**Task 2**

1. Task 1 code
   * resets immediately as there is no delay function
2. Task 2 code
   * waits for the light to turn off, then resets
   * has a delay function
   * the LED lights up, and only then is the switchstate read

The delay function blocks code, pausing it. Using it is not good practice.

**Task 3**

1. **What would be the effect of declaring currentTime and previousTime as type int?**

int = 16-bits long, can be both positive and negative numbers

unsigned long = 32-bits long, an integer that can never be negative

C++ does not specify a standard size for int and long datatypes, instead the size depends on the architecture (and the compiler). The Arduino Uno has an 8-bit microcontroller so int is 16-bits and long is 32-bits. On a 64-bit system (e.g. modern Intel/AMD CPU), a C++ int would be 32-bits and long would be 64-bits.

An int (integer) is a 16-bit number, it holds values between -32,768 and 32,767. Those may be some large numbers, but if the Arduino is counting 1000 times a second with millis(), you’d run out of space in less than a minute. The long datatype holds a 32-bit number (between -2,147,483,648 and 2,147,483,647). Since you can’t run time backwards to get negative numbers, the variable to store millis() time is called an unsigned long. When a datatype is called unsigned, it is only positive. This allows you to count even higher. An unsigned long can count up to 4,294,967,295. That’s enough space for milis() to store time for almost 50 days.

1. **What change to your code would be required to change the interval from 5 seconds to 10 minutes?**

int interval = 5000;

Change the above line to 600000 (60 seconds \* 10 minutes \* 1000 to convert to milliseconds).

**Task 4**

Given that digitalWrite() sets the voltage on an output pin to 0 V (LOW) or 5 V (HIGH), and that the forward voltage of the LEDs is 1.8 V, what is the current that flows through an LED when:

**Voltage V 1.8 volts**

**Current I ? amps**

**Resistance R 1k ohm**

**Ohm's Law V = IR**

**5 – 1.8 = 3.2 volts?**

1. **LED on**

High = 5 V

V = IR

3.2 = (I)(1k)

3.2 = 1kI

I = 1000/3.2

I = 312.5 Kilo Amps

312.5/1000 = 0.3125 Amps

1. **LED off**

Low = 0 V

V = IR

Current = 0 Amps

**Task 5**

[will do after the MCQ]