

CSLR61 : EMBEDDED SYSTEMS

LAB-4

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Section : CSE-B

1. Write a program to increase the intensity of external LED. At the same rate, increase the sound intensity of speaker.

Libraries to be Used: pwmout

```
#include "mbed.h"

PwmOut led(p5);
PwmOut spker(p6);

int main()
{
    led = 0.0;
    spker = led;
    while (true)
    {

        led = led + 0.1;
        spker = led;
        printf("LED is now %.2f\n", led.read());
        printf("SPEAKER is now %.2f\n", spker.read());
        wait(1);
    }
}
```

Output :

Mbed Simulator
PLAYING

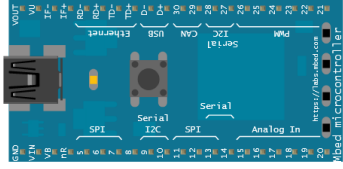
https://simulator.mbed.com/#user_1646040957813

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arm MBED

Blinky Load demo Run + Add component

```
1 #include "mbed.h"
2
3 PwmOut led(p5);
4 PwmOut spker(p21);
5
6 int main(){
7     led = 0.0;
8     spker = led;
9     while (true)
10 {
11     led = led+0.1;
12     spker = led;
13     printf("LED is now %.2f\n", led.read());
14     printf("SPEAKER is now %.2f\n", spker.read());
15     wait(1);
16 }
17
18 }
```



LED (p5) PWM Speaker (p21)

Serial output

```
SPEAKER is now 0.50
LED is now 0.60
SPEAKER is now 0.60
LED is now 0.70
SPEAKER is now 0.70
LED is now 0.80
SPEAKER is now 0.80
LED is now 0.90
SPEAKER is now 0.90
LED is now 1.00
SPEAKER is now 1.00
LED is now 1.00
SPEAKER is now 1.00
LED is now 1.00
SPEAKER is now 1.00
LED is now 1.00
SPEAKER is now 1.00
```

2. Design an alarm system, which makes double beep sound for every 5s using a speaker.

Libraries To Be Used: pwmout, analogin

```
#include "mbed.h"

PwmOut speaker(p21);
Ticker tck;

void beepTwice()
{
    speaker = 0.0;
    speaker = 1.0;
    printf("Beep");
    wait(0.2);
    speaker = 0.0;
    wait(0.2);
    speaker = 1.0;
    printf("Beep\n");
    wait(0.2);
    speaker = 0.0;
}

int main()
{
    beepTwice();
    tck.attach(&beepTwice, 5);
}
```

Output :

Mbed Simulator
PLAYING

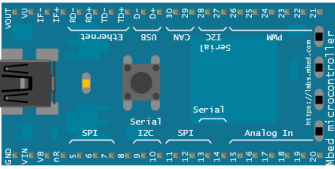
https://simulator.mbed.com/#user_1646044228358

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arm MBED

Pwm Speaker ▾ Load demo Run + Add component ↻

```
1 #include "mbed.h"
2
3 PwmOut speaker(p21);
4 Ticker tck;
5
6 void beepTwice()
7 {
8     speaker = 0.0;
9     speaker = 1.0;
10    printf("Beep");
11    wait(0.2);
12    speaker = 0.0;
13    wait(0.2);
14    speaker = 1.0;
15    printf("Beep\n");
16    wait(0.2);
17    speaker = 0.0;
18 }
19
20 int main()
21 {
22     beepTwice();
23     tck.attach(&beepTwice, 5);
24 }
25
```



PWM Speaker (p21) X



Serial output

```
BeepBeep
BeepBeep
BeepBeep
BeepBeep
BeepBeep
```

3. Have a switch, 2 LEDs and a speaker interfaced with mbed board. Upon switching on, the intensity of the sound should be increasing and upon switching off, should make the intensity of the sound decreasing. Proportionally increase or decrease the intensity of two LEDs.

```
#include "mbed.h"

PwmOut led1(p5);
PwmOut led2(p6);
PwmOut spker(p21);

InterruptIn swt(p7);

void on()
{
    while (true)
    {
        spker = spker + 0.1;
        led1 = spker;
        led2 = spker;
        printf("Speaker is now %.2f\n", spker.read());
        printf("Led1 is now %.2f\n", led1.read());
        printf("Led2 is now %.2f\n", led2.read());
        wait(2);
    }
}
```

```

}
void off()
{
    while (true)
    {
        spker = spker - 0.1;
        led1 = spker;
        led2 = spker;
        printf("Speaker is now %.2f\n", spker.read());
        printf("Led1 is now %.2f\n", led1.read());
        printf("Led2 is now %.2f\n", led2.read());
        wait(2);
    }
}

int main()
{
    spker = 0.5;
    swt.rise(&on);
    swt.fall(&off);
}

```

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