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# The Education University of Hong Kong
# 2022-2023 Quality Education Fund Thematic Network - Tertiary Institutes
# STEM Project Team

SCHOOL: Sha Tin Methodist Primary School (P.5)

TOPIC: Sound insulation

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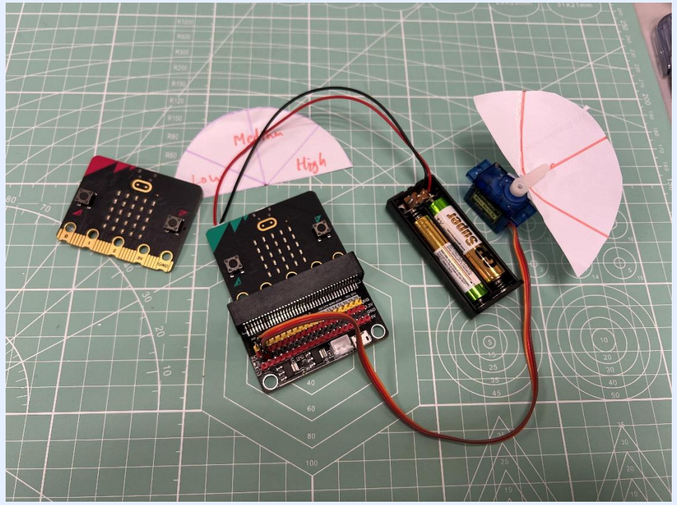
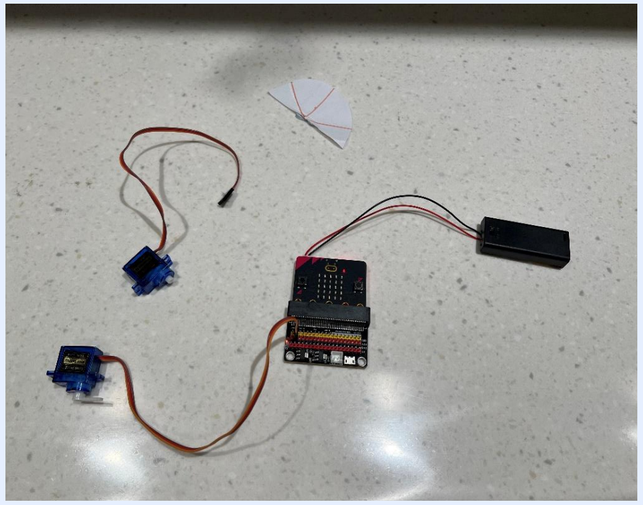
# Experiment material



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# Objectives of Experiment 1

A) To compare sound meter apps on different device with Professional device R8050 in different distance

B) To compare the sound meter level difference with the sound source place on the table and on the sponge by using different devices

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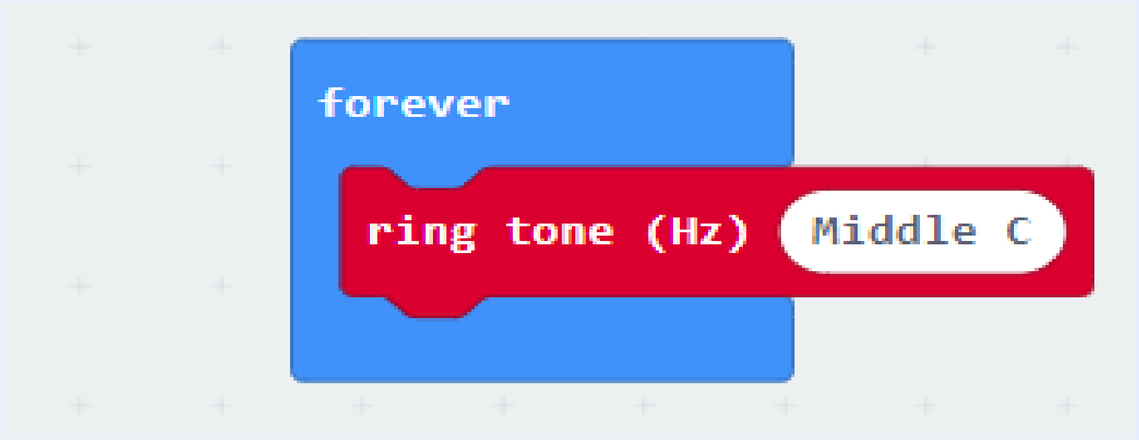
# Sound Source Coding

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| distance (on table) | R8050 | iphone | calibration | ipad | calibration | samsung | calibration |
|---|---|---|---|---|---|---|---|
| 0 | 73 | 74 | -1 | 62 | 11 | 78 | -5 |
| 0.5 | 51 | 56 | -5 | 41 | 10 | 58 | -7 |
| 1 | 51 | 55 | -4 | 39 | 12 | 57 | -6 |
| 1.5 | 50 | 55 | -5 | 39 | 11 | 54 | -4 |
| 2 | 48 | 52 | -4 | 36 | 12 | 56 | -8 |
| 2.5 | 50 | 53 | -3 | 35 | 15 | 53 | -3 |
| / | / | / | Average -3.67 | / | Average 11.8 | / | Average -5.5 |

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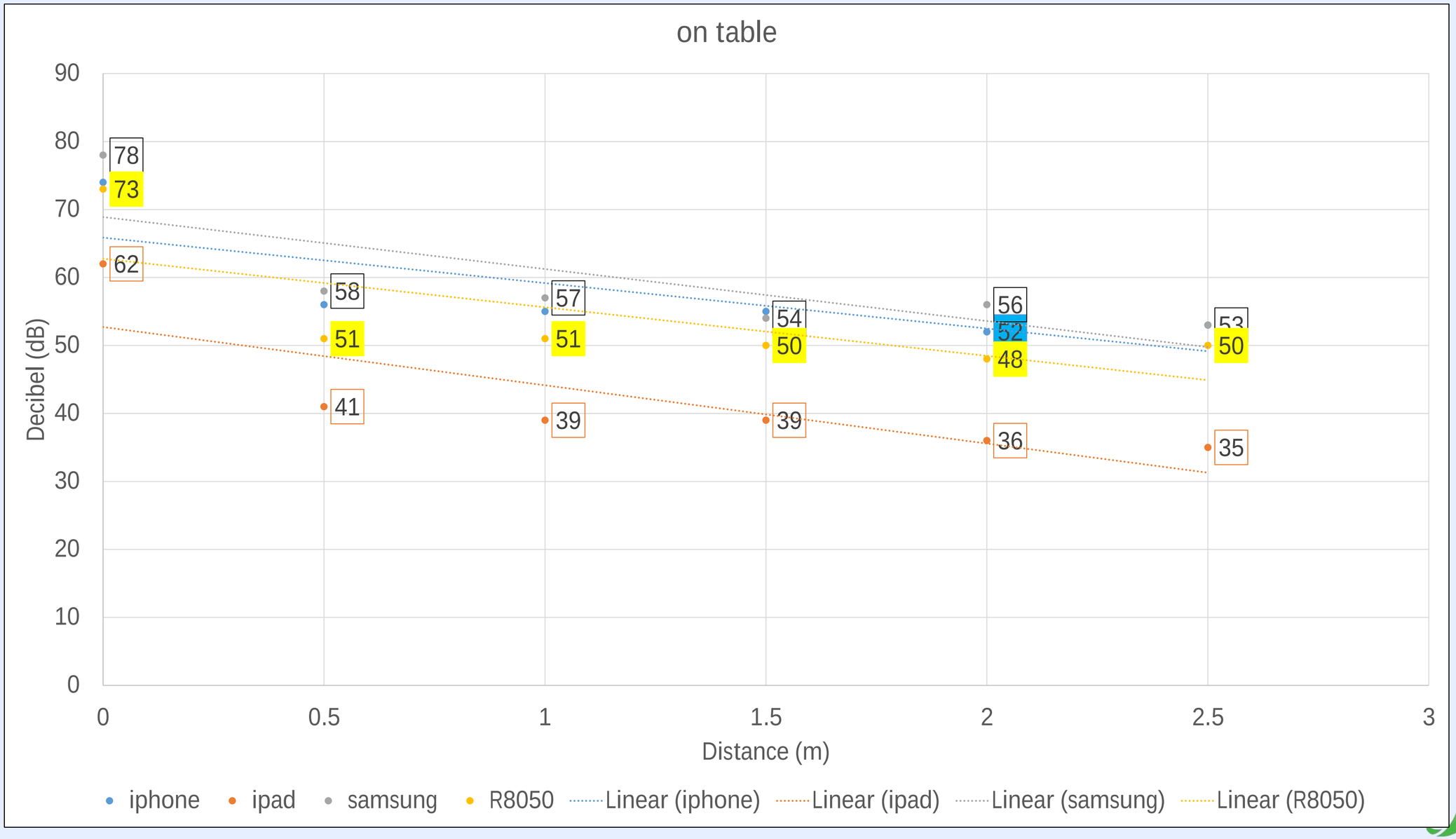


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| distance (on sponge) | R8050 | iphone | calibration | ipad | calibration | samsung | calibration |
|---|---|---|---|---|---|---|---|
| 0 | 59 | 57 | +2 | 49 | +10 | 58 | +1 |
| 0.5 | 54 | 50 | +4 | 39 | +15 | 51 | +3 |
| 1 | 48 | 49 | -1 | 36 | +12 | 48 | 0 |
| 1.5 | 45 | 47 | -2 | 34 | +11 | 47 | +2 |
| 2 | 45 | 49 | -4 | 41 | +4 | 48 | +3 |
| 2.5 | 43 | 48 | -5 | 33 | +10 | 46 | +3 |
| / | / | / | Average -1 | / | Average 10.3 | / | Average 2 |

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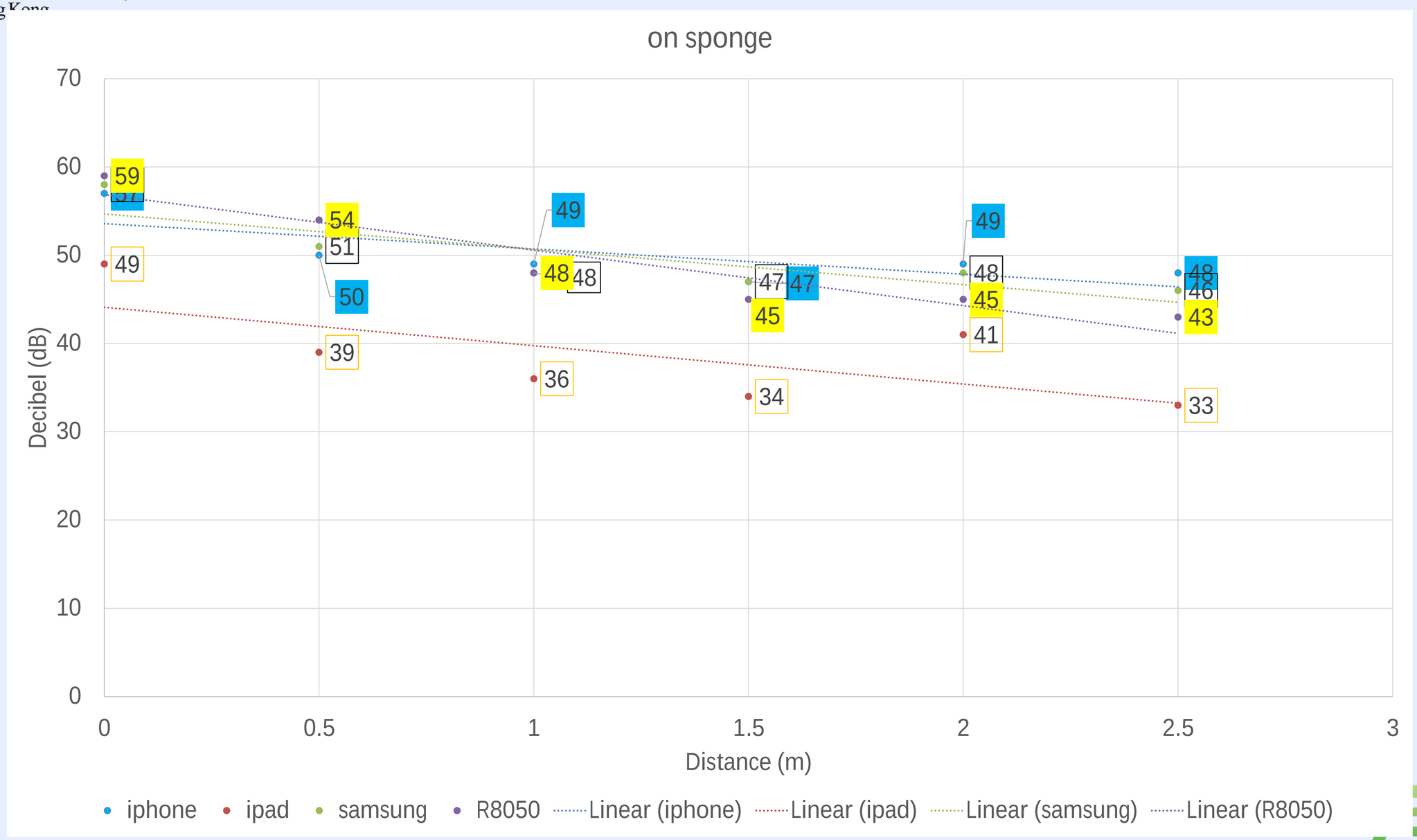

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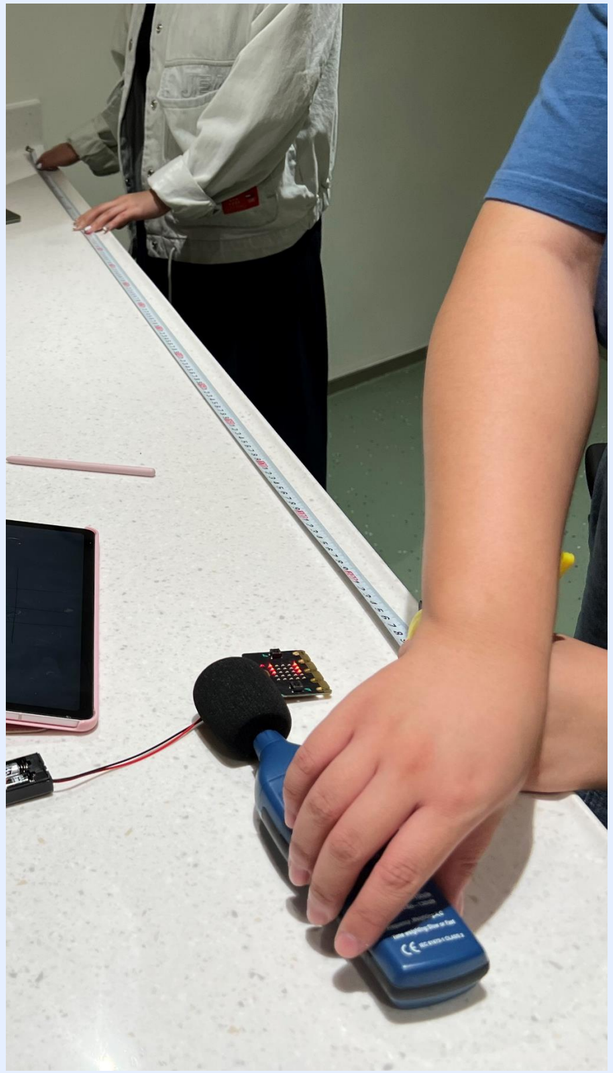

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# Objectives of experiment 2

- To compare different sound source by using R8050 and Microbit

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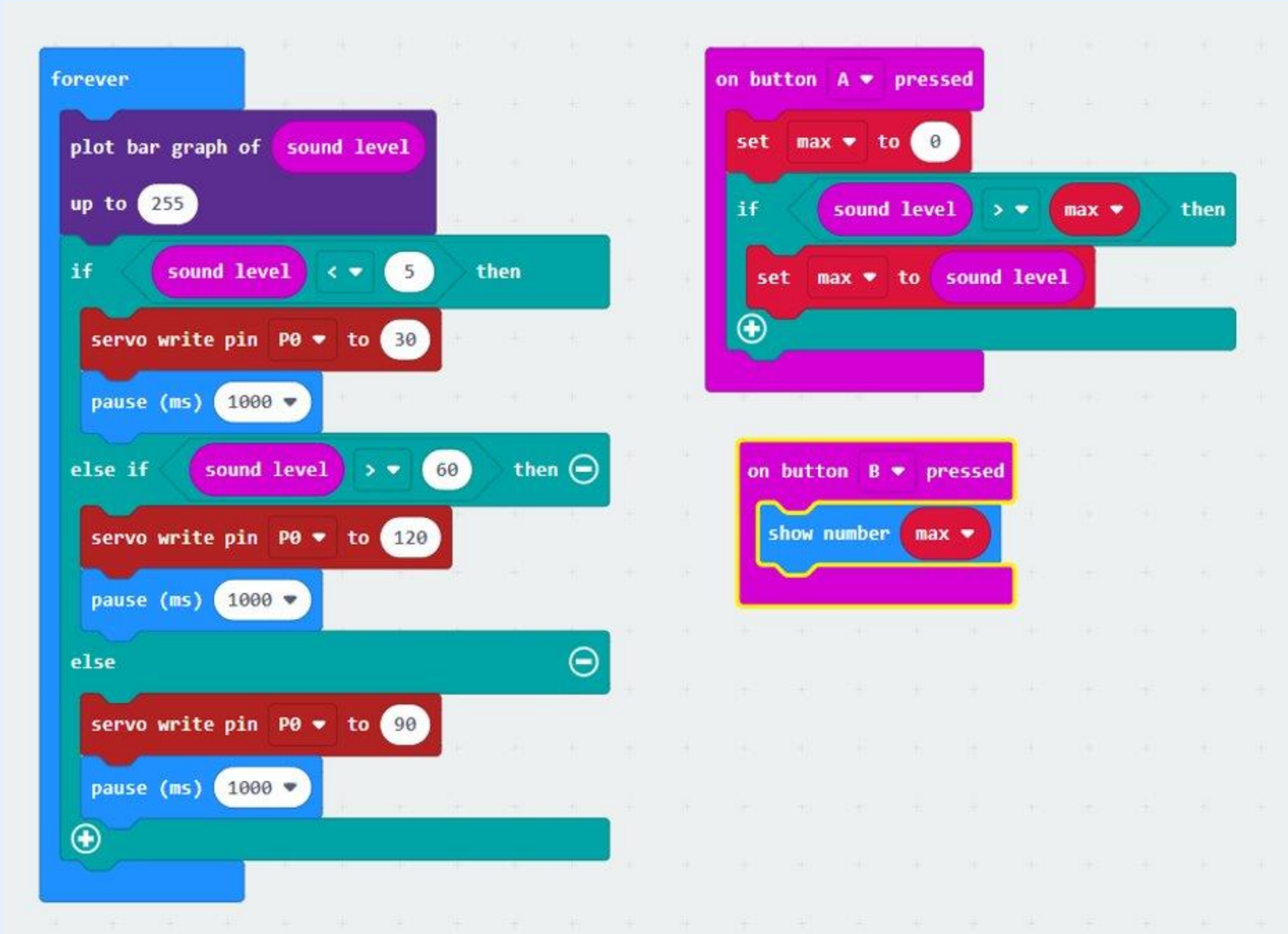
# Sound meter of micro:bit coding

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# Experiment 2

| Distance (m) | clock | white noise |
|---|---|---|
| 0 | 127/87 | 106/88 |
| 0.5 | 121/80 | 67/73 |
| 1 | 108/79 | 63/74 |
| 2 | 97/73 | 56/72 |

*R8050/Microbit

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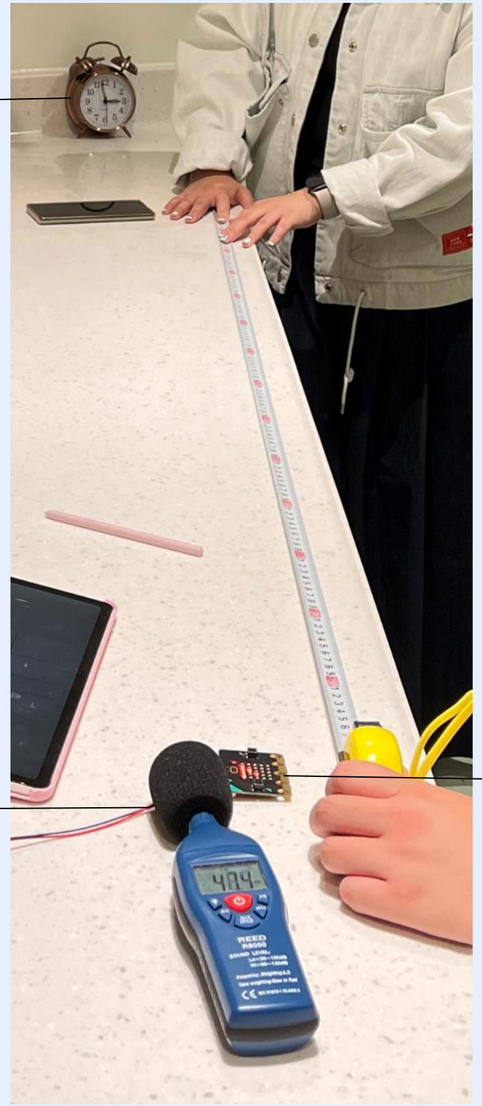


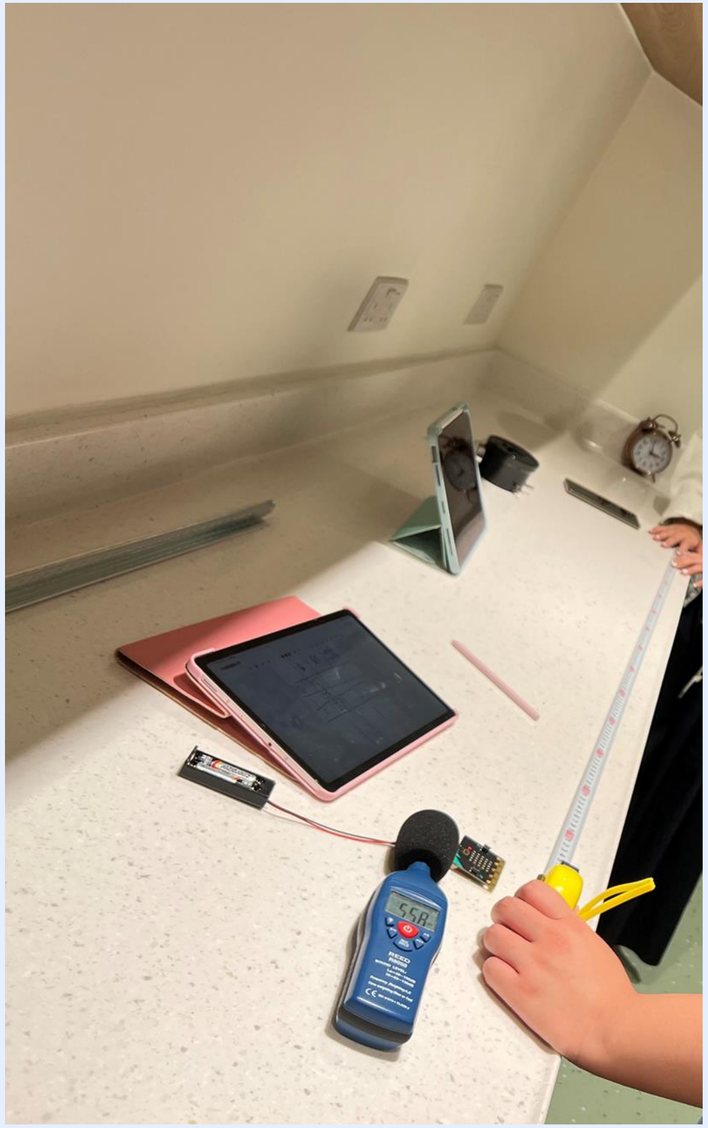

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# Objectives of experiment 3

- To compare the effect of soundproofing of different sound insulation materials

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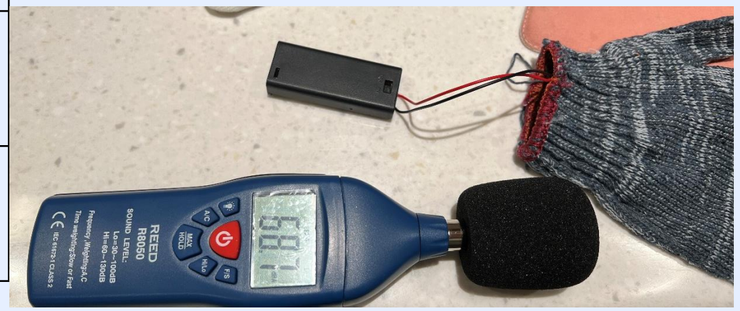
# Experiment 3

| wrapping material | Decibel (dB) |
|---|---|
| none | 71 |
| pink gloves | 62 |
| white gloves | 67 |
| gray gloves | 68 |
| hand | 50 |
| all | 45 |



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# Objectives of experiment 4

- Using Microbit as sound source, and measure sound level by using Microbit as sound meter

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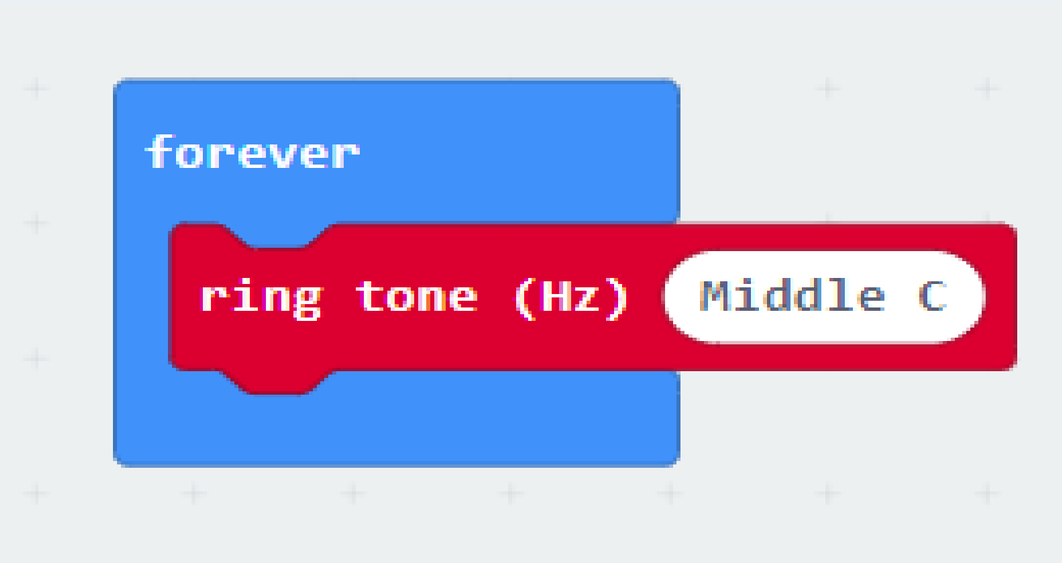
# Sound Source Coding

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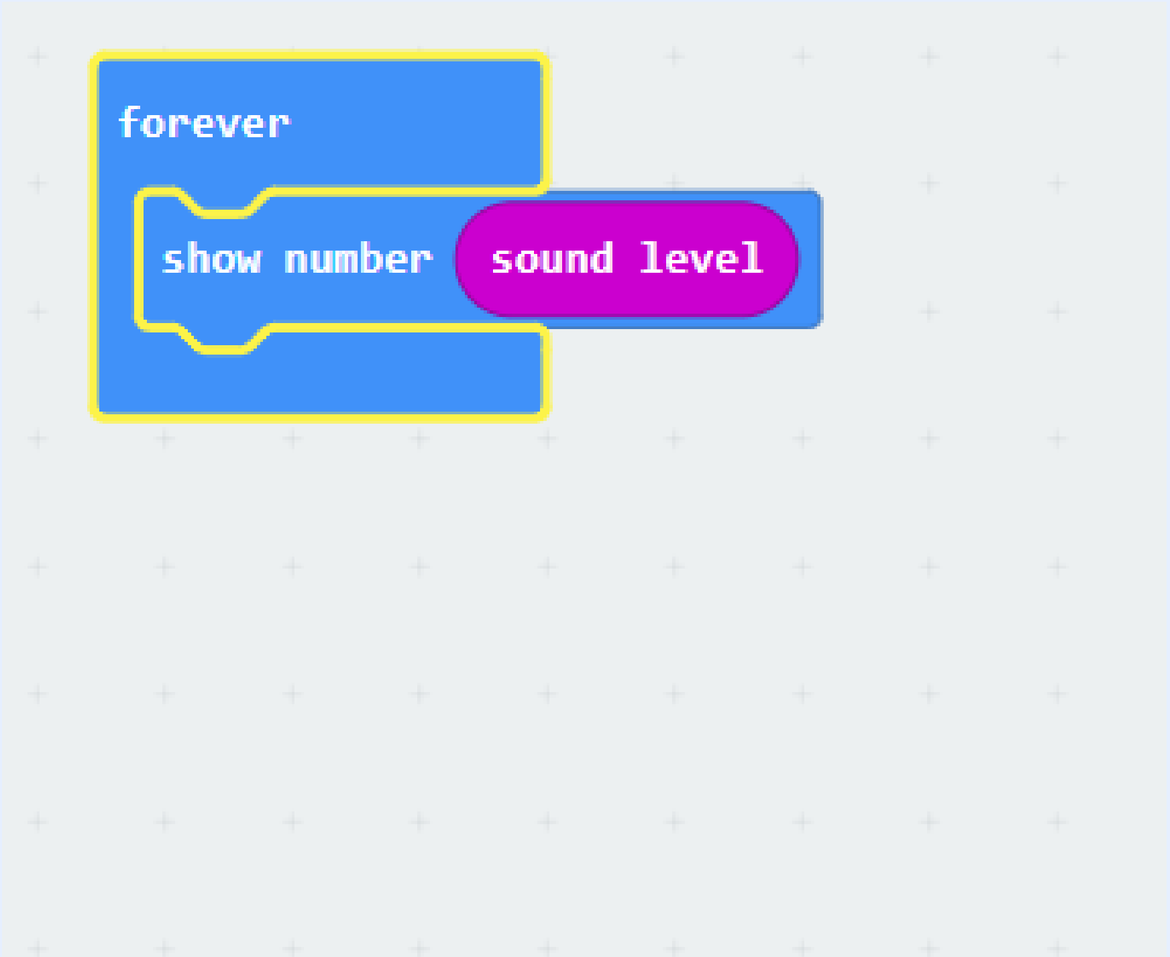
# Coding of sound meter in experiment 4

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# Experiment 4

| distance between 2 microbit (m) | Sound level of Microbit (receiver on table) | Average | Sound level of Microbit ( receiver on sponge) | Average | Sound level of Microbit (both on sponge) | Average |
|---|---|---|---|---|---|---|
| 0 | 60 | 60 | 52/56/60 | 56 | 33/37/48 | 39.3 |
| 0.5 | 22/30 | 26 | 22/30 | 26 | 15/22/33 | 23.3 |
| 1 | 15/22/30 | 22.3 | 22/30 | 26 | 15/22/30 | 22.3 |
| 1.5 | 22/30 | 26 | 15/22/30 | 22.3 | 15/22/30 | 22.3 |
| 2 | 15/22/30 | 22.3 | 15/22/30 | 22.3 | 22/30 | 26 |

* Result of holding and rotating the receiving micro:bit board do not have clear difference.

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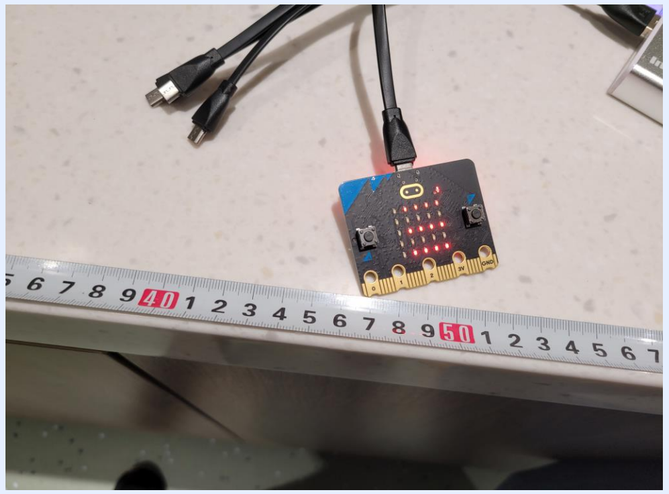

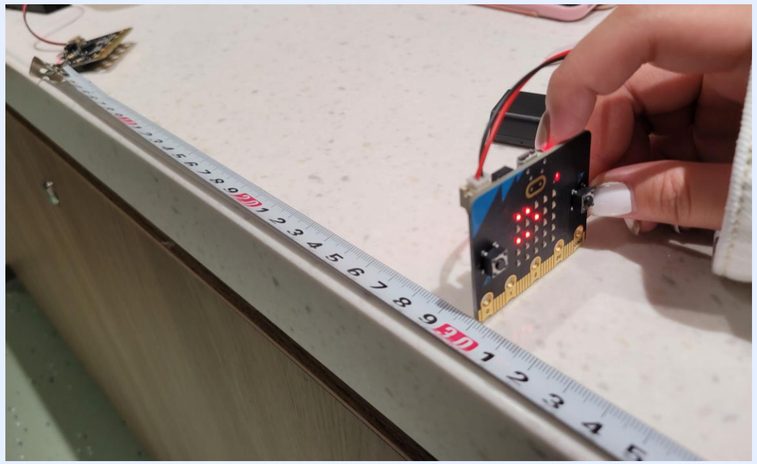

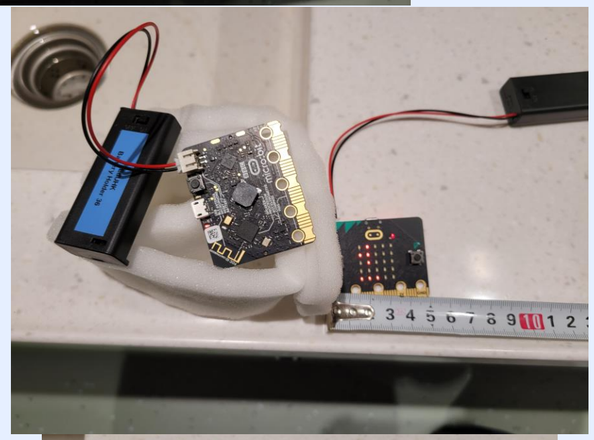

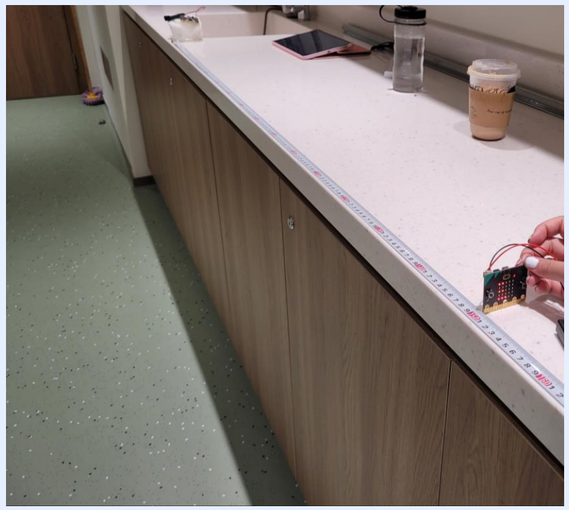

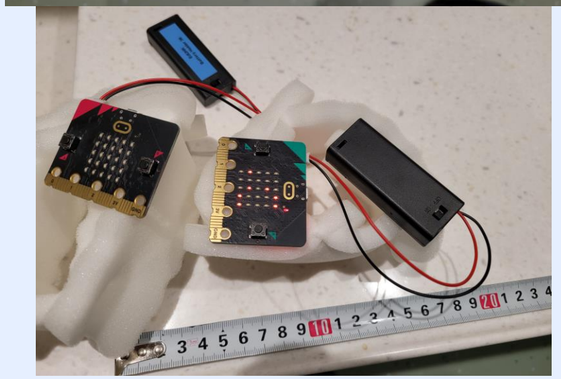

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# Objectives of experiment 5

- Using Microbit as a sound logger to detect the maximum sound level of different sound source in the same distance(0m)

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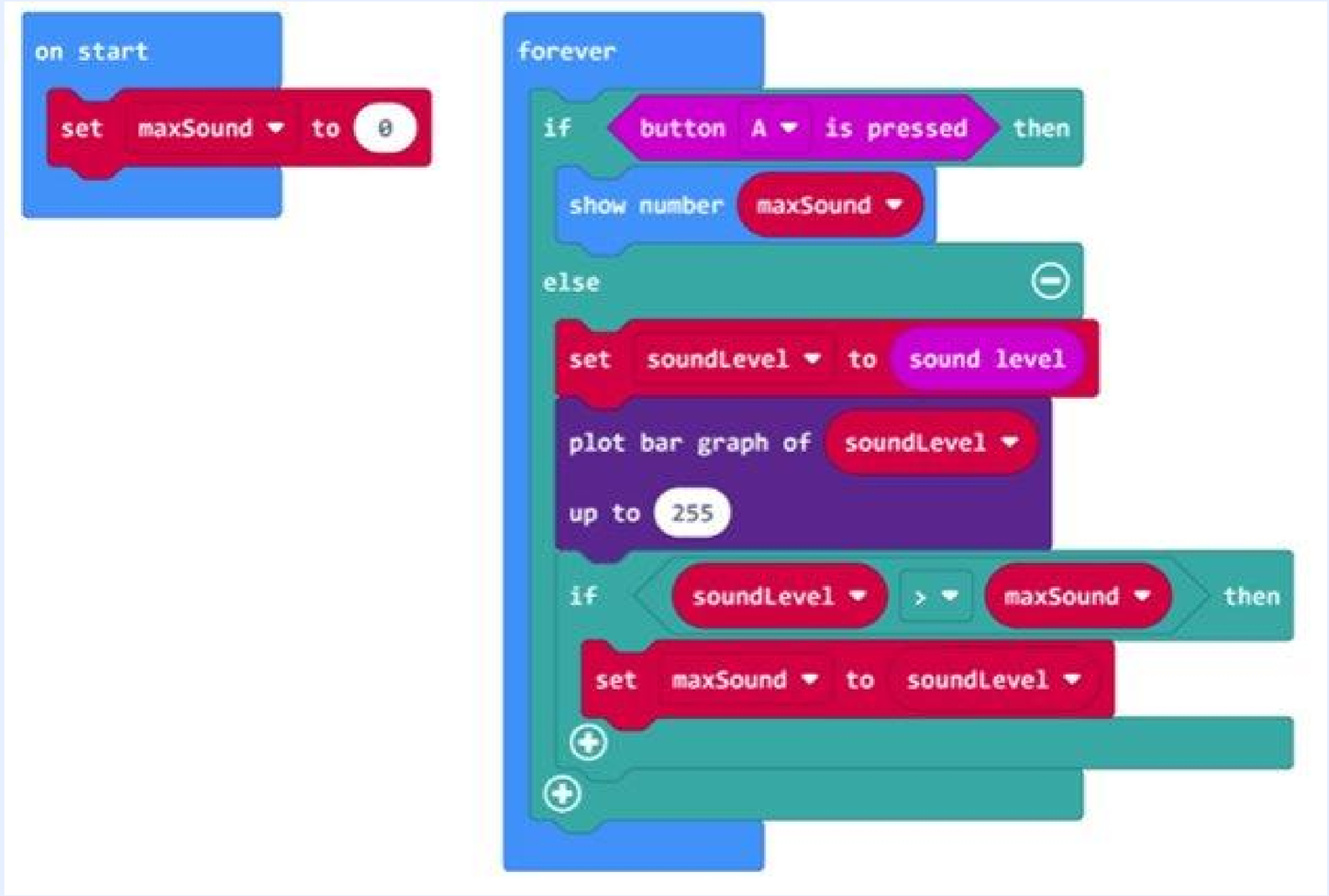
# Coding of sound logger in experiment

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# experiment 5

| sound source | Max sound level |
|---|---|
| Clock | 131 |
| 2 clocks | 131 |
| human screaming | 131 |
| 2 human screaming | 131 |
| all | 131 |

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# Objectives of experiment 6

- Compare the sound level differences of R8050 and Microbit by using Microbit as a sound source in the same distance(0m)

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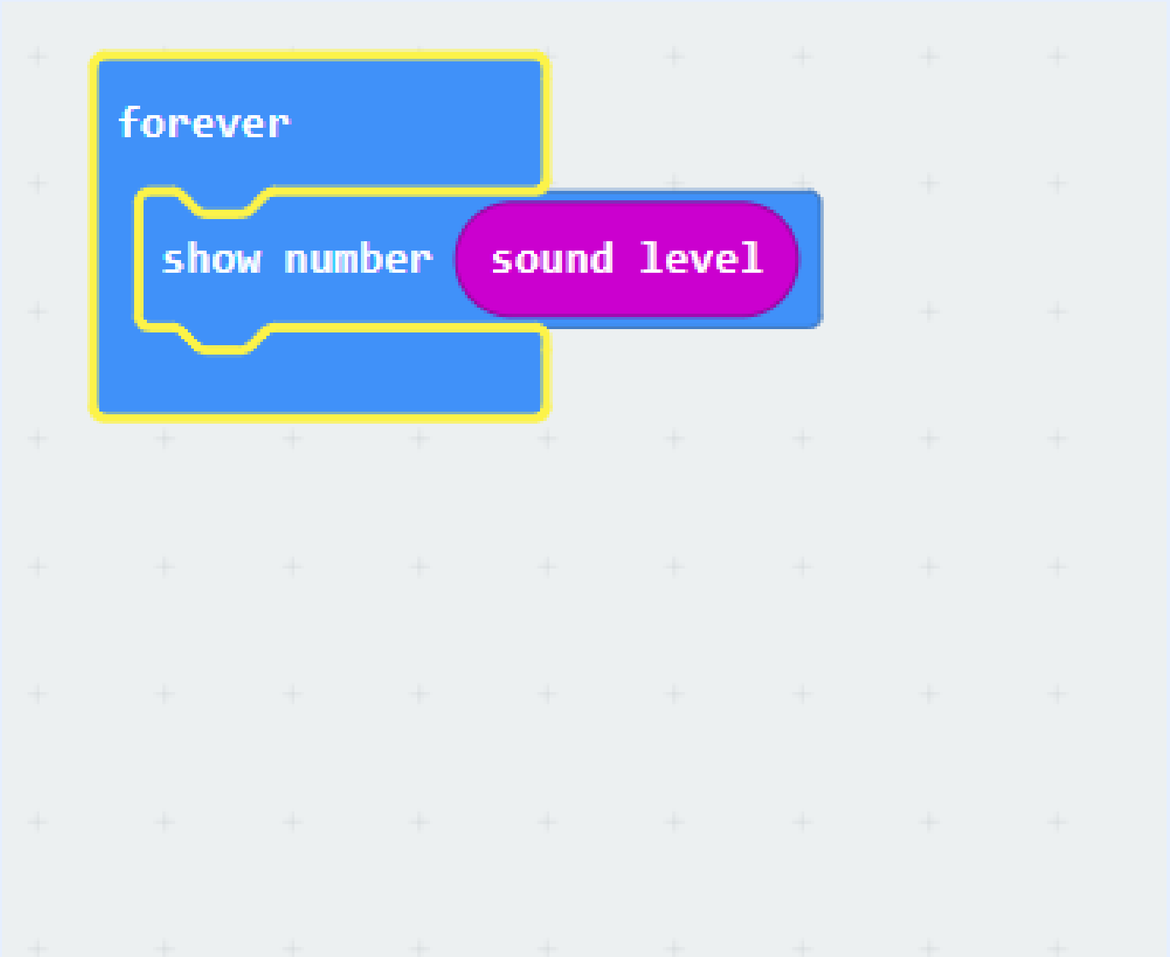
# Coding of sound meter in experiment 6

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# experiment 6

| distance | Microbit sound level | R8050 decibel |
|---|---|---|
| 0 | 60 | 70.2 |
| 0.5 | 15 | 53.2 |
| 1 | 15 | 50 |
| 1.5 | 15 | 48.2 |
| 2 | 15 | 46.3 |

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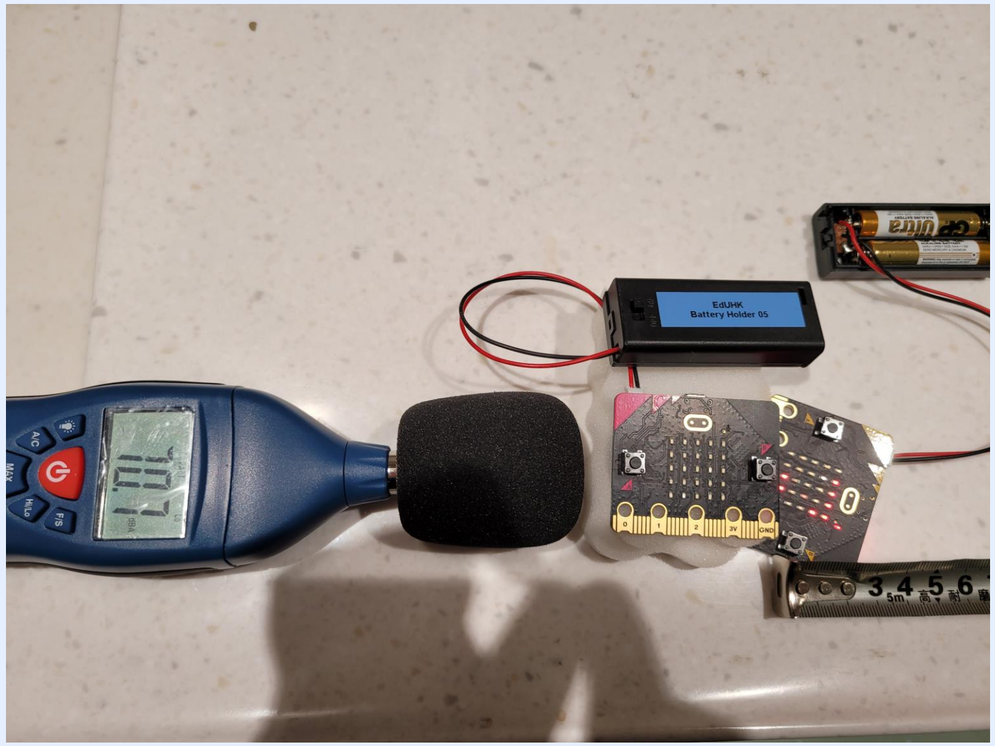
# experiment 6



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# Objectives of experiment 7

- Compare the sound level differences of R8050 and Microbit by using Microbit as a sound source in the same distance(0m) with different Sound insulation material

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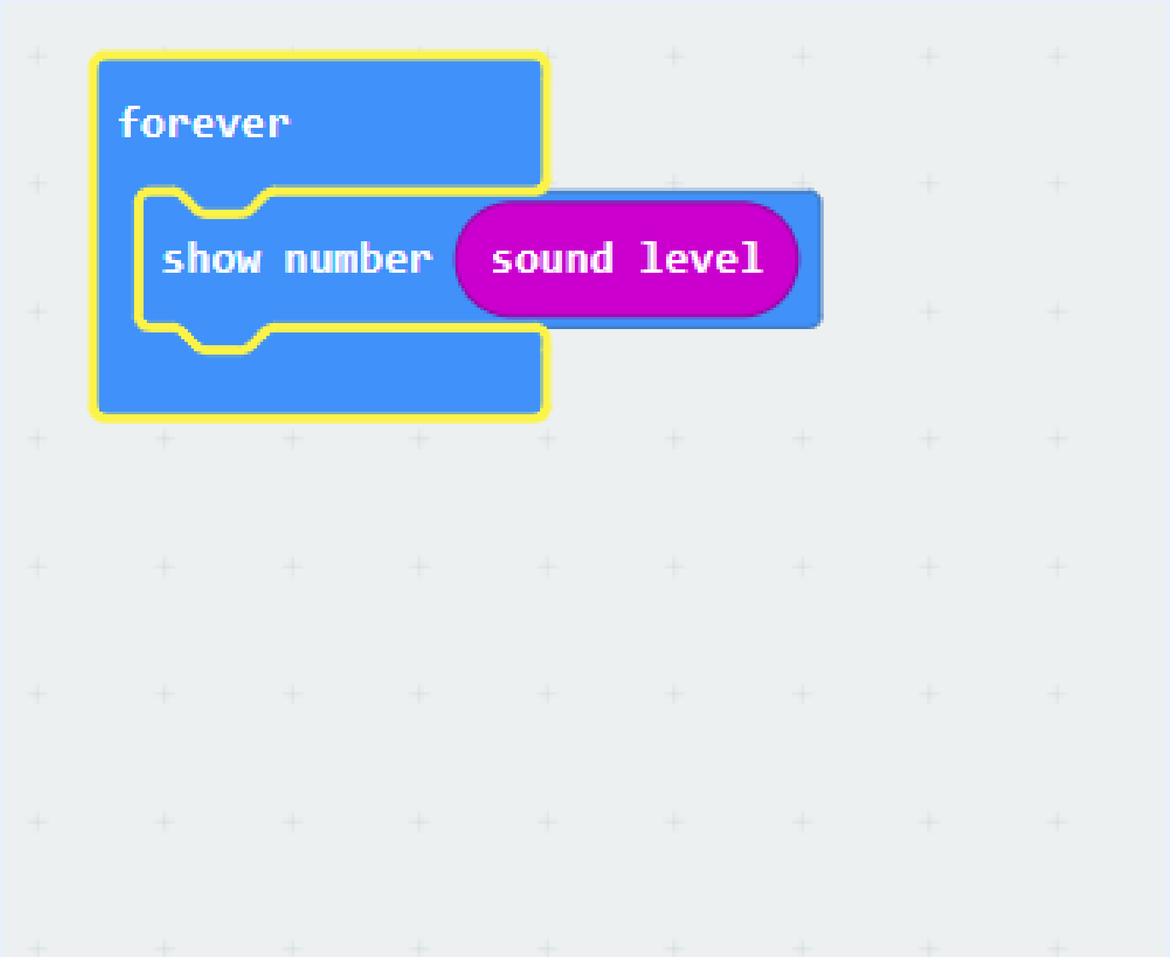
# Coding of sound meter in experiment 7

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# experiment 7

| Sound insulation material | Micro:bit sound level | R8050 decibel |
|---|---|---|
| N/A | 45 | 74 |
| inside a paper cup with sponge | 30 | 64 |
| inside a box with sponge (open) | 15 | 60 |
| inside a box with sponge (close) | 7 | 46 |

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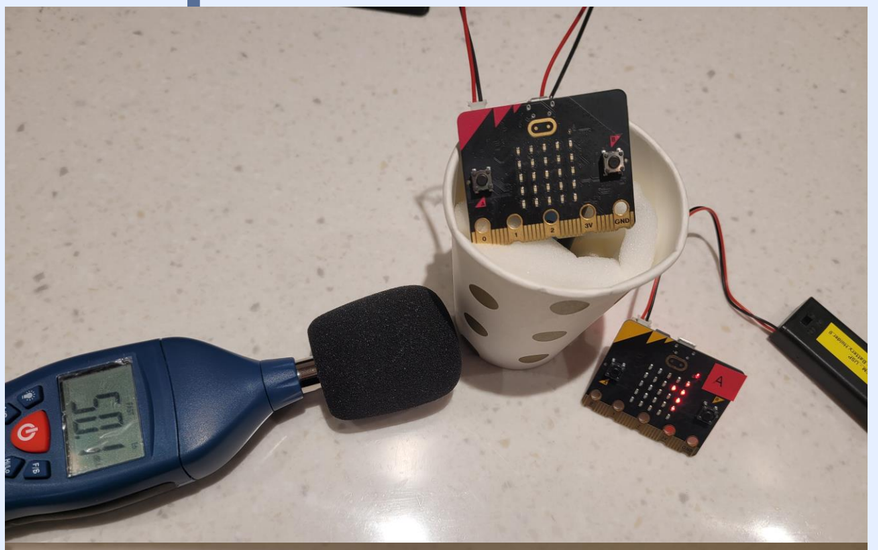
# experiment 7



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# Objectives of experiment 8

- Use Microbit A as sound meter and sender and Microbit B as receiver that receive data from Microbit A, and use 165Hz from Iphone as sound source, to detect the sound level by using different materials for sound insulation in 1m.
- A# Sound source in box
- B# Sound meter in box
- Sound source: https://www.youtube.com/watch?v=bZyCHCop2WQ

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# experiment 8

| Experiment 8a | Sound level |
|---|---|
| N/A | 56 |
| on the box with sponge | 37 |
| inside the box with sponge | 30 |

| Experiment 8b | Sound level |
|---|---|
| N/A | 56 |
| on the box with sponge | 37 |
| inside the box with sponge | 30 |

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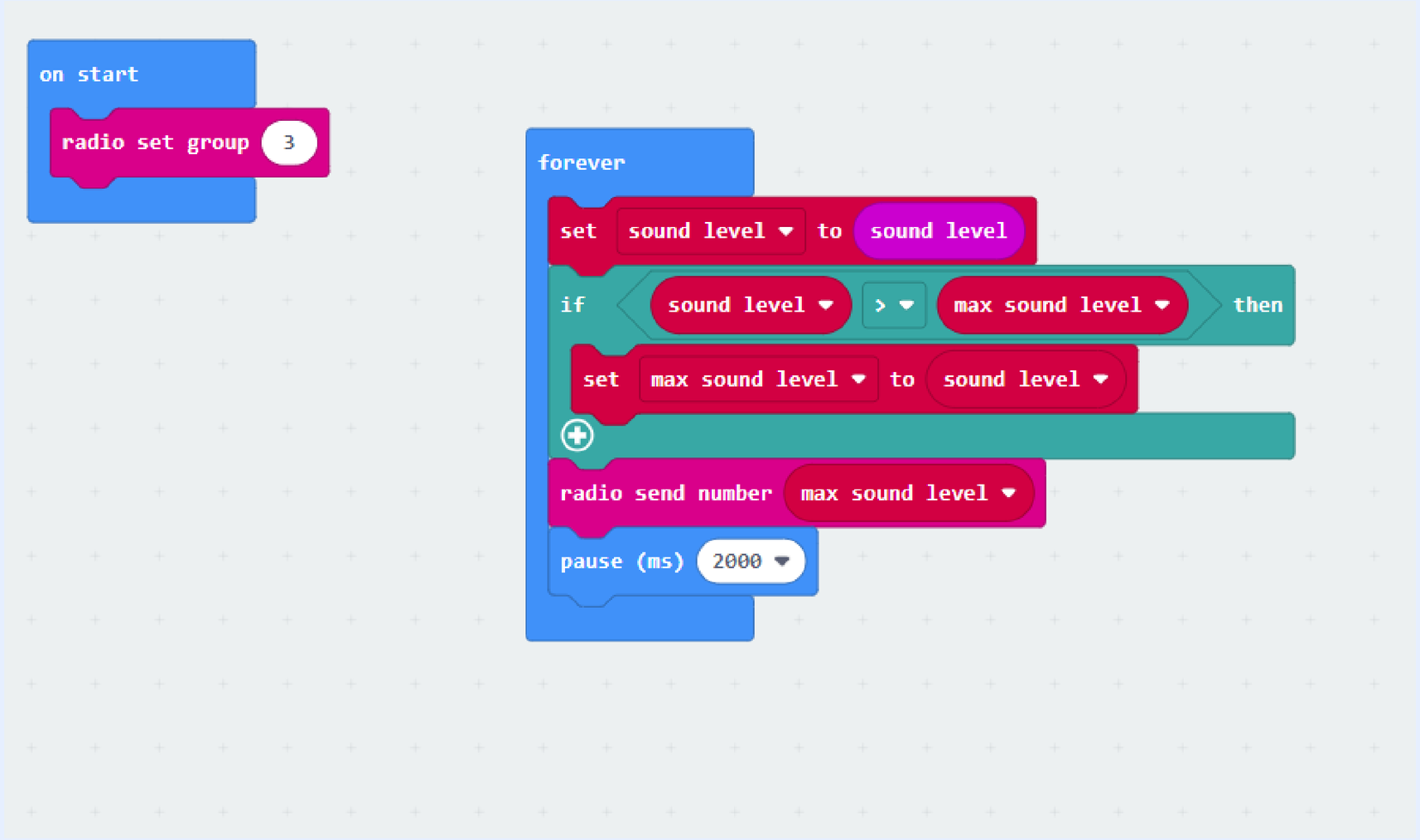
# Coding of sender

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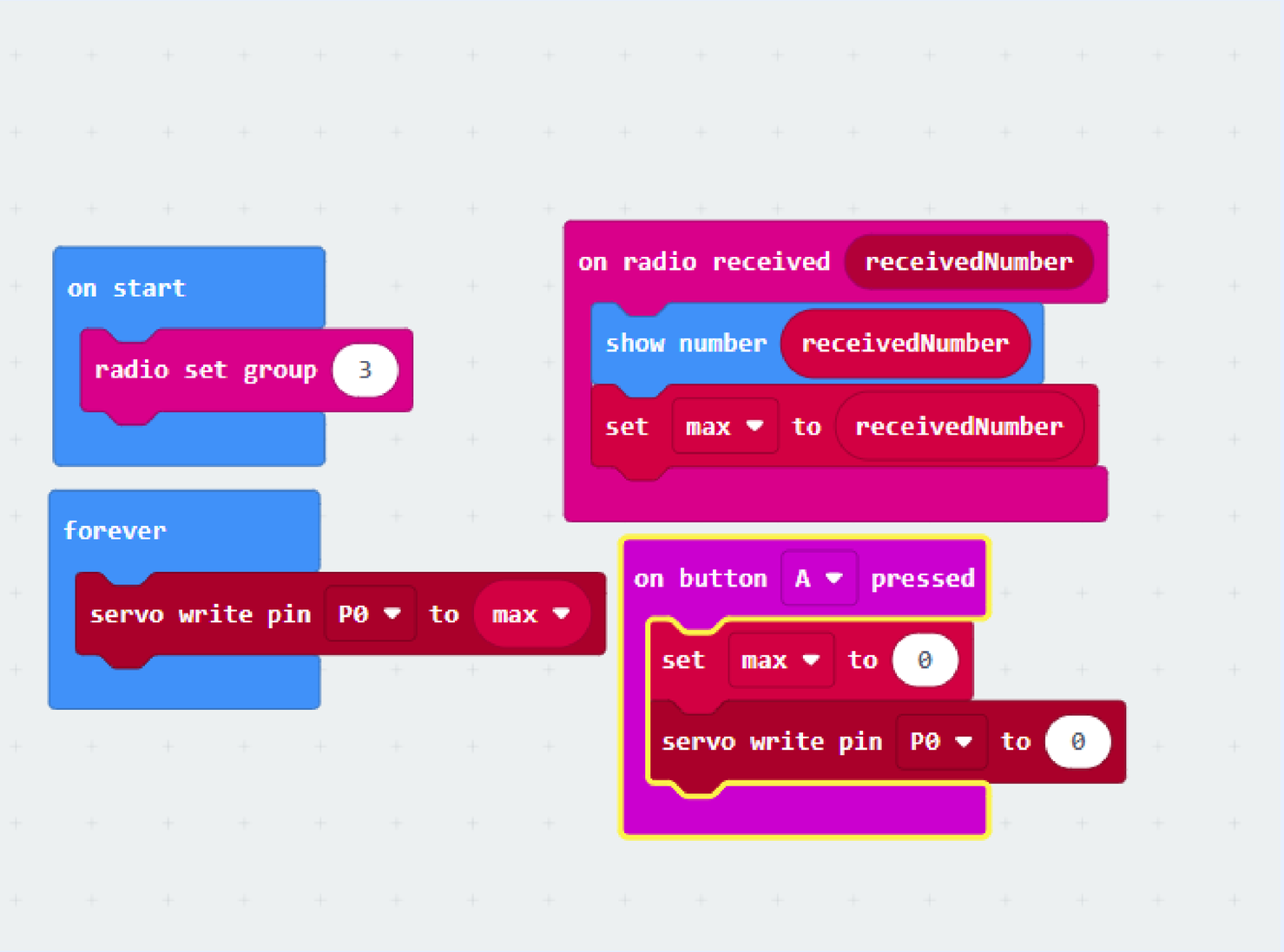
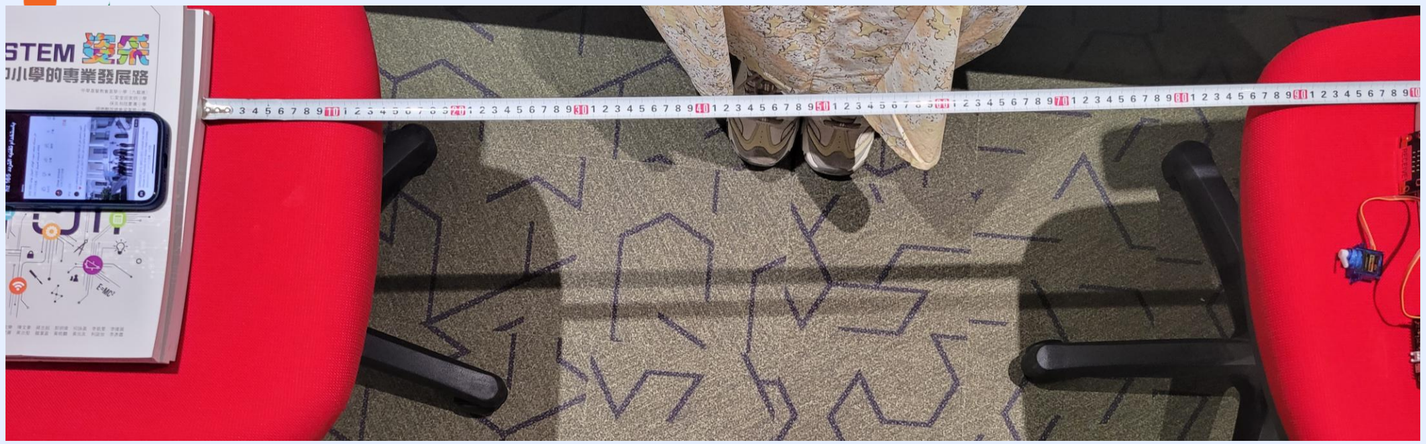
# Coding of receiver





# experiment 8a

## Sound source in box

* with video

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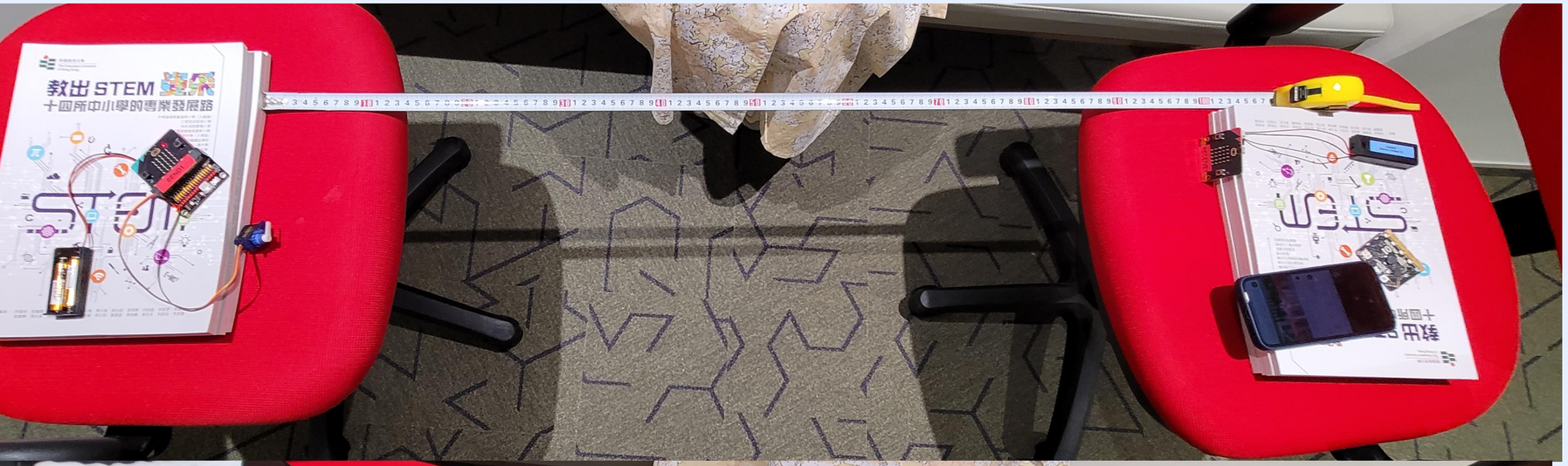

# experiment 8b

# Sound meter in box

* with video

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# Objectives of experiment 9

Calibration to find out the

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# Objectives of experiment 2

- To compare different sound source by using R8050 and Microbit

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