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.

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.

```
1  /* Desired Behavior: print "Hello World" 10 times */
2
3  void setup() {
4    int i = 0;
5    Serial.begin(9600);
6  }
7
8  void loop() {
9    delay(10000);
10   Serial.println("Hello World");
11   i = i + 1;
12   if (i>=10){
13     return;
14   }
15 }
```

declare and initialize i outside of any function, so loop() can access it

move this if statement to before 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
22 void loop() {
23   delay(10000);
24   int i = 0;
25   Serial.println("Hello world");
26   i = i + 1;
27   if (i >= 10) {
28     return;
29   }
30 }
```

declare and initialize i outside of loop, otherwise it will keep declaring and setting it to 0 infinitely

fix the "w" in "Hello World" to be uppercase

again, print "Hello World" after you check i

```
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);
41   Serial.println("Hello World");
42   i = i + 0.4;
43   if ( i >= 4){
44     return;
45   }
46 }
```

```
/* Desired Behavior: print the numbers 0 to 255 exactly once */

char i; //hint what limitations does this have?
void setup() {
  i = 0;
  Serial.begin(9600);
}

void loop() {
  Serial.println(i);
  i = i + 1;

  if (i >= 256){
    return;
  }
}
```

Exercise 2 (Resistor datasheet)**.** In the class web site you can find the datasheet for the carbon film fixed resistors manufactored 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.

   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?

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

Note: When a manufactor sells 220 Ohm resistors with $\pm 5\%$, the commitment is that all the resistors sold have resistance that differes 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.