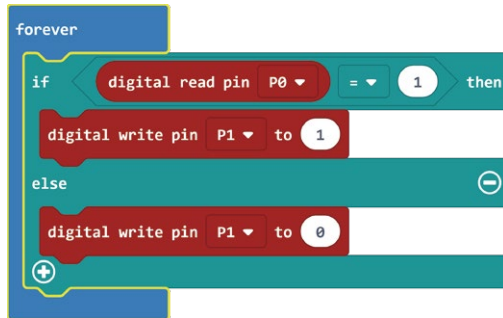## Programming and note

- **Digital Read:** Just like the way **digital write** block turns a pin on (1) or off (0), the **digital read** block check at the state of a pin, which is either HIGH (1) or LOW (0). In this case, we can detect if the switch is pressed or not by using this block.

- **If/else:** The **if/else** block is a logical structure. If the logical statement that is attached to it (switchState=1) is true, then it will execute the code blocks inside of the if. If that statement is false, it will execute the **else** blocks. In this case, if the statement is true(the value is digital read from P0 port equal to 1), then turn on the LED on pin 1; else, turn off the LED on P1.

- **Download the program to micro:bit to see what happens.**

> **Result**
> When you press the switch, the LED lights up, and when you press the switch a second time, the LED turns off.

> *Do you have this experience? whenever you go up the stairs at night, the lights will light up in front of you. Can we make such a lamp?*

Experiment 3 – Micro:bit singer

Instruction

Do you like music? Have you ever dreamed of becoming a singer? The power of music is really great, it can make people happy physically and mentally. In this experiment, we will make the micro:bit to be a "singer", let's see how to do it!

Target

- Learn how the buzzer work and use it to play songs.
- Learn how to run the code once at the beginning of the program.

Required Parts

- Micro:bit x1
- Crowtail-Base shield for Micro:bit x1
- Crowtail-Buzzer x1
- Crowtail-Cable x1
- USB cable x1

Hardware learning and connection

The buzzer module is used for making sound in your project. It makes a sound when activated by a logic HIGH signal. Connect the buzzer to any port of Crowtail- Base shield for Micro:bit, you can easily make it sound with setting the related port to logic HIGH. The buzzer module can also be connected to an analog pulse-width modulation(PWM) output to generate various tones, which means you can use it to create your own melody!

Connect Crowtail-Buzzer to P0 port of Crowtail-Base shield for Micro:bit. The hardware connections are as follows:
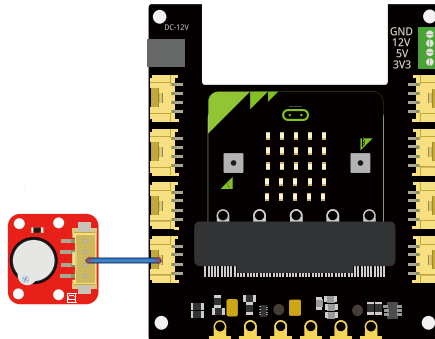
Programming and note

- **Start melody repeating:** The `Start Melody Repeating` block eliminates all of the frustration from getting music from a microcontroller. It is as simple as selecting one of the many songs that were pre-programmed into MakeCode and repeating it as many times as possible! Note that: There's no other to run while the melody is playing. Which is called "blocking" code and must be Considered in your program.

- **On start:** Different from `forever` block that loops your code forever, The `On start` block is a block of code that only runs once at the very beginning of your program. In this case, we use it to set the melody to play once.

- **Download the program to micro:bit to see what happens.**

> **Result**
>
> Once you upload the program to micro:bit, you can hear the buzzer playing the "dadadum" melody once and then stop.

> *How to make a buzzer play multiple melodies and control the previous and next song by pressing a button?*

Experiment 4 – Do not touch

Instruction

There are so many dangerous areas that we can't touch with our hands directly, otherwise, we may be in danger. For example, we can't touch the power socket with our hands because the danger of electric shock! Therefore, this time we will make a touch alarm, put this alarm in a simulated danger area, and when someone touches it, make the buzzer shout loudly so that they will never touch this area again!

> ⚠️ **Note:** *Do not use it in a truly dangerous area, it can be dangerous!*

Target

- Learn how the touch sensor work and use it to make a touch alarm with buzzer.

Required Parts

- Micro:bit x1
- Crowtail-Base shield for Micro:bit x1
- Crowtail-Touch Sensorx1
- Crowtail-Buzzer x1
- Crowtail-Cable x2
- USB cable x1

Hardware learning and connection

The touch sensor can detect the human touch by sensing changes in capacitance. When it detects a touch, it outputs a HIGH logic level signal. Based on the touch IC TTP223-B, this module can detect human finger in 0~3mm, that is, you can place this sensor on a non-metallic surface such as the glass or paper, with a thickness of less than 3MM, this would be useful for applications that waterproof is needed, or you want to keep the buttons secret.