Day 2 group 19 - S214809, s225044

5a

Code is commented for function

```
int incomingByte = 0; // defines a variable as integer (not a constant)
void setup() {
        Serial.begin(9600);
}
void loop() {
        if (Serial.available() > 0) { // checks if Serial connection is
active
                incomingByte = Serial.read(); // If active reads
                Serial.print("I received: ");
                Serial.println(incomingByte, DEC); // and prints
(converted to decimal)
        }
}
```

- [x] ~~5b: Implement the code in your own IDE.~~
- [x] ~~5c: Open the serial monitor (ctrl+shift+m), and set it to "no line ending". Send some data using the top line of the serial monitor.~~

5d: Why are you not receiving what you wrote? (e.g. G becomes 71)

It converts to an ASCII char so 'A' becomes 65 and newline is 10

5e: What happens if the serial monitor sends a line ending?

It outputs `received 10`

5f: Try changing the line Serial.print(incomingByte, DEC) to Serial.print((char)incomingByte).

What happens?

It does not output `received 10`

Why?

Because the serial monitor does not automatically send a line ending

6a: What is a char? How many bits does one use?

A char represents an ASCII character with 8 bits

6b: What is the resulting character stored in the variable mychar ?

```
char mychar = '4'; // 52
int val = mychar-'0'; // 52 - 48 = 4
mychar = (char)(val+'A'-1) // 4+65-1 = 68 = D
```

Value is 68 or D

6c: Make a program that lights an LED depending on what character has been send to the Uno

- [x] ~~The LEDs should represent the letters a, b, c, d and e. One LED for each letter.~~
- [x] ~~When sending one of the first five letters of the alphabet (case invariant) the corresponding LED must light up.~~
- [x] ~~All other characters should turn off all five LEDs.~~
- [x] ~~Lamps should only turn off if an unknown character is sent.~~

```
int incomingByte = 0; // defines a variable as integer (not a constant)

const int delayTime = 1000;

const int ledA = 2;
const int ledB = 8;
const int ledC = 11;
const int ledD = 5;
const int ledE = 6;

void setup() {
        Serial.begin(9600);
  pinMode(ledA, OUTPUT);
  pinMode(ledB, OUTPUT);
```

```
  pinMode(ledC, OUTPUT);
  pinMode(ledD, OUTPUT);
  pinMode(ledE, OUTPUT);

}
void loop() {
        if (Serial.available() > 0) { // checks if Serial connection is
active
                incomingByte = Serial.read(); // If active reads

    char c;
    if (incomingByte >= 'a' && incomingByte <= 'z') {
      c = (char)incomingByte - 32;
    } else {
      c = (char)incomingByte;
    }

    Serial.print("I received: ");
                Serial.println(c); // and prints (converted to decimal)


    if (c == 'A'){
      digitalWrite(ledA, HIGH);
      delay(delayTime);
      digitalWrite(ledA, LOW);
    } else if (c == 'B'){
      digitalWrite(ledB, HIGH);
      delay(delayTime);
      digitalWrite(ledB, LOW);
    } else if (c == 'C'){
      digitalWrite(ledC, HIGH);
      delay(delayTime);
      digitalWrite(ledC, LOW);
    } else if (c == 'D'){
      digitalWrite(ledD, HIGH);
      delay(delayTime);
      digitalWrite(ledD, LOW);
    } else if (c == 'B'){
      digitalWrite(ledE, HIGH);
      delay(delayTime);
      digitalWrite(ledE, LOW);
    } else if (c >= 'A' && c <= 'Z') {
      Serial.print("other character");
      // Turn all LEDs on
      digitalWrite(ledA, HIGH);
      digitalWrite(ledB, HIGH);
      digitalWrite(ledC, HIGH);
      digitalWrite(ledD, HIGH);
      digitalWrite(ledE, HIGH);
```

```
      delay(1000);  // Keep them on for 1 second

      // Turn all LEDs off
      digitalWrite(ledA, LOW);
      digitalWrite(ledB, LOW);
      digitalWrite(ledC, LOW);
      digitalWrite(ledD, LOW);
      digitalWrite(ledE, LOW);
    } else {
      Serial.print("invalid input");
    }


        }


}
```

7a: What is an RGB value? Why does it use the interval 0-255?

RGB value is a tuple of three inteeer

7b: What does the function Serial.parseInt() do ?

7c: Parse values from theserial monitor

- [x] ~~Send a string of three comma separated values from the serial monitor e.g. 200,100,40~~
- [x] ~~Read these values as integers (not a string), you can use Serial.parseInt()~~

7d: Use the values the fade the RGB LED

```
int incomingByte = 0;
const int delayTime = 1000;
const int ledR = 13;
const int ledG = 9;
const int ledB = 11;

int redValue = 0;
int greenValue = 0;
int blueValue = 0;

void setup() {
    Serial.begin(9600);
    pinMode(ledR, OUTPUT);
    pinMode(ledG, OUTPUT);
```

```
    pinMode(ledB, OUTPUT);

    // Initially turn off all LEDs (common anode)
    digitalWrite(ledR, HIGH);
    digitalWrite(ledG, HIGH);
    digitalWrite(ledB, HIGH);

}

void loop() {

    if (Serial.available() > 0) {
        redValue = Serial.parseInt();
        // comma
        Serial.read();

        greenValue = Serial.parseInt();
        Serial.read();

        blueValue = Serial.parseInt();

        while (Serial.available() > 0) {
            char c = Serial.read();
            if (c == '\n') break;
        }

        Serial.print("Setting RGB to: ");
        Serial.print(redValue);
        Serial.print(",");
        Serial.print(greenValue);
        Serial.print(",");
        Serial.println(blueValue);

        // common anode, invert the values
        // 0 = full on, 255 = full off
        analogWrite(ledR, 255 - redValue);
        analogWrite(ledG, 255 - greenValue);
        analogWrite(ledB, 255 - blueValue);
    }
}
```

8a: How is the analog value represented by the MCU?

As an integer between 0-1023

8b: What is maximum voltage that can be read on A0?

5V

8c: Read the voltage on the A0 pin. Does the value seem reasonable?

Yes it goes between 0 and 5V when i turn the dial (connected mine to the 5v)

8d: Print out the voltage to the serial monitor with 3 decimals.

8e: Use the voltage to control the color of the LED.

- [x] ~~When applying 0V on the A0 pin the RGB LED should be purple and when applying maximum voltage it should be red. When tuning the potentiometer, the RGB LED should slowly fade between the different colors.~~

```
int incomingByte = 0;
const int delayTime = 1000;
const int ledR = 13;
const int ledG = 9;
const int ledB = 11;

int redValue = 0;
int greenValue = 0;
int blueValue = 0;

float voltage = 0;

void setup() {
   Serial.begin(9600);
   pinMode(ledR, OUTPUT);
   pinMode(ledG, OUTPUT);
   pinMode(ledB, OUTPUT);

   // Initially turn off all LEDs (common anode)
   digitalWrite(ledR, HIGH);
   digitalWrite(ledG, HIGH);
   digitalWrite(ledB, HIGH);

}
```

```
void loop() {

        Serial.print(analogRead(A1));
        Serial.print("\n");
        voltage = analogRead(A1) * (5.0 / 1023.0);
        Serial.print(voltage);
        Serial.print("V\n");
        blueValue = map(analogRead(A1), 0, 1023, 0, 255);
        analogWrite(ledR, 0);
        analogWrite(ledB, 255 - blueValue);
        delay(100);


}
```