Tutorial Sheet 1

Main Task

1. How do you edit the code provided to make the other two LEDS blink?

#include "mbed.h"

// Define the three LEDs

DigitalOut led1(LED1);  // Green

DigitalOut led2(LED2);  // Blue

DigitalOut led3(LED3);  // Red

int main() {

    while (true) {

        led1 = !led1;

        led2 = !led2;

        led3 = !led3;

        wait\_us(500000); // (0.5) seconds

    }

}

1. Write a function that makes each LED blink in sequence: LED1 blinks first, then LED2, and finally LED3. Each LED should stay on for 500 ms, then off for 500 ms before the next LED blinks.

#include "mbed.h"

// LED definitions

DigitalOut led1(LED1);

DigitalOut led2(LED2);

DigitalOut led3(LED3);

// Function to blink one LED

void blinkLED(DigitalOut &led) {

    led = 1;              // Turn ON LED

    wait\_us(500000);      // Wait (0.5) seconds

    led = 0;              // Turn OFF LED

    wait\_us(500000);      // Wait another (0.5) seconds

}

int main() {

    while (true) {

        blinkLED(led1);   // Blink LED1

        blinkLED(led2);   // Blink LED2

        blinkLED(led3);   // Blink LED3

    }

}

1. Modify your code from Question 2 to make all three LEDs blink simultaneously. Each LED should turn on for 300 ms and then off for 300 ms in sync.

#include "mbed.h"

// LED definitions

DigitalOut led1(LED1);

DigitalOut led2(LED2);

DigitalOut led3(LED3);

void blinkAllLEDs() {

    // Turn On all LEDs

    led1 = 1;

    led2 = 1;

    led3 = 1;

    wait\_us(300000);  // (0.3) seconds

    // Turn all LEDs OFF

    led1 = 0;

    led2 = 0;

    led3 = 0;

    wait\_us(300000);  // (0.3) seconds

}

int main() {

    while (true) {

        blinkAllLEDs();

    }

}

1. Write code to create a pattern where:

• LED1 turns on for 200 ms, then off.

• LED2 turns on after LED1 turns off, staying on for 400 ms.

• LED3 turns on after LED2 turns off, staying on for 600 ms.

After LED3 turns off, the sequence should repeat indefinitely.

#include "mbed.h"

// Define the three LEDs

DigitalOut led1(LED1);

DigitalOut led2(LED2);

DigitalOut led3(LED3);

int main() {

    while (true) {

        // LED1 ON for (0.2) seconds

        led1 = 1;

        wait\_us(200000);  // (0.2) seconds

        led1 = 0;

        // LED2 ON for (0.4) seconds

        led2 = 1;

        wait\_us(400000);  // (0.4) seconds

        led2 = 0;

        // LED3 ON for (0.6) seconds

        led3 = 1;

        wait\_us(600000);  // (0.6) seconds

        led3 = 0;

    }

}

1. Create a function where all three LEDs blink together for five times (200 ms on, 200 ms off for each blink). After five blinks, LED1 stays on continuously, while LED2 and LED3 remain off.

#include "mbed.h"

// Define the three LEDs

DigitalOut led1(LED1);

DigitalOut led2(LED2);

DigitalOut led3(LED3);

// Function to blink all LEDs together

void blinkAllLEDs(int times) {

    for (int i = 0; i < times; i++) {

        // Turn all ON

        led1 = 1;

        led2 = 1;

        led3 = 1;

        wait\_us(200000);  // (0.2) seconds

        // Turn all OFF

        led1 = 0;

        led2 = 0;

        led3 = 0;

        wait\_us(200000);  // (0.2) seconds

    }

}

int main() {

    // Phase 1: Blink all 3 LEDs 5 times

    blinkAllLEDs(5);

    // Phase 2: LED1 ON, LED2 & LED3 OFF

    led1 = 1;

    led2 = 0;

    led3 = 0;

    // Infinite loop to hold the final state

    while (true) {

    }

}