C4

Connecting the Outside World

CHAPTER ASSIGNMENT

Name _____ Class _____ No. _____ Date _____

> Answer every question in the space given. Show your working. You may use the chapter page to help you.

Questions from the Guru Jazzy micro:bit chapter page.

Labs from the chapter

Lab 4.1 London Bridge

1. Build the code below. **play tone** is in the Music group.
2. Download it to the Micro:bit.
3. Set the **P0 jumper to PIEZO**.
4. Press button A on the Micro:bit or the activity board.

```
basic.forever(function () {
    if (input.buttonIsPressed(Button.A)) {
        music.playTone(Note.G, music.beat(BeatFraction.Whole))
        music.playTone(Note.A, music.beat(BeatFraction.Whole))
        music.playTone(Note.G, music.beat(BeatFraction.Whole))
        music.playTone(Note.F, music.beat(BeatFraction.Whole))
        music.playTone(Note.E, music.beat(BeatFraction.Whole))
        music.playTone(Note.F, music.beat(BeatFraction.Whole))
        music.playTone(Note.G, music.beat(BeatFraction.Double))
        music.playTone(Note.D, music.beat(BeatFraction.Whole))
        music.playTone(Note.E, music.beat(BeatFraction.Whole))
        music.playTone(Note.F, music.beat(BeatFraction.Double))
        music.playTone(Note.E, music.beat(BeatFraction.Whole))
        music.playTone(Note.F, music.beat(BeatFraction.Whole))
        music.playTone(Note.G, music.beat(BeatFraction.Double))
        music.playTone(Note.G, music.beat(BeatFraction.Whole))
        music.playTone(Note.A, music.beat(BeatFraction.Whole))
        music.playTone(Note.G, music.beat(BeatFraction.Whole))
        music.playTone(Note.F, music.beat(BeatFraction.Whole))
        music.playTone(Note.E, music.beat(BeatFraction.Whole))
        music.playTone(Note.F, music.beat(BeatFraction.Whole))
        music.playTone(Note.G, music.beat(BeatFraction.Double))
        music.playTone(Note.D, music.beat(BeatFraction.Double))
        music.playTone(Note.G, music.beat(BeatFraction.Double))
        music.playTone(Note.E, music.beat(BeatFraction.Double))
        music.playTone(Note.C, music.beat(BeatFraction.Double))
    }
})
```

Lab 4.2.1

Steps

1. Build the code, then download it to the Micro:bit.
2. Plug the ZX-LED into P16.
3. Press A and the LED lights. Press B and it goes out.

```
basic.forever(function () {
    if (input.buttonIsPressed(Button.A)) {
        pins.digitalWritePin(DigitalPin.P16, 1)
    }
    if (input.buttonIsPressed(Button.B)) {
        pins.digitalWritePin(DigitalPin.P16, 0)
    }
})
```

Lab 4.2.5

Build it block by block

1. Add **on start**. Inside it, put **set variable to 0** from Variables.
2. Make a new variable called **LED_Status** and select it in that block.
3. From Logic, drop **false** into the block, so the LED starts in the off state.
4. Add **forever**, and put an **if … then** inside it.
5. In the condition, put a comparison from Logic. On its left, put **analog read pin** set to P1.
6. Change the comparison to **>** and the number to **50**.
7. Inside then, add **set LED_Status**. Fill it with **not** from Logic, holding the LED_Status variable.
8. Below that, add an **if … then … else** that checks **LED_Status = true**.
9. Under then, put **digital write pin P16 to 1**. Under else, put the same block set to **0**.
10. After the outer if, add **pause (ms) 100**.
11. Download it, connect the parts, then clap near the microphone. Clap again to turn the LED off.

Think

Think about it

Press and hold the button in the simulator. The light flickers, because the code flips the variable every 100 ms for as long as the sound lasts. How could you fix this? One idea is a longer pause after each flip.

Lab 4.3

Build the thermometer

1. Create the variables **val** and **temp** in Variables.
2. In **forever**, add **set val to** with **analog read pin P1** inside it. That block is under Advanced › Pins.
3. Add **set temp to**. From Math, build the sum one block at a time: val × 16, then that ÷ 100, then that − 20.
4. Wrap the sum in **round**, and add **show number** holding temp.
5. Download it, then plug the probe into **P1**.
6. Warm the probe in your hand and watch the number change.

Activity · Build your own

1. Change the threshold in the light lab. Find the value that suits your classroom.

2. Program a different tune, using the same blocks as London Bridge.

3. Fix the clap switch, so that one long clap only flips the light once.

4. Challenge: make the thermometer light the ZX-LED above 30 °C, as a heat alarm.

Check yourself

1. Why should you usually avoid P3, P4 and P10?

   A) They are broken B) They are shared with the LED display C) They only carry 5 V

   D) They are power pins

2 Which pins are free digital pins, not shared with anything on the board?

A) P5 and P11 B) P8, P12 and P16 C) P19 and P20 D) P6, P7 and P9

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3 What range does analog read pin give?

A) 0 or 1 B) 0 to 100 C) 0 to 1023 D) 0 to 3.3

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4 digital write pin P16 to 1 means...

A) Send a logic high, so the ZX-LED lights B) Read P16 C) Wait 1 second

D) Play a note

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5 The ZX-SWITCH01 output is _____ when pressed.

A) Logic 1 (3.3 V) B) Logic 0 (0 V) C) Exactly 500 D) Disconnected

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6 In the light lab, why does removing show number make the LED respond faster?

A) The LED gets more power B) Scrolling the number takes time, so the if block waits

C) The sensor gets warmer D) It uses a different pin

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7 In the clap switch, what does set LED_Status to not LED_Status do?

A) Always sets it to false B) Swaps true and false C) Deletes the variable

D) Turns the sensor off

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8 Using Temp = (adc × 0.16) − 20, what is the temperature when adc is 300?

A) 20 °C B) 28 °C C) 30 °C D) 48 °C

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9 Which cable joins the AX-microBIT+ to an INEX sensor board?

A) JST3AA-8 B) A barrel plug C) An Ethernet cable D) HDMI

End of assignment · Check your answers against the chapter at gurujazzy.com/subjects/microbit/chapter-4-connecting-the-outside-world/