Lab 11

Motor Code:

```
#include <xc.h>
#define _XTAL_FREQ 20000000UL
// CONFIGURATION BITS
#pragma config FOSC = HS
#pragma config WDTE = OFF
#pragma config PWRTE = ON
#pragma config BOREN = ON
#pragma config LVP = OFF
#pragma config CPD = OFF
#pragma config WRT = OFF
#pragma config CP = OFF
// ----------------------------------------
// Custom delay in microseconds
// ----------------------------------------
void delay_us_custom(unsigned int us)
{
    while(us--)
    {
        __delay_us(1);
    }
}
// ----------------------------------------
// Servo pulse output 0°–180°
// ----------------------------------------
void servo_write(unsigned int angle)
{
    unsigned int pulse;   // 500 to 2500 microseconds
    pulse = 500 + (angle * 2000UL) / 180UL;

    // HIGH pulse
    PORTBbits.RB0 = 1;
    delay_us_custom(pulse);

    // LOW for rest of 20 ms frame
    PORTBbits.RB0 = 0;
    delay_us_custom(20000,pulse);
void main(void)
{
    // Configure RB0 as output
    TRISBbits.TRISB0 = 0;
    PORTBbits.RB0 = 0;

    unsigned int angle = 0;
    int step = 1;   // +1 = sweep up, -1 = sweep down

    while(1)
    {
        // Send one frame at current angle
        servo_write(angle);

        // Update angle gradually
        angle += step;

        // Reverse direction at limits
        if(angle >= 180) step = -1;
        if(angle == 0)   step = +1;
    }
```