

# INTRO. TO ELECTRICAL AND COMPUTER ENG. — ECE5: HOMEWORK #1

**Exercise 1** (Issues with variables). All the following sketches include minor errors that prevent compilation and/or produce undesired behavior. Please correct each snippet of code and explain what was wrong with the original version.

*Hint: You can use the Arduino IDE (with your computer connected to a board) or <https://www.tinkercad.com> (without a board) to test your code.*

```
1  /* Desired Behavior: print "Hello World" 10 times */
```

```
2
3  void setup() {
4      int i = 0;
5      Serial.begin(9600);
6  } declare and initialize i outside of any function,
7  so loop() can access it
8  void loop() {
9      delay(10000);
10     Serial.println("Hello World");
11     i = i + 1;
12     if (i>=10){
13         return;
14     } move this if statement to before
15     line 10, since if it checks and returns after
        it prints "Hello World" it would print forever
```

Correct code:

```
int i = 0;
void setup() {
    Serial.begin(9600);
}
```

```
void loop() {
    delay(100);
    if (i >= 10){
        return;
    }
    Serial.println("Hello World");
    i = i + 1;
}
```

```
16 /* Desired Behavior: print "Hello World" 10 times */
```

```
17
18 void setup() {
19     Serial.begin(9600);
20 }
21 declare and initialize i outside
22 void loop() { of loop(), otherwise it will
23     delay(10000); keep declaring and setting it
24     int i = 0; to 0 infinitely
25     Serial.println("Hello world");
26     i = i + 1; fix the "w" in "Hello World" to be uppercase
27     if (i >= 10) {
28         return;
29     } again, print "Hello World" after you check i
30 }
```

Correct code:

```
int i = 0;
void setup() {
    Serial.begin(9600);
}
```

```
void loop() {
    delay(100);
    if (i >= 10){
        return;
    }
    Serial.println("Hello World");
    i = i + 1;
}
```

```
31 /* Desired Behavior: print "Hello World" 10 times */
```

```
32
33 int i;
34 void setup() {
35     i = 0;
36     Serial.begin(9600);
37 }
38
39 void loop() {
40     delay(10000); again, print "Hello World" after you check i
41     Serial.println("Hello World");
42     i = i + 0.4;
43     if (i >= 4){
44         return;
45     } Since i is an int, adding a decimal value less than
46     1 does not do anything, since it gets truncated
```

Correct code:

```
int i = 0;
void setup() {
    Serial.begin(9600);
}
```

```
void loop() {
    delay(100);
    if (i >= 10){
        return;
    }
    Serial.println("Hello World");
    i = i + 1;
}
```

**Note.** The function

`Serial.println("text")` display the string `text` into a computer connected to the Arduino through the USB port. To use this function you need to include `Serial.begin(9600)`; in your `setup()` function.

**Note.** The numeric argument in `Serial.begin(9600)`; specifies the speed of communication with the laptop. It is generally a good idea to set it as high as possible, often `Serial.begin(115200)`; . However, this requires changing the data rate in the IDE's monitor window.

```

47  /* Desired Behavior: print the numbers 0 to 255 exactly once */
48  change char to int here
49  char i; //hint what limitations does this have?
50  void setup() {
51      i = 0;
52      Serial.begin(9600);
53  }
54
55  void loop() {
56      Serial.println(i);
57      i = i + 1;
58
59      if (i >= 256){
60          return;
61      } check if i is less than or equal
62      } to 256 before you print i

```

Correct code:

```

int i;
void setup() {
    i = 0;
    Serial.begin(9600);
}

void loop() {
    if (i >= 256){
        return;
    }
    Serial.println(i);
    i = i + 1;
}

```

**Exercise 2** (Resistor datasheet). In the class web site you can find the datasheet for the carbon film fixed resistors manufactured by Royal Ohm. Use the datasheet to answer the following questions:

1. What is the part number for a 220 Ohm resistor with a power rating of .25W at 70C and that can withstand a maximum working voltage of 250V, with a tolerance of  $\pm 5\%$  ?

Please provide the full 14 digit part number, assuming you want to purchase a box of 1000 resistors (bulk), with 38mm lead wires. **CFR0W4J0251B17**

*Hints:  $\pm 5\%$  tolerance corresponds to the E24 series. This information, together what you can find in the first 2 pages of the datasheet should be enough to help you sort out this question.*

2. What is the diameter and length of the desired resistors? **Diameter: 2.5 Length: 6.8**

3. If your design only required a working voltage of 100V, could you use a smaller resistor?

**Yes**

*Note: When a manufacturer sells 220 Ohm resistors with  $\pm 5\%$ , the commitment is that all the resistors sold have resistance that differs from 220 Ohms by no more than  $\pm 5\%$ , which in this case means that the resistors will be in the range 209–231 Ohms.*