There is also a loop function which will keep on running over and over. Within that function there is a digitalWrite() it takes a pin number and a constant of LOW or HIGH low will turn off while high will turn on. Finally there is a delay function which takes in a number, this number is milliseconds of delay, so if you do something like this delay(1000) it will wait 1 second since there is 1000 milliseconds in 1 second.

4. Constants are predefined expressions in the Arduino language; so it’s meant to be more or less a read only thing. Unlike a variable where you can create as much as you want, edit and change them throughout the code, they can be read and written.

5.

Syntax Error:

A Syntax error pretty much means that something you wrote doesn’t add up, for example an if statement is structured like “if (statement) { code }” if you didn’t do that, it will error.

Logic Error:

A logic error is something that is caused by mixing two things that can’t really go

Together. An Example is, like in python when you try to minus a number from a string it throws and error because a string isn’t a number.

Run-time Error:

This happens when you’re program is already running and it collides with an error. This can be caused by memory leaks, a code error while compiling.

**Level 3: Using External Documentation**

1. **void** setup() {
2. // put your setup code here, to run once:
3. pinMode(LED\_BUILTIN, OUTPUT);
4. }
6. **void** blink(**int** totalTime) {
7. digitalWrite(LED\_BUILTIN, HIGH);
8. delay(totalTime);
9. digitalWrite(LED\_BUILTIN, LOW);
10. delay(totalTime);
11. }
13. **void** loop() {
14. // put your main code here, to run repeatedly:
15. **for** (**int** i = 0; i < 2; i++) {
16. blink(200);
17. }
19. blink(1000);
20. }

**Level 4: Add External LED**

1. //Which pin in the external LED connected to?
2. **int** externalLED = 10;
4. **void** setup() {
5. // put your setup code here, to run once:
6. pinMode(LED\_BUILTIN, OUTPUT);
7. pinMode(externalLED, OUTPUT);
8. }
10. **void** blink(**int** led, **int** delaytime) {
11. digitalWrite(led, HIGH);
12. delay(delaytime);
13. digitalWrite(led, LOW);
14. delay(delaytime);
15. }
17. /\*\*
18. \* If Sync is true, then the led and external led will blink together
19. \* Otherwise, they'll offset
20. \*\*/
21. **void** synced(boolean sync) {
22. **if** (sync) {
23. **for** (**int** i = 0; i < 2; i++) {
24. digitalWrite(externalLED, HIGH);
25. digitalWrite(LED\_BUILTIN, HIGH);
26. delay(200);
27. digitalWrite(externalLED, LOW);
28. digitalWrite(LED\_BUILTIN, LOW);
29. delay(200);
30. }
31. digitalWrite(externalLED, HIGH);
32. digitalWrite(LED\_BUILTIN, HIGH);
33. delay(1000);
34. digitalWrite(externalLED, LOW);
35. digitalWrite(LED\_BUILTIN, LOW);
36. delay(1000);
37. } **else** {
38. **for** (**int** i = 0; i < 2; i++) {
39. blink(LED\_BUILTIN, 200);
40. blink(externalLED, 1000);
41. }
42. blink(LED\_BUILTIN, 500);
43. blink(externalLED, 100);
44. }
45. }
47. **void** loop() {
48. // put your main code here, to run repeatedly:
49. synced(**false**);
50. }