

# The Education University of Hong Kong

## 2022-2023 Quality Education Fund Thematic Network - Tertiary Institutes

### STEM Project Team

SCHOOL: 嘉諾撒聖方濟各學校 St. Francis' Canossian School 

TOPIC: footstep counter (p.4)

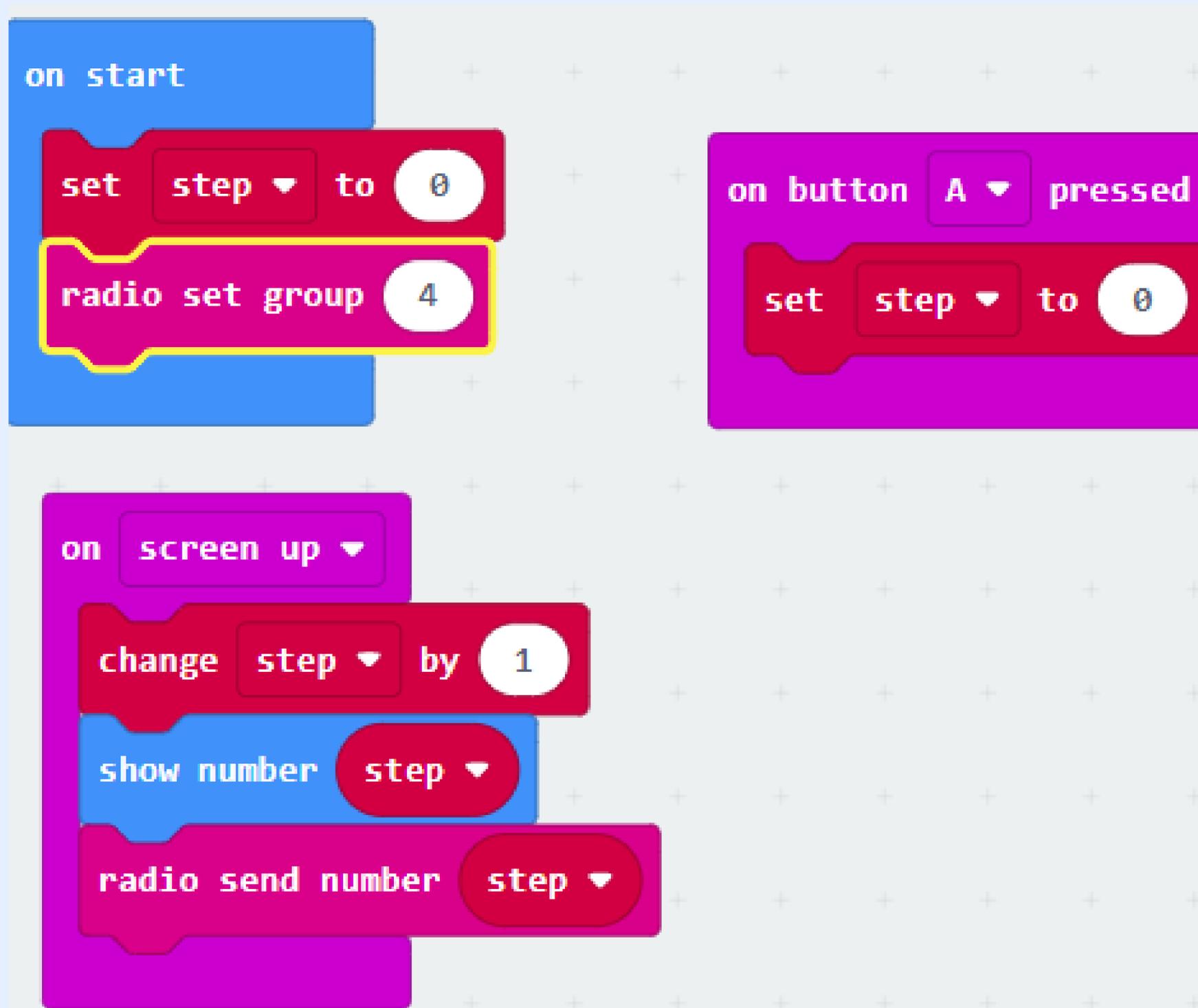
# Topic

- 打算在小冊子加入不同運動可消耗的卡路里、學生思考那種運動最有利健康、編程流程圖、學生進行測試時的注意事項及向同學推廣計步器！

# Objectives of Experiment 1

1. Using the coding "Screen up" in Microbit to count footstep during walking
2. Using the coding "logo up" in Microbit to count footstep during walking
3. Using the coding "shake" in Microbit to count footstep during walking
4. Using the coding "3g" in Microbit to count footstep during walking

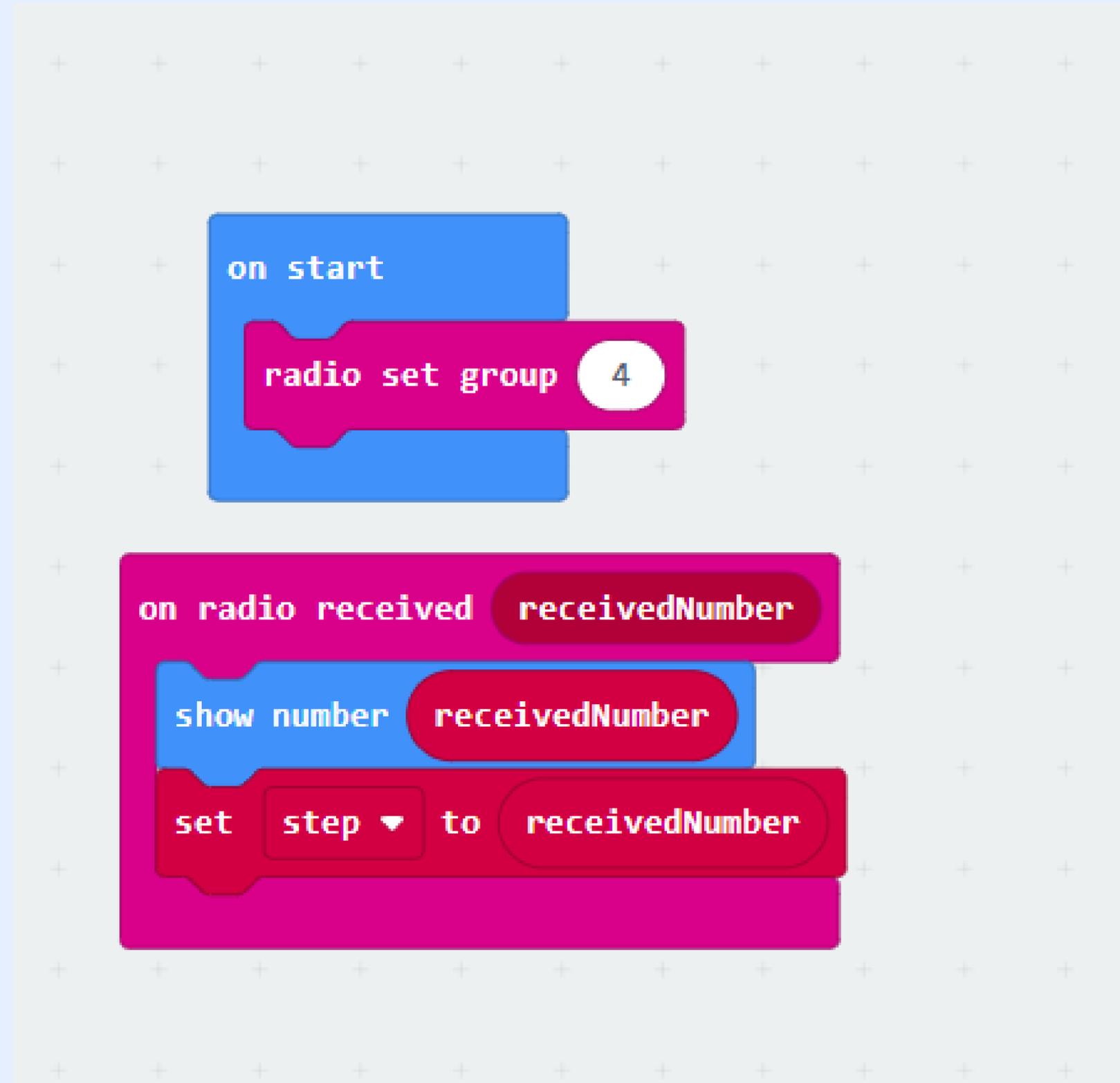
# Setup 1 Screen up: Coding of sender



The image displays a Scratch script for a 'sender' screen. It consists of three event-driven code blocks:

- on start** (blue block):
  - set **step** to 0 (red block)
  - radio set group 4 (pink block)
- on button A pressed** (purple block):
  - set **step** to 0 (red block)
- on screen up** (purple block):
  - change **step** by 1 (red block)
  - show number **step** (blue block)
  - radio send number **step** (pink block)

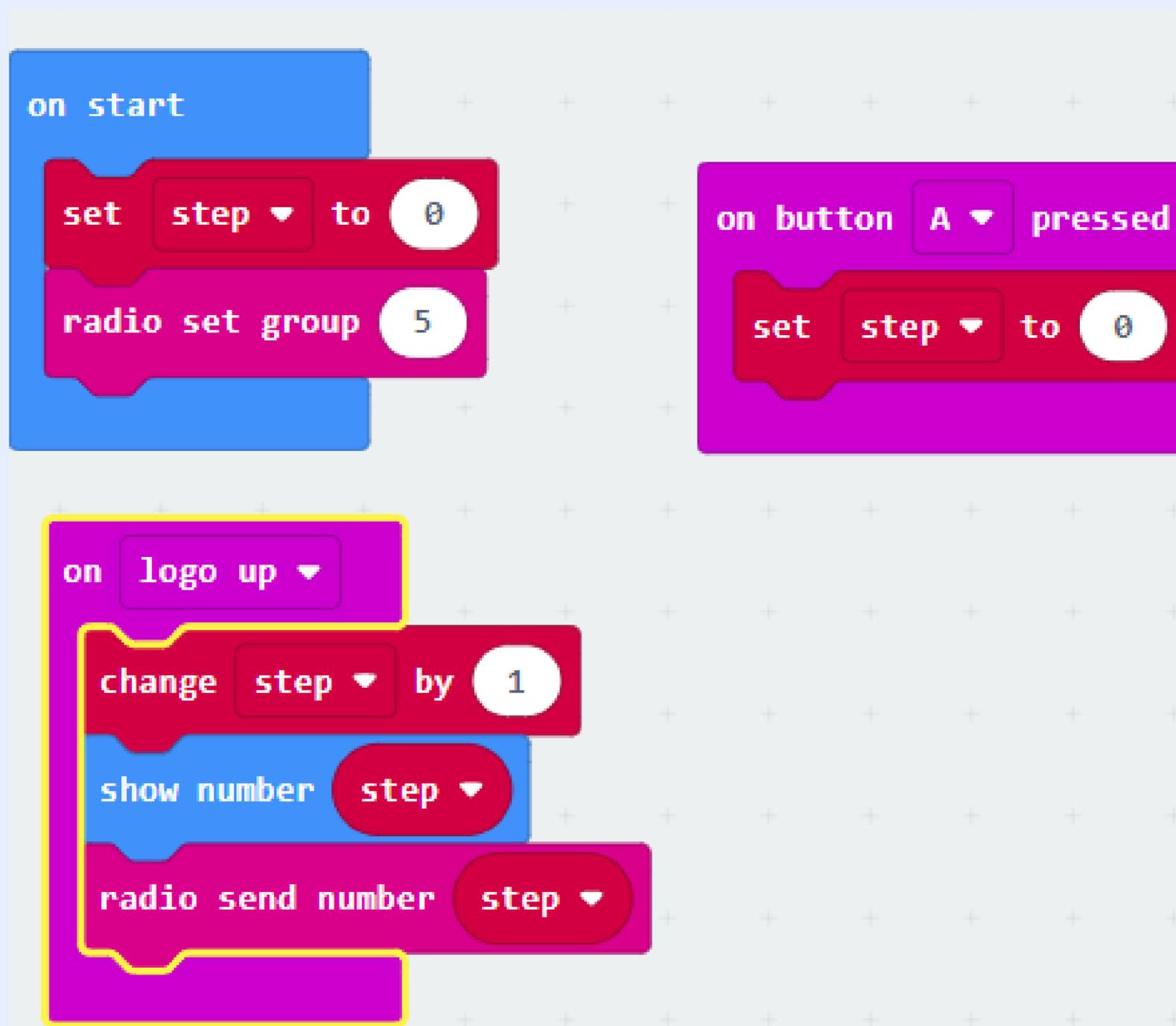
# Setup 1 Screen up Coding of receiver



```
on start
  radio set group 4

on radio received receivedNumber
  show number receivedNumber
  set step to receivedNumber
```

# Setup 2 logo up Coding of sender



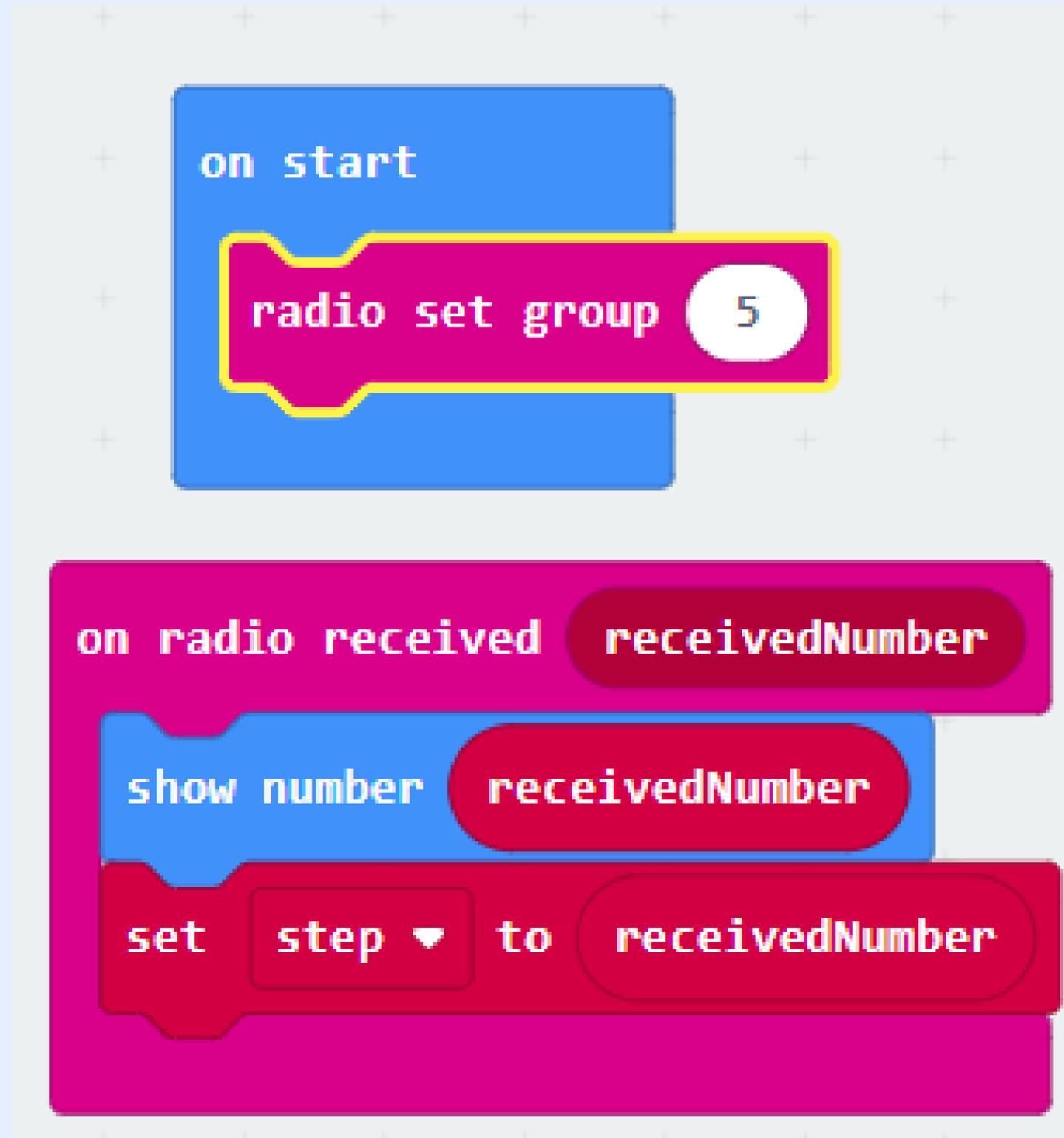
```
on start
  set step to 0
  radio set group 5

on button A pressed
  set step to 0

on logo up
  change step by 1
  show number step
  radio send number step
```

The image shows a Scratch script for a 'sender' program. It consists of three event-driven blocks: 'on start', 'on button A pressed', and 'on logo up'. The 'on start' block (blue) initializes a variable 'step' to 0 and sets the radio group to 5. The 'on button A pressed' block (purple) resets 'step' to 0. The 'on logo up' block (purple) increments 'step' by 1, displays the current value of 'step', and sends the value via radio.

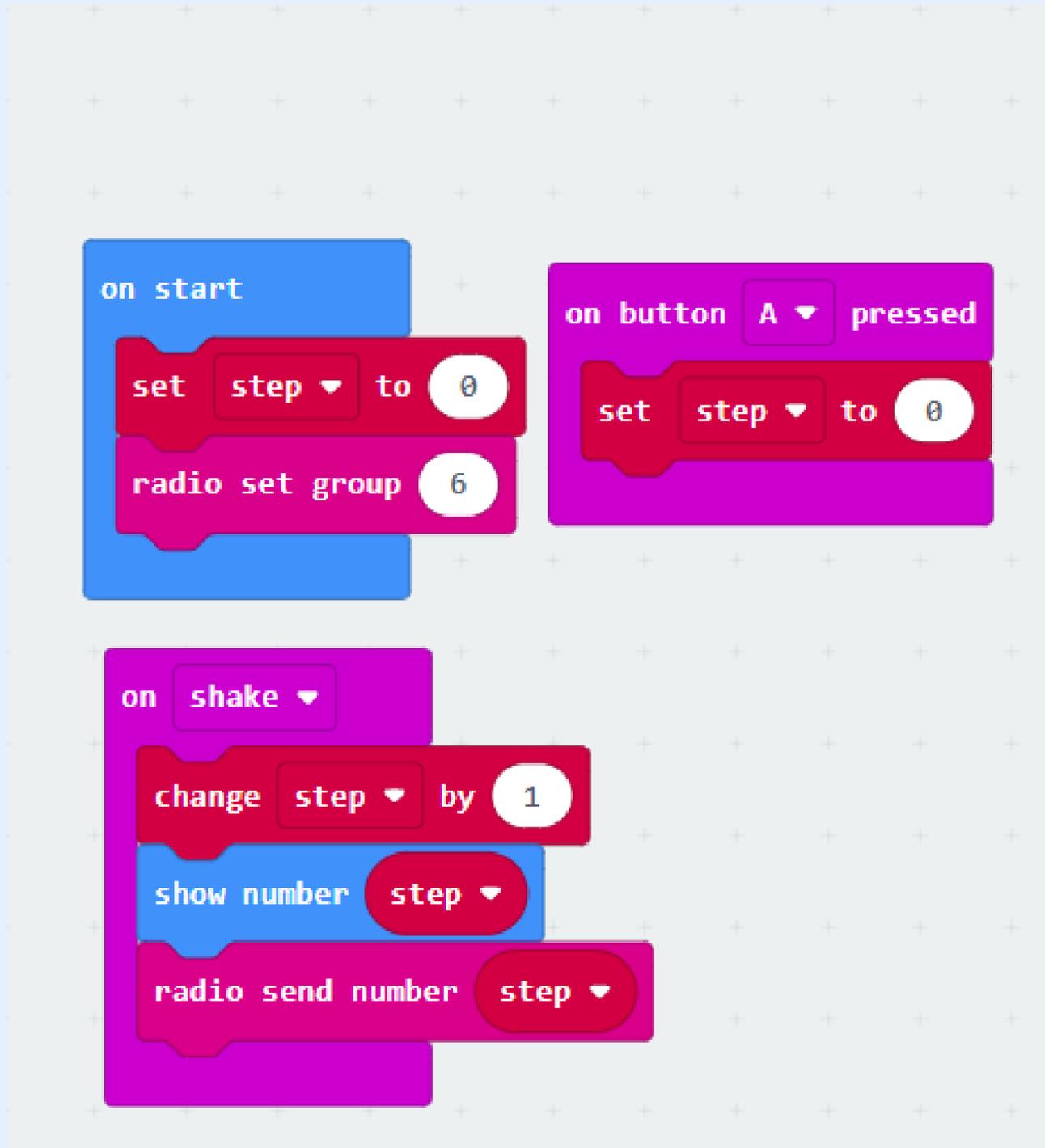
## Setup 2 logo up Coding of receiver



The image shows a Scratch script for a radio receiver. It consists of two main blocks: an 'on start' block and an 'on radio received' block. The 'on start' block contains a 'radio set group' block with the value '5'. The 'on radio received' block contains three sub-blocks: a 'show number' block with the variable 'receivedNumber', and a 'set step' block with a dropdown arrow and the variable 'receivedNumber'.

```
on start  
  radio set group 5  
  
on radio received receivedNumber  
  show number receivedNumber  
  set step ▼ to receivedNumber
```

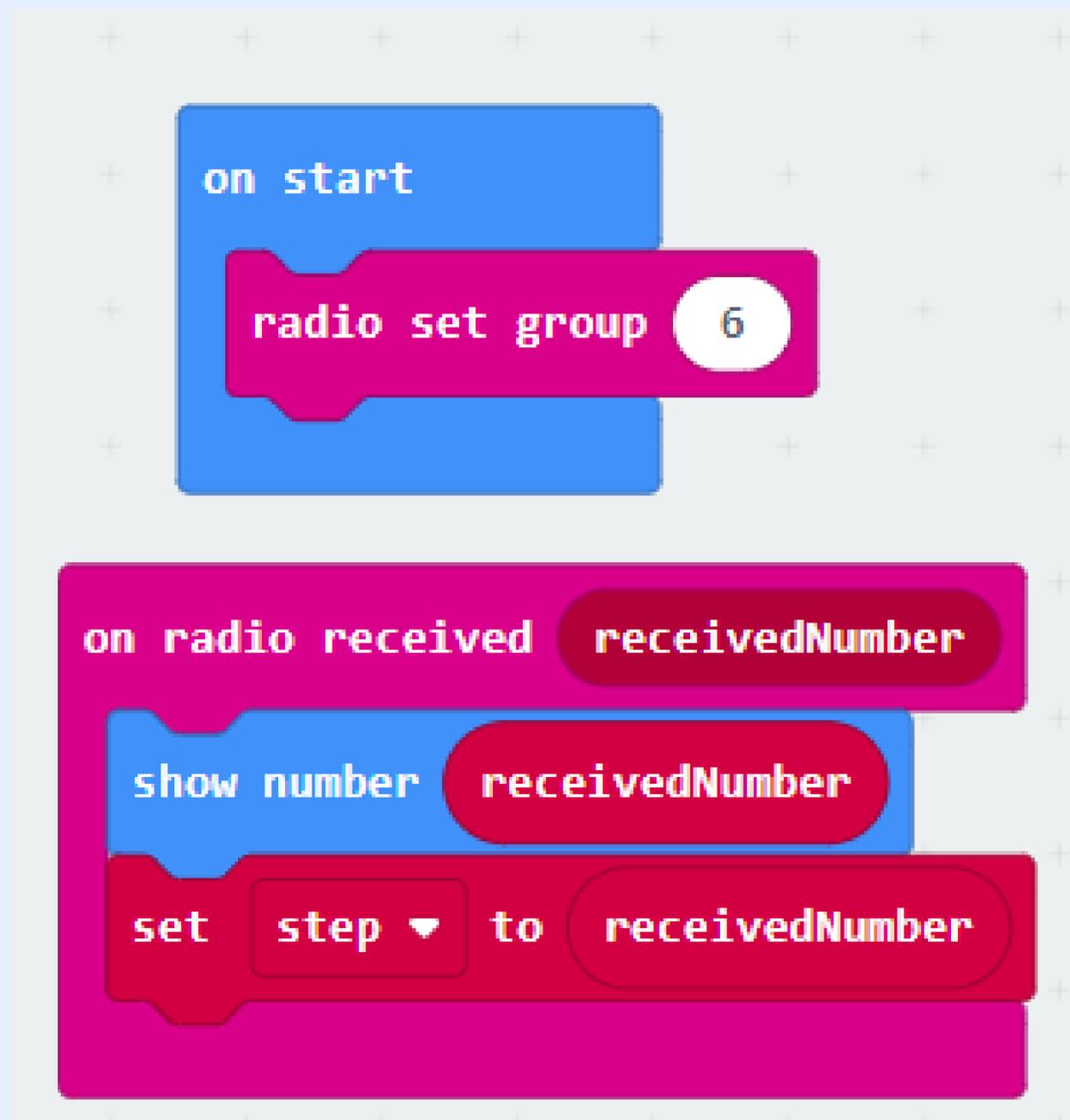
## Setup 3 shake Coding of sender



The image shows a Scratch script on a yellow grid background. It consists of three event-driven code blocks:

- on start** (blue block):
  - set **step** to 0 (red block)
  - radio set group 6 (pink block)
- on button A pressed** (purple block):
  - set **step** to 0 (red block)
- on shake** (purple block):
  - change **step** by 1 (red block)
  - show number **step** (blue block)
  - radio send number **step** (pink block)

## Setup 3 shake Coding of receiver



```
on start
  radio set group 6

on radio received receivedNumber
  show number receivedNumber
  set step to receivedNumber
```

The image shows a Scratch script on a light yellow grid background. It consists of two main blocks. The first is a blue 'on start' block containing a pink 'radio set group' block with the number '6' in a white circle. The second is a pink 'on radio received' block with 'receivedNumber' in a dark red oval. Inside this pink block are two sub-blocks: a blue 'show number' block with 'receivedNumber' in a dark red oval, and a red 'set' block with a dropdown menu showing 'step', a downward arrow, and 'to' followed by 'receivedNumber' in a dark red oval.

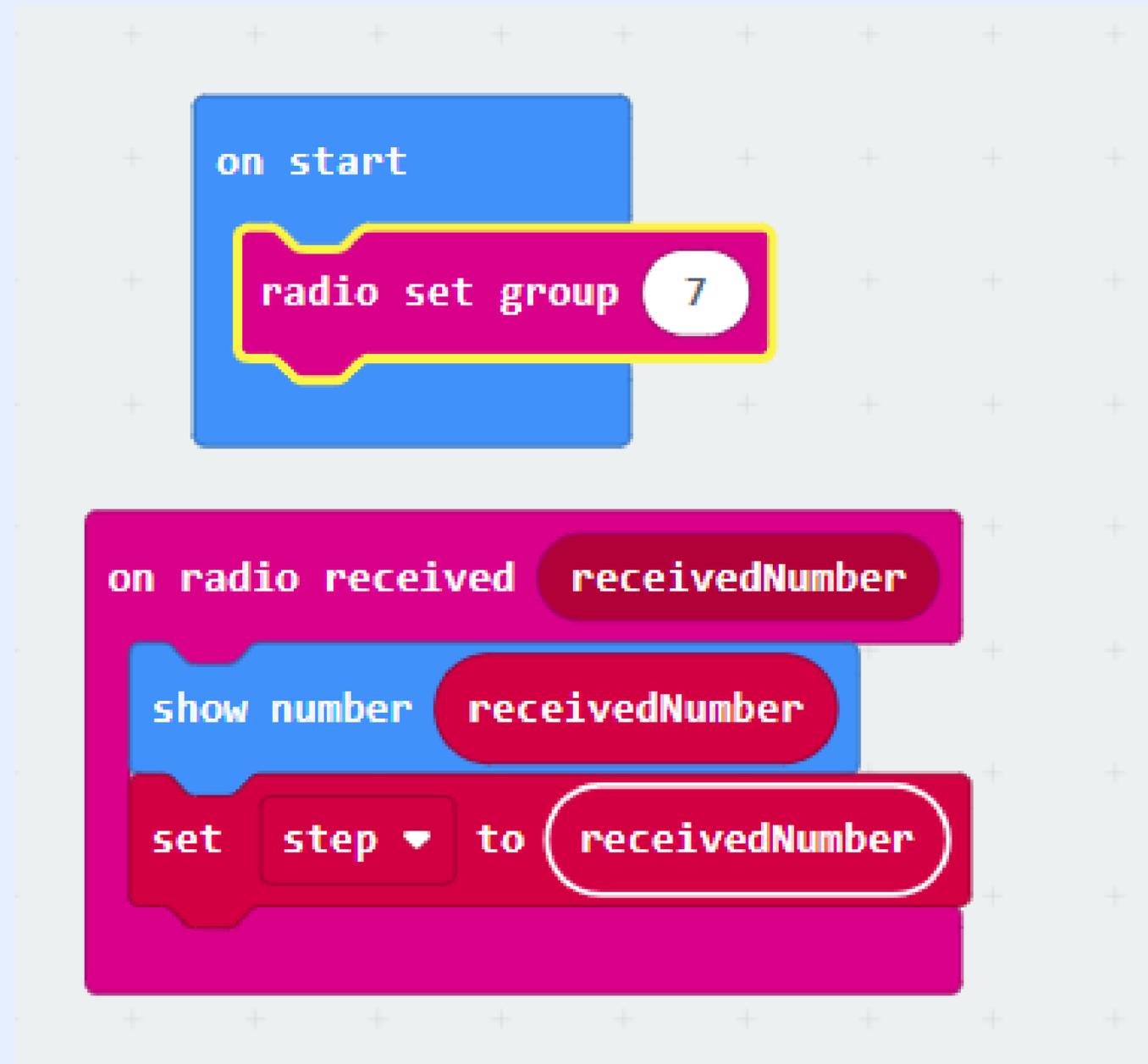
# Setup 4 3g Coding of receiver

```
on start
  set step to 0
  radio set group 7

on button A pressed
  set step to 0

on 3g
  change step by 1
  show number step
  radio send number step
```

# Setup 4 3g Coding of receiver



```
on start
  radio set group 7

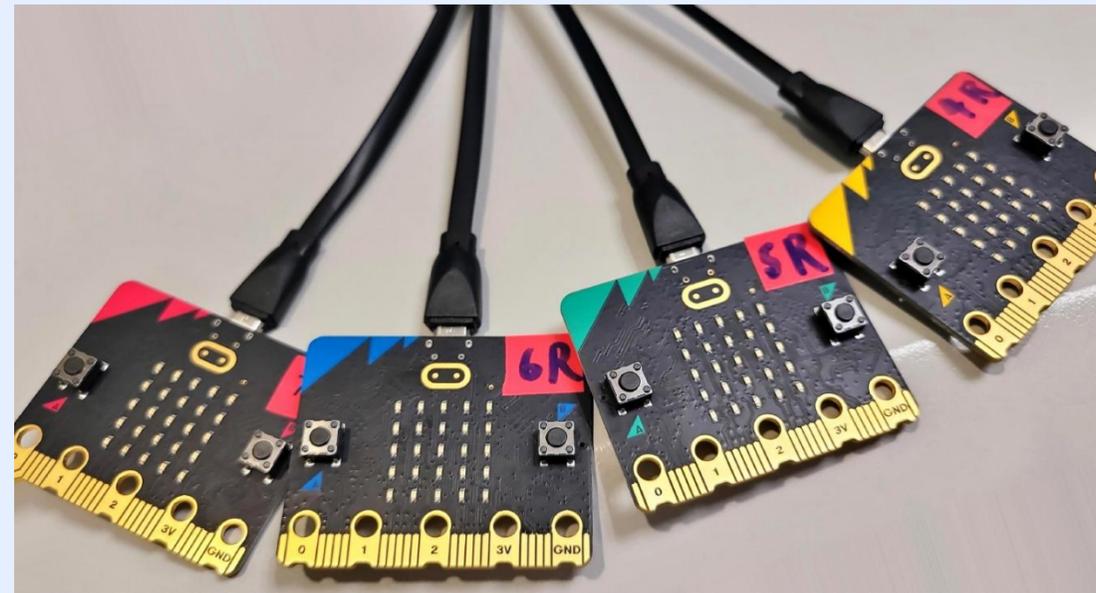
on radio received receivedNumber
  show number receivedNumber
  set step to receivedNumber
```

The image shows a Scratch script on a light yellow grid background. It consists of two main blocks. The first is a blue 'on start' block containing a pink 'radio set group' block with the number '7' in a white circle. The second is a larger pink 'on radio received' block with 'receivedNumber' in a dark red oval. Inside this block are two sub-blocks: a blue 'show number' block with 'receivedNumber' in a dark red oval, and a red 'set step' block with a dropdown arrow and 'receivedNumber' in a white oval.

# Result

no. of step	screen up	logo up	shake	3g	actual move of left foot
instep	12/17/11	16/18/17	0/4/0	2/2/1	10/10/10
ankle	0/0/0	0/0/0	2/3/1	0/0/0	10/10/10

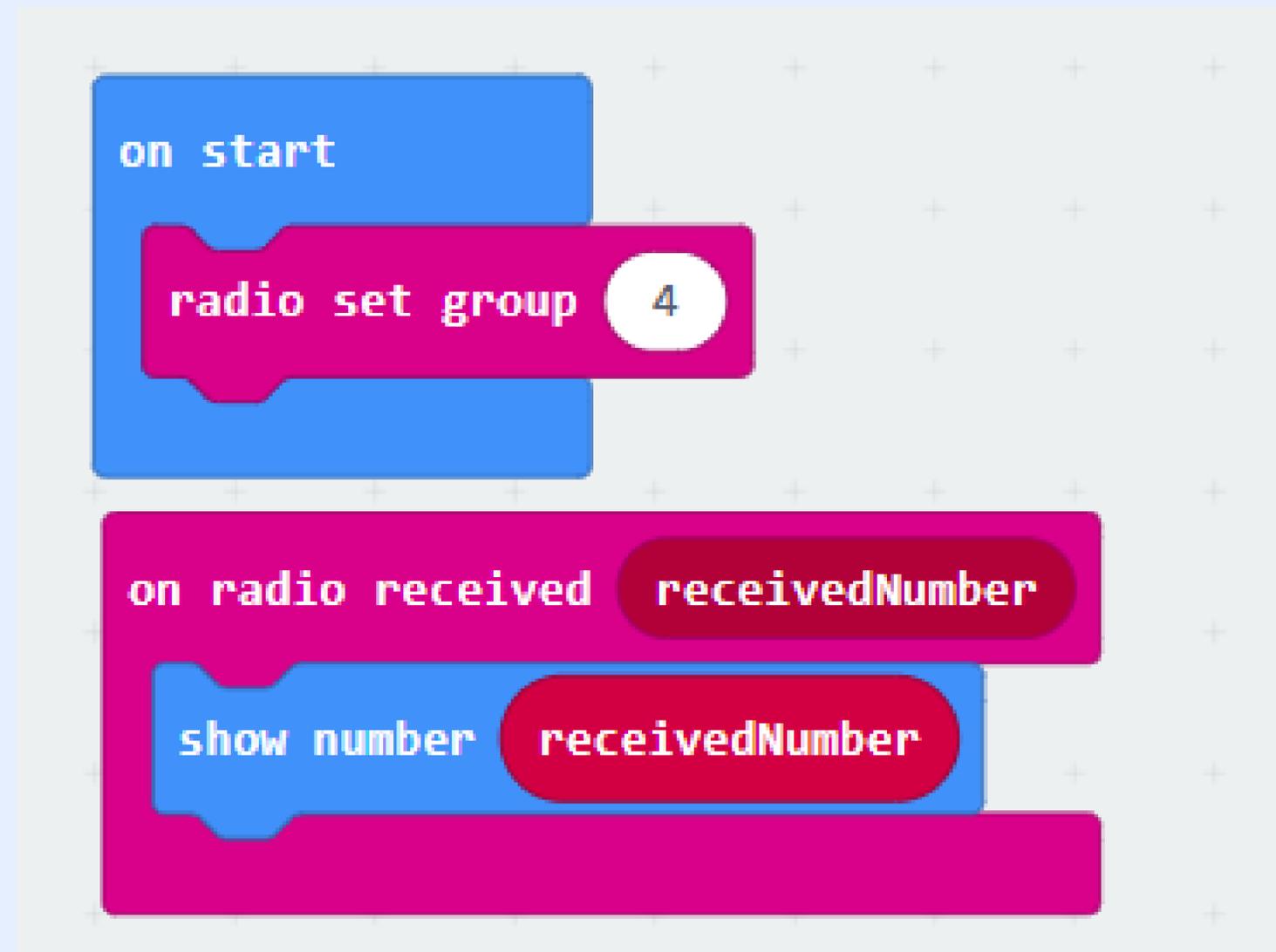
# Photo



## Objectives of Experiment 2

- Using accelerometer in different axis to count step

# Coding of receiver



```
on start
  radio set group 4

on radio received receivedNumber
  show number receivedNumber
```

The image shows a Scratch script for a radio receiver. It consists of two main blocks: an 'on start' block and an 'on radio received' block. The 'on start' block contains a 'radio set group' block with the value '4'. The 'on radio received' block contains a 'show number' block with the variable 'receivedNumber'.

# Coding of sender v2

```
on start
  set step to 0
  radio set group 4

forever
  if acceleration (mg) x > 1100 then
    change step by 1
    show number step
  +
  radio send number step
```

# Setup 4 3g Coding of receiver

```
on start
  set step to 0
  radio set group 4

forever
  if acceleration (mg) y > 1500 then
    change step by 1
    show number step
    +
    radio send number step
```

# Result

axis	x axis	y axis	actual move on left wrist
no. of step	1/1/1	10/10/ 10	10/10/1 0

photo



# Objectives of Experiment 3

To compare the difference between Microbit v1 and v2

# Coding of sender v2

```
on start
  set step to 0
  radio set group 8

forever
  if acceleration (mg) strength > 1500 then
    change step by 1
    show number step
    +
    radio send number step
```

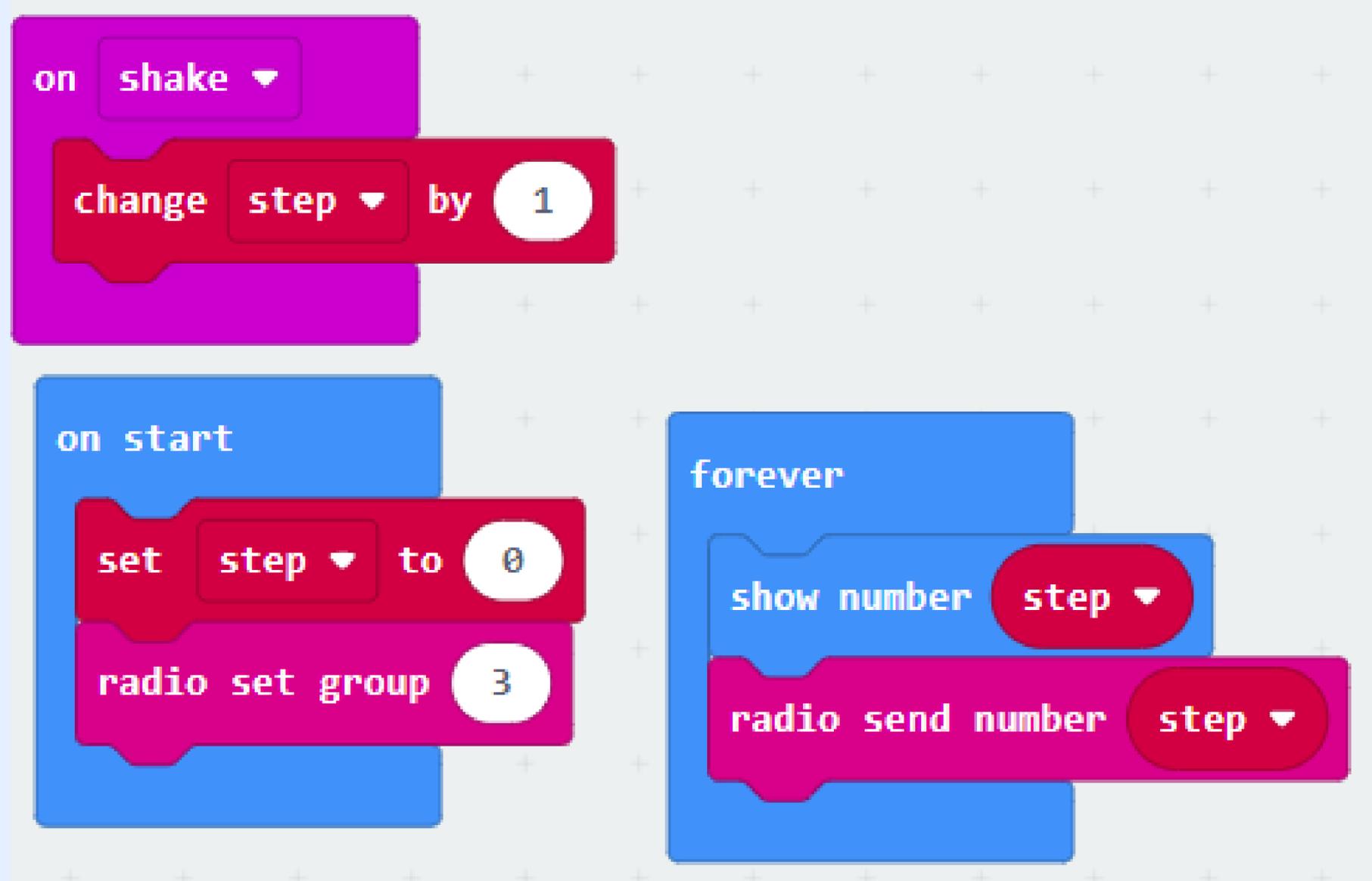
# Result

version	v1	v2	actual move on left foot
no. of step	10/10/10	10/10/10	10/10/10

# Objectives of Experiment 3

- Using the coding "shake" in Microbit v1 to count footstep during walking

# Coding of sender



```
on shake
  change step by 1

on start
  set step to 0
  radio set group 3

forever
  show number step
  radio send number step
```

The image shows a Scratch script for a 'sender' object. It consists of three main blocks: 'on shake', 'on start', and 'forever'. The 'on shake' block (purple) contains a 'change step by 1' block (red). The 'on start' block (blue) contains two blocks: 'set step to 0' (red) and 'radio set group 3' (pink). The 'forever' loop block (blue) contains two blocks: 'show number step' (blue) and 'radio send number step' (pink).

# Coding of receiver



# Result

	v1 reading	actual move on left foot
no. of step	10/10/11	10/10/10

