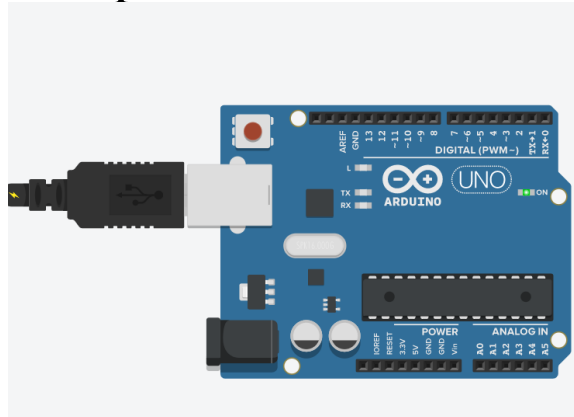


LAB REPORT 3

Ben Giftakis

3/2/20

Screenshot + Components:



- Arduino – single board computer

Summary:

- I created the code to first initialize a series of chars in memory addresses 0-7 with a checksum output going in memory address 8, then made a function that creates a checksum by XOR'ing the memory addresses 0-7 sequentially, then taking its compliment.

Results:

```
initial check
```

```
000    h
001    R
002    I
003    P
004    L
005    E
006    Y
007    O
008
```

```
EEPROM has been reinitialized
```

```
000    T
001    R
002    I
003    P
004    L
005    E
006    X
007    9
008    □
```

Conclusions:

- Learned syntax for bitwise operations
- Found out that the serial monitor doesn't always show the checksum char
- It was quite helpful to do my own initializing in the beginning to show that "corruption" that took place. It made things a little easier to visualize.

Code:

```
#include <EEPROM.h>

void setup()
{
    Serial.begin(9600);
    EEPROM.write(0, 'T');//0
    EEPROM.write(1, 'R');//1
    EEPROM.write(2, 'I');//2
    EEPROM.write(3, 'P');//3
    EEPROM.write(4, 'L');//4
    EEPROM.write(5, 'E');//5
    EEPROM.write(6, 'Y');//6
    EEPROM.write(7, 'O');//7

    // for test purposes only
    EEPROM.write(0, 'h'); // overwrite something to simulate data corruption

    // print initial state of EEPROM
    Serial.println("initial check");
    printEEPROM();

    // if checksum is not OK, reinitialize EEPROM to default values
    if((checkSum() & 0xff) != EEPROM.read(0x08)) {
        initialize();
        Serial.println("EEPROM has been reinitialized");
    }
    else {
        Serial.println("EEPROM checksum is OK");
    }

    printEEPROM();
}

void loop() {}
```

```

void printEEPROM() {
    for(int address = 0; address < 0x09; address++) {
        // read a byte from the current address of the EEPROM
        char value = EEPROM.read(address);

        if (address < 0x10)
            Serial.print("00");
        else if (address < 0x100)
            Serial.print("0");
        Serial.print(address, HEX);
        Serial.print("\t");
        Serial.print(value);
        Serial.println();
    }
    Serial.println();
}

void initialize() {
    //put some initial values in addresses 0x0 through 0x7
    EEPROM.write(0, 'T');//0
    EEPROM.write(1, 'R');//1
    EEPROM.write(2, 'I');//2
    EEPROM.write(3, 'P');//3
    EEPROM.write(4, 'L');//4
    EEPROM.write(5, 'E');//5
    EEPROM.write(6, 'X');//6
    EEPROM.write(7, '9');//7

    EEPROM.write(8, checksum()); //recalculate checksum and store it at 0x
8
}

char checksum() {
    char chksm = EEPROM.read(0);
    for (int i = 1; i<8;i++){
        chksm = chksm ^ EEPROM.read(i);
    }
    chksm = ~chksm;
    return chksm; //just a default value so the code compiles
}

```