Microbit Robotics Advanced Level 3

Lesson 2

Introduction To Superbit

Presented by Advanced Superlogic Team

Today's Topic

1. Remote Controller
2. Send Message Via Radio
3. Remote Control your Mobile Shooter
4. Challenge Time
5. Activity

Learning Outcome

1. Understand how Remote Controlling works
2. Using Microbit to send message via radio
3. Program your Remote Control for your Mobile Shooter

Remote Controller:

What types of Remote Controller have you seen in your daily life?

Remote Controller

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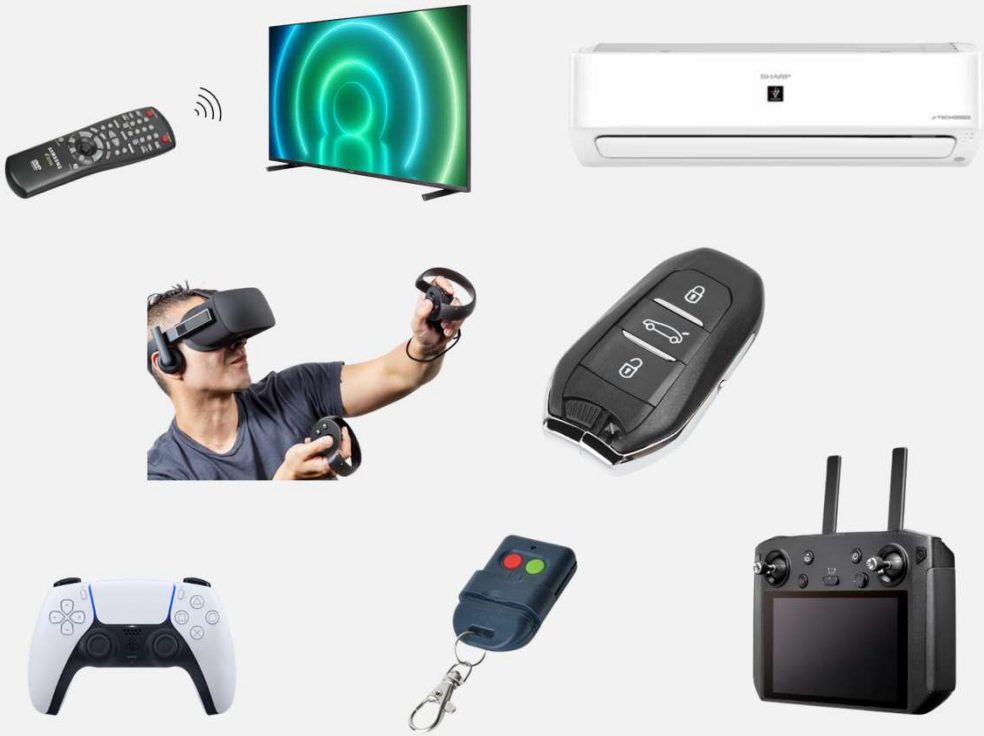
Different Types of Remote Controllers



- Air Conditioner
- TV Remote Controller
- Game Console
- Car Key
- House Gate
- Drone Controller
- Virtual Reality Headset

Methods to do Remote Controller

Remote control can be done by sending signals through either **infrared light** (like a TV remote), **visible light**, **radio waves**, **wires**, **fiber optics**, or by **soundwaves.**

Wireless Remote Controller

Receiver

Transmitter

To make a wireless remote controller, we need to have a **transmitter** built in on a controller and also a **receiver** built in our robots (or things to be controlled wirelessly).

A **transmitter** and **receiver** pair is a device that allows you to **transmit** and **receive** **radio signals**.

Wireless Remote Controller

Transmitter

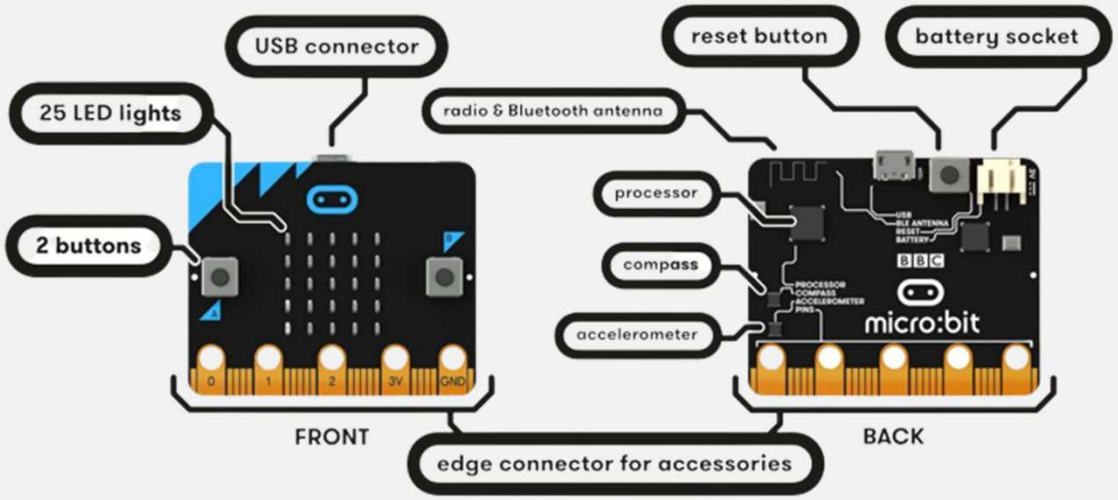
Receiver

With technology now, we also can make wireless Remote Controller using:

- Wifi Connection
- Bluetooth Connection
- Infrared (IR)

Microbit Send Message Via Radio

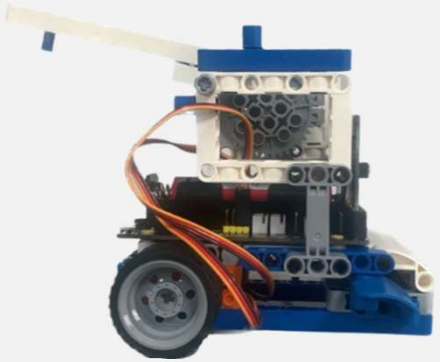
Microbit radio function



The radio module allows devices to work together via simple wireless networks. The radio module is conceptually very simple: Broadcast messages are of a certain configurable length (up to 251 bytes).

Remote Controller & Mobile Shooter

New Microbit (Transmitter)



Mobile shooter (Receiver)

Let’s take out your mobile shooter, and also take out another microbit to set as a remote controller.

Code your Remote Controller

Remote Control

Let's program our remote controller first.

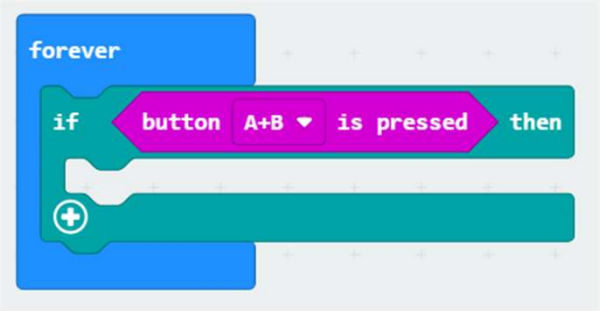
At first, we need to set radio group, please select a number from 0 – 255.

I will be using 1 as an example.

The radio group is served as a channel for your microbit to communicate via radio signal. So your mobile shooter should be listening to the same channel to work.

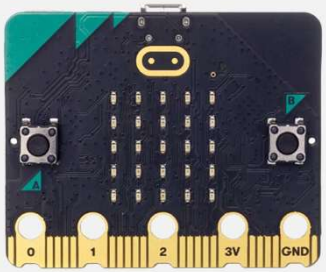
Code your Remote Controller

Remote Control

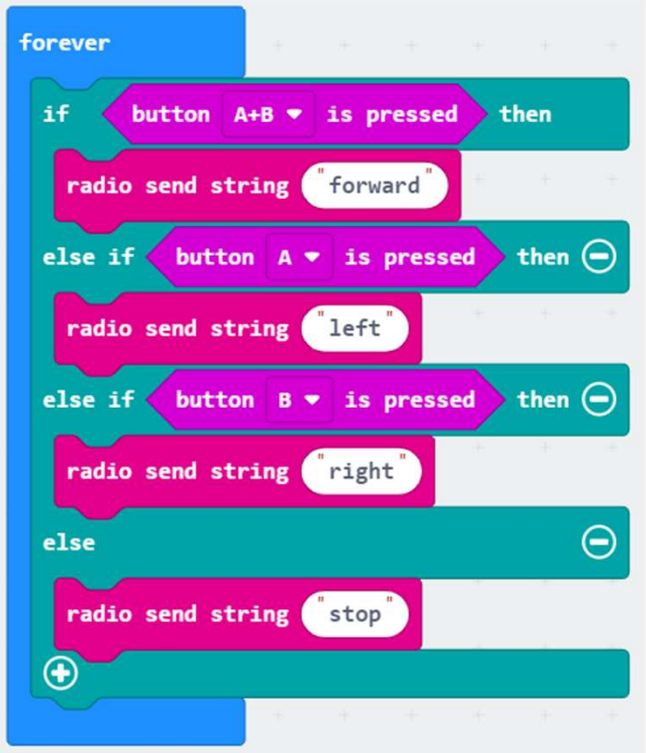


Let's add a condition that when your button A and button B are pressed together, I will send a signal through radio to other microbit with the same group.

Code your Remote Controller



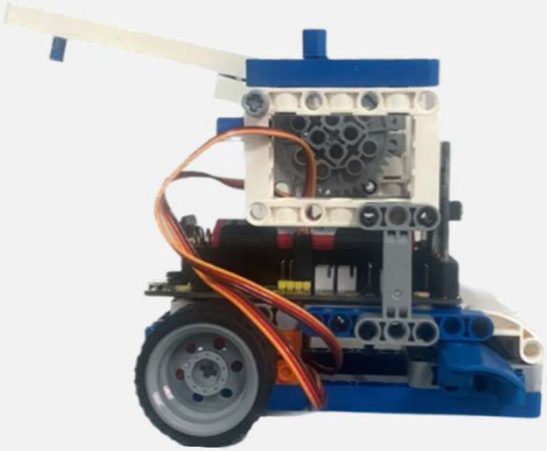
Remote Control



Then we add in different trigger to send different strings.

Then your remote controller is done.

Code your Mobile Shooter



Mobile shooter

Now is the time to code your mobile shooter to do action when receiving strings via radio from the remote controller.

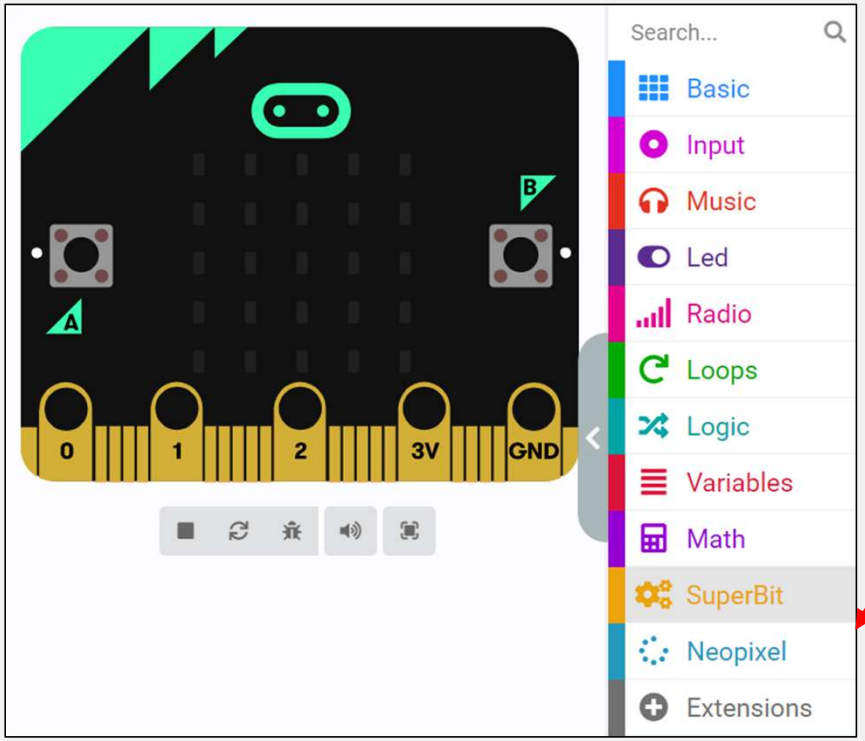
MakeCode Programming

First, we need to connect the micro:bit to the computer by USB cable. The computer will pop up a USB flash drive and click on the URL in the USB flash drive: http://microbit.org/ to enter the programming interface.

Add the Yahboom package https://github.com/lzty634158/SuperBit to program.

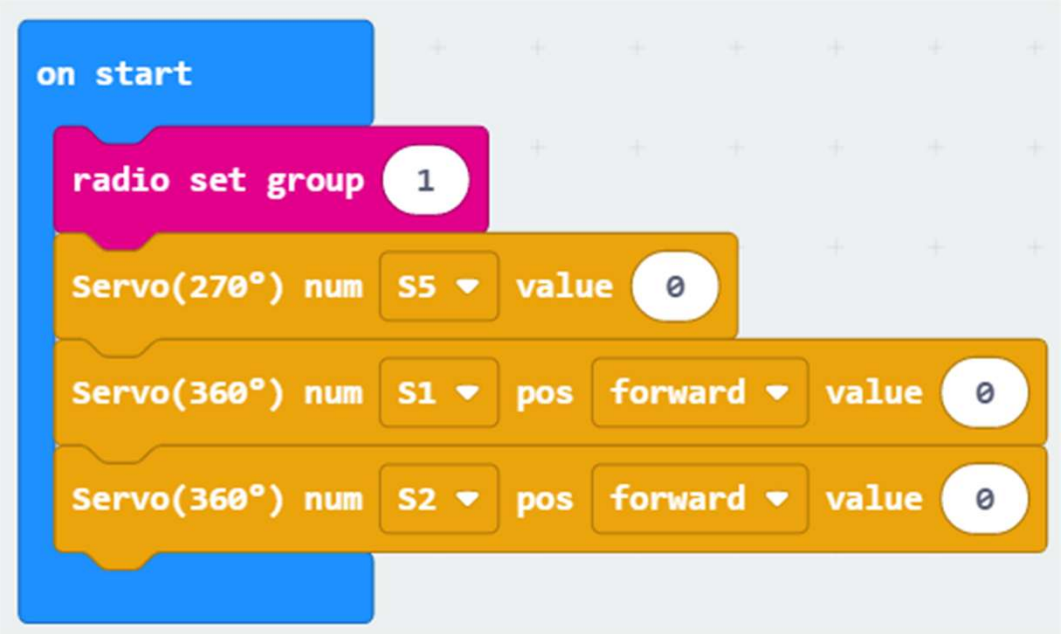
Or search lzty634158/SuperBit in the Microbit extension.

Superbit Extension



After importing the superbit extension, you will see **SuperBit** and **Neopixel** in your coding blocks.

MakeCode Programming



Program our starting state of our servos. And also set the radio group to the group that you set on your remote controller.

**You can use your last lesson's program.

**We just need to add the actions for received signals from the remote controller.

Make a Function - Move Forward

To make our program easy, we better make functions for our move forward, turn right, turn left and move backward as well as shooting.

Let's start with Move Forward.

**You can use your last lesson's program.

**We just need to add the actions for received signals from the remote controller.

Make a Function

**You can use your last lesson's program.

**We just need to add the actions for received signals from the remote controller.

Let's program for the remaining functions.

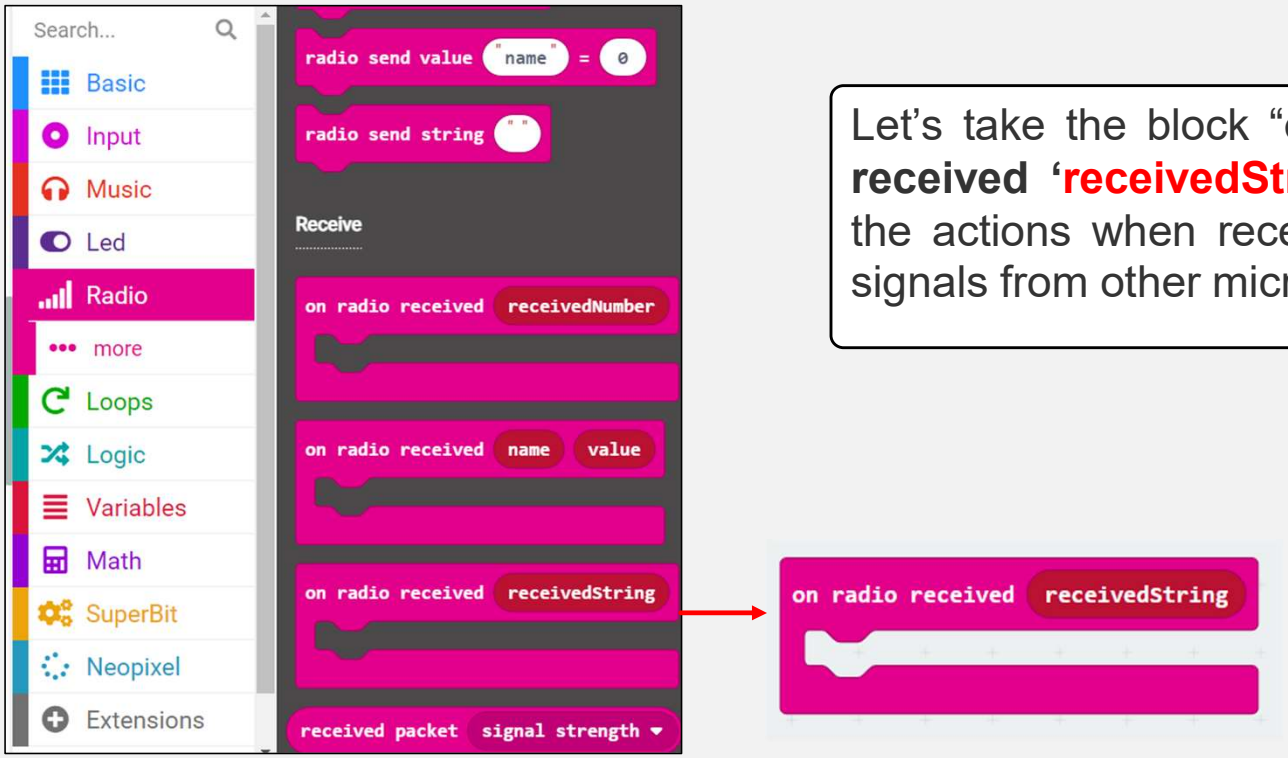
Make a Function - Shoot

The shoot function is like shooting with a catapult, so we just need to turn our grey servo to 60°, then go back to 0° after 0.5 second.

**You can use your last lesson's program.

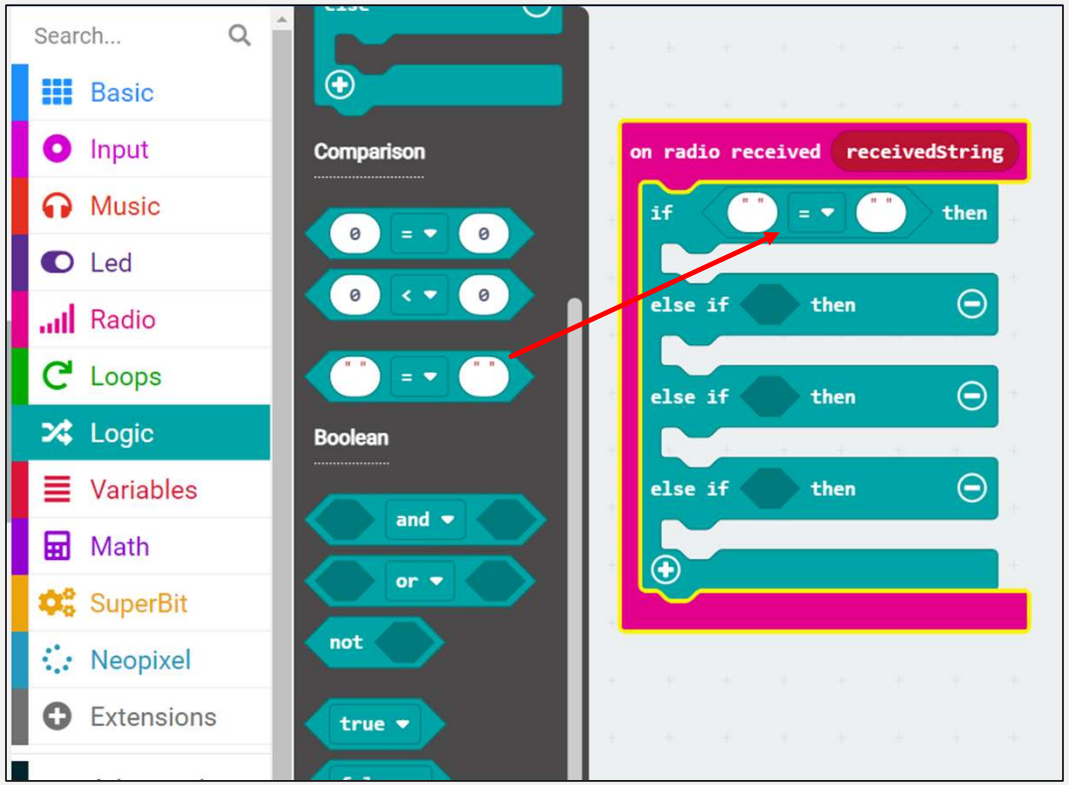
**We just need to add the actions for received signals from the remote controller.

Code your Mobile Shooter's actions



Let's take the block "**on radio received '**receivedString**'**" for the actions when received the signals from other microbit.

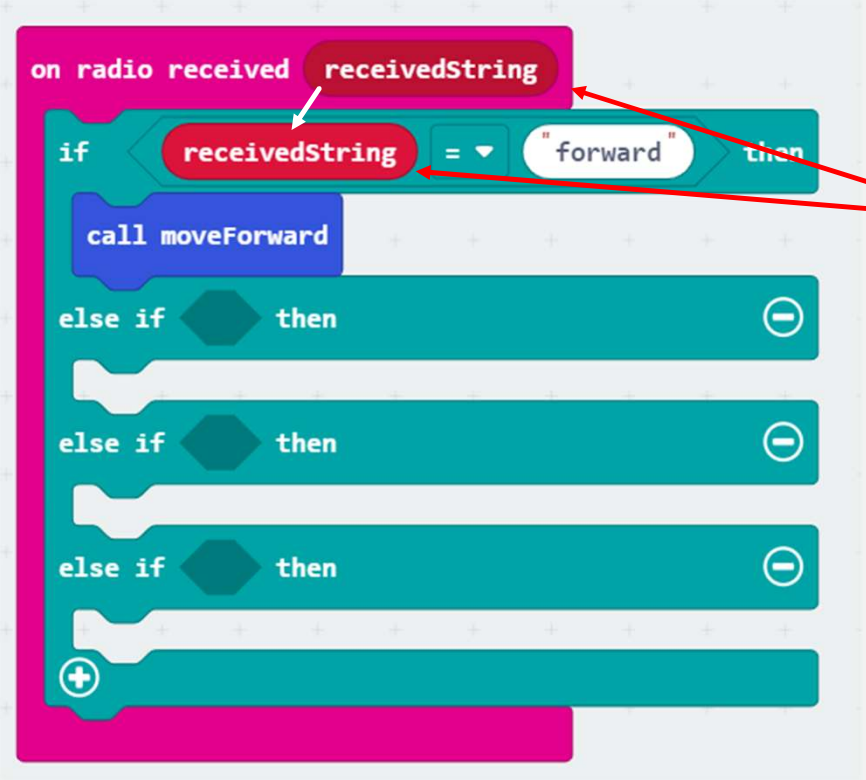
Code your Mobile Shooter's actions



Since we got 4 possible strings received from our controller, we need to set **4 conditions** inside.

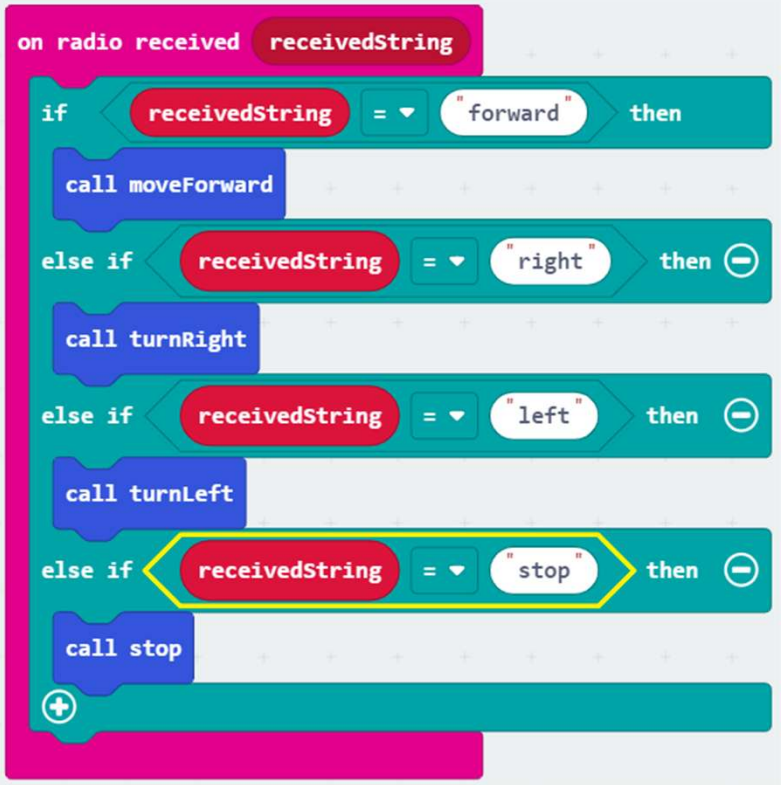
As now we are comparing the string, not the number, make sure your comparison operator is using the **string comparison** with the quotation mark (“”).

Code your Mobile Shooter's actions



We will need to check what string is received and set if the string received is "**forward**", then we want to call the **moveForward** function.

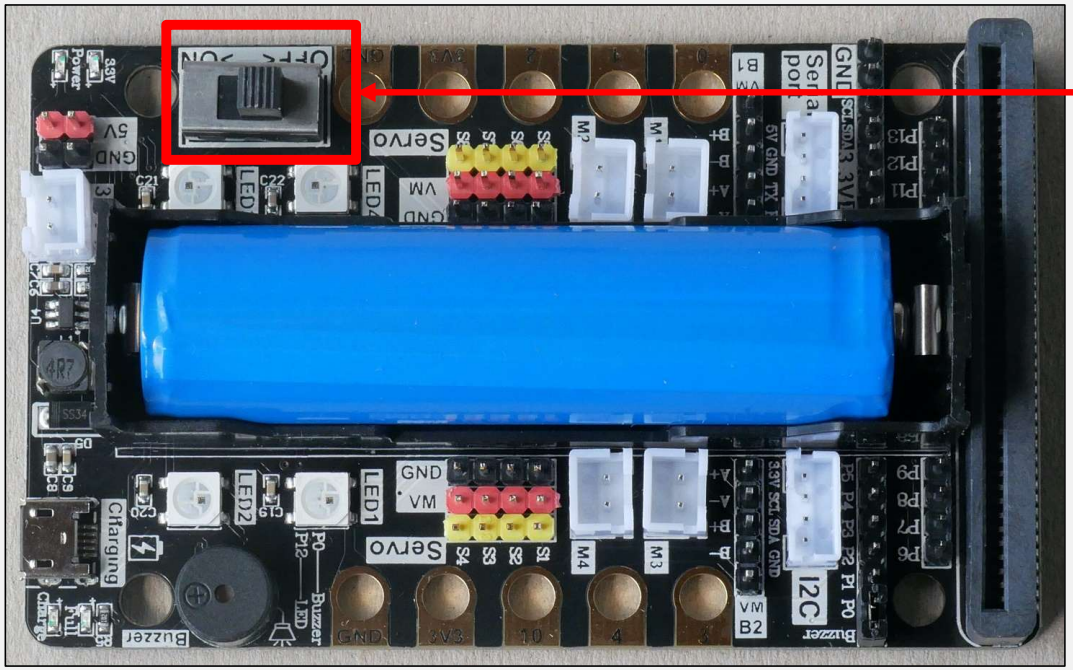
Code your Mobile Shooter's actions



Complete the actions for remaining functions.

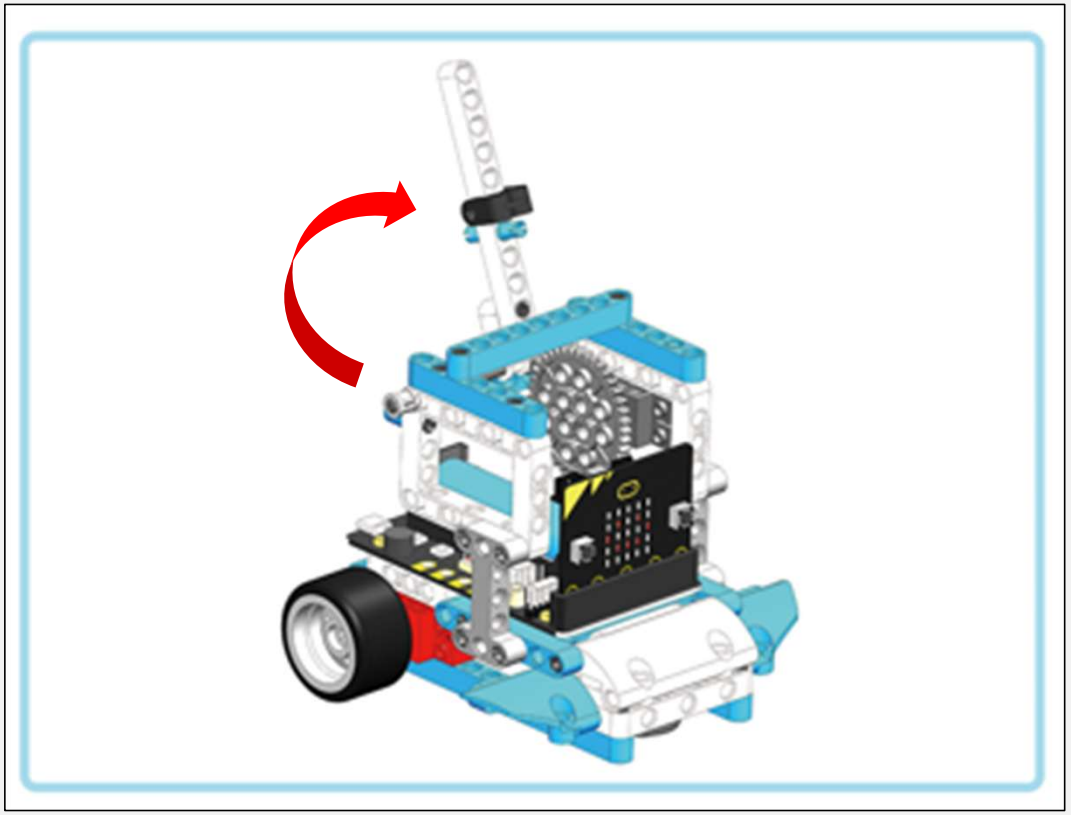
Please make sure the strings must be totally same (case sensitive) from the strings that you program with your remote controller.

MakeCode Programming

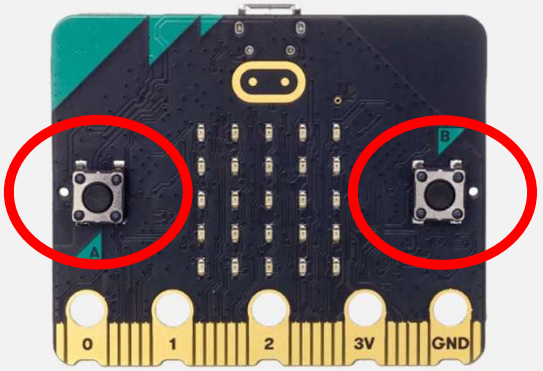


After the program is downloaded, turn on the SuperBit with the power switch to turn on your mobile shooter.

Phenomenon



30 Points

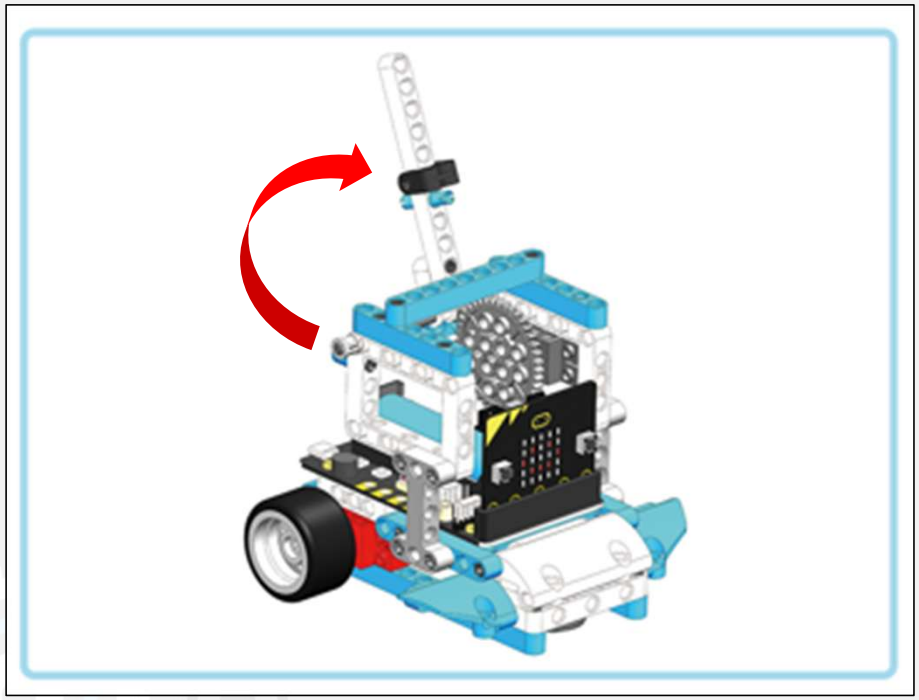


Connect your remote controller to your laptop to power on and try to interact with the button A & button B, then observe what happen to your mobile shooter. You now should be able to control your mobile shooter with forward, left and right.

CHALLENGE

for : Lesson 2

L2 – Challenge 1



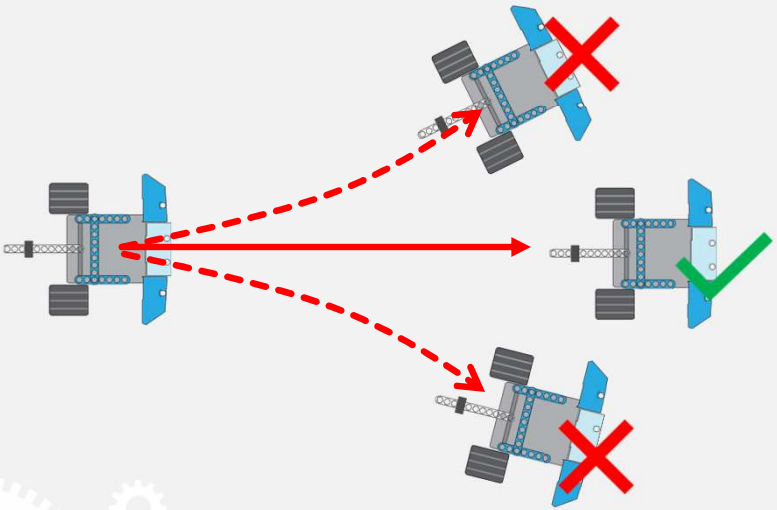
We need a shoot function for your mobile shooter.

Please program a shooting function for your mobile shooter and add a trigger from the remote controller to shoot.

**Go to your input coding blocks and see what are the inputs can be used as a trigger.

30 Points

L2 – Challenge 2

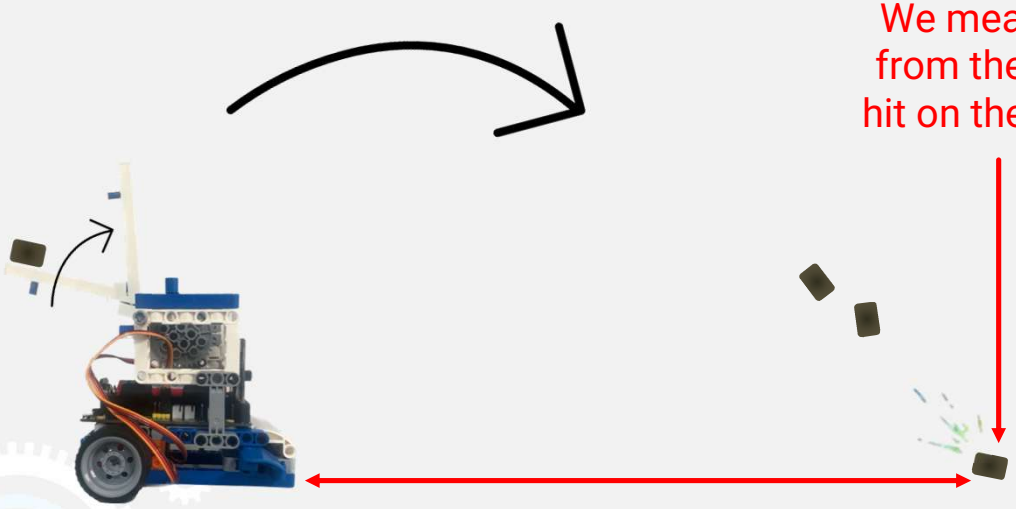


Tune up your mobile shooter and make it move straight when moving backwards and forwards.

Add a control for moveBackward function.

30 Points

L2 – Challenge Activity 3



30 Points

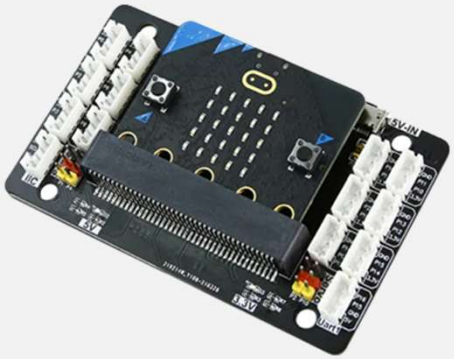
Now you can modify your shooter, but the part to be shot is the same.

Let's see which group can shoot the part with the furthest distance.

The distance is calculated based on the first hit on the floor.

Each group only has **3 shots**.

L2 – Mission



Can you use WOM modules as a controller and add in button as for shooting functions, and the rocker module as the movement control for the mobile shooter?

50 Points