# TT TELLO TALENT
INTRODUCTION COURSE

Introduction

Welcome to the future! The Robomaster Tello Talent drone is out of this world! This is the iExplore Space Station. The iExplore has selected the Robomaster TT to be its drone of choice. Oh, and you have been selected as the coder and pilot. Well done!

In this lesson we are going to learn about this amazing drone and the expansion board add-on.

We will start by learning the basics of the hardware. Once you have a firm grasp on the hardware, we will take on the challenge of writing code to assist the iExplore Team as they make their way to a newly discovered planet.

Good luck!
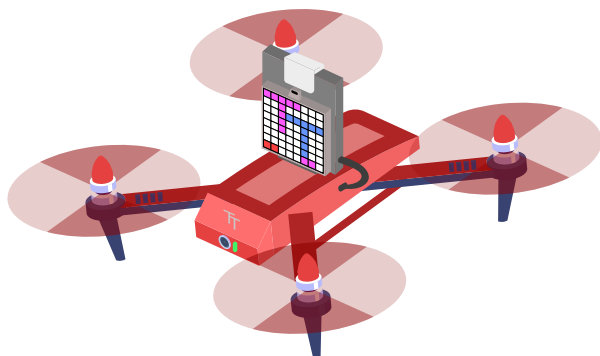
Robomaster TT 101

The TT is a remarkable drone ready for the future. It is an upgraded version of the Tello EDU Drone. In this lesson we are going peek at some of the new features as you get to know your new drone.

Here are some of the new out-of-the box features:

256 RGB LED
8x8 Dot Matrix Display
ToF Distance Sensing Module
Open Source ESP32 Microcontroller
Better WiFi
Supports Router mode (connect multiple drones to one router)

Over the next few lessons we are going to cover using some of these in our code.

Before we begin, you might be wondering, what's the difference between Robomaster TT and the Tello EDU? I suggest reading this blog post here to find out more.

Moving forward let's start prepping our new drones. This is so exciting!

Firmware Updating

Firmware is software that is installed on your hardware that makes everything work. It is what lets the components talk to each other correctly. DroneBlocks app prefers the latest version of the Robomaster TT in order to function correctly.

This is why one of the most important things to do before we get started is to make sure our TTs all have the latest firmware. You can find out how to do that by [clicking here.](#)

Here are some signs that you might need to update the firmware:

Mission code does not launch correctly.
DroneBlocks app crashes.
Video feed doesn't appear on start up.
Random blocks of code flash up on the screen randomly.

Putting It All Together

Once you have your TT fully charged, it's time for some next level excitement. The LED / Matrix / Controller is attached to the top of the Tello like this:

Plug the micro USB cable into the TT. Turn on the TT and you will see TT power up and TT will appear on the 8x8 matrix.

Once the Expansion Kit is installed we plug it into TT's charging port. That's all you need to connect it to the TT. Turn on the TT and the 8x8 Matrix should greet you with the letters "TT" on it. There will also be 4 red dots moving in the bottom right corner. This is the ToF sensor (Time-of-fight). It tells the drone how far away / close something is.
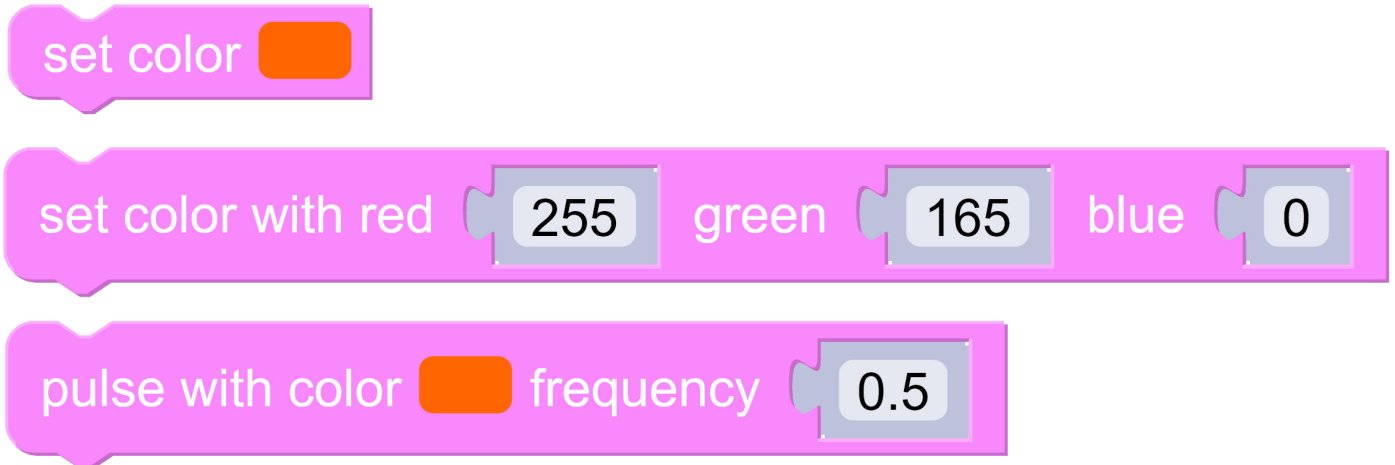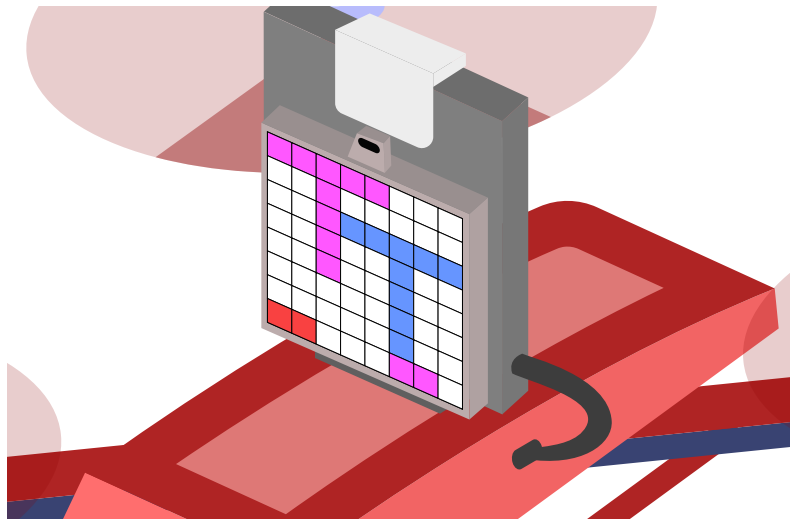

Now that you have assembled your TT, let's look at the RBG LED light on the top of it.
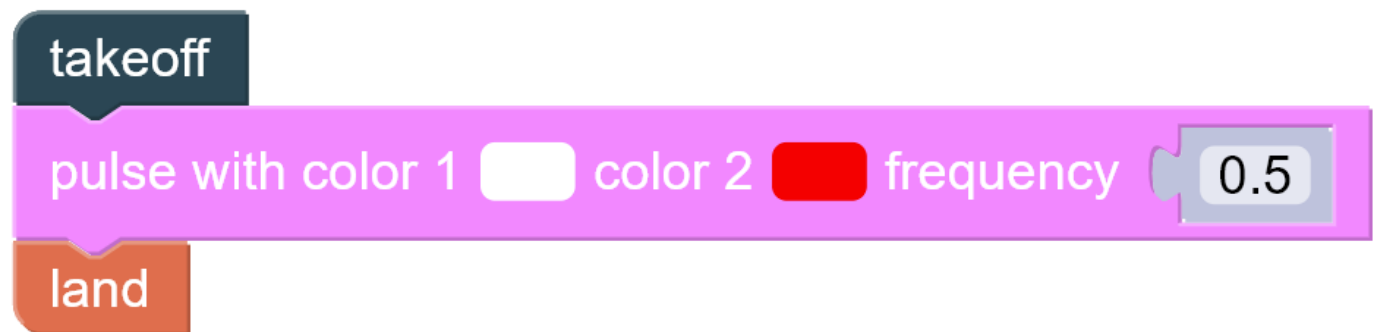
Test Mission iExplore - 2024/1

Now that we have the latest update, we can start building some test code. This test code will test the LED. We want it to pulse orange. An orange warning light will alert people on the space station that the drone is in use.

The orange like is a universal "warning / caution" light. What other machines do you know that have a flashing orange light while in use?
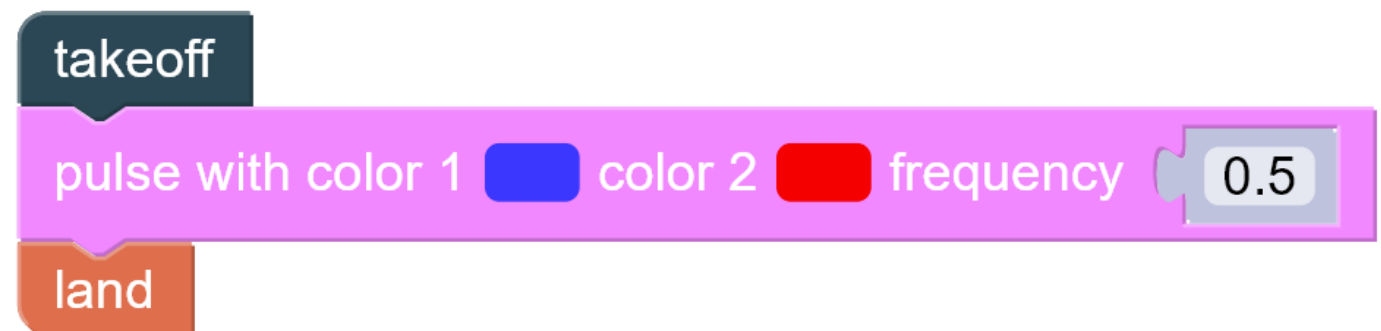
set color 🟧

set color with red `255` **green** `165` **blue** `0`

pulse with color 🟧 **frequency** `0.5`

Set color will set the LED color with a color picker.
Set color with red green blue sets the RGB value of LED
Pulse with color + frequency will flash the color at the selected speed.

takeoff
pulse with color 1 ⬜ **color 2** 🟥 **frequency** `0.5`
land

What message does the above block of code communicate?

takeoff
pulse with color 1 🟦 **color 2** 🟥 **frequency** `0.5`
land

What about this combination of lights?
How amazing is the TT's LED system??

Service Drone Routine V1.0.1

Amazing work on that LED DroneBlocks coder. What we need to do now is write the base code that will get our TT to fly around the iExplore Space Station and see if any areas need repair.

We will start with the solar panels. Our TT will fly in a square checking each panel's durability.

The LED will pulse blue while "scanning" the panels. Once the scan is complete the LED will give us the following colors:

Green   : Perfect
Orange   : Ok
Red   : Bad

Let's see what that code would look like:

How awesome is that! Let's break it down. We fly forward. The LED pulses blue for 2 seconds during the scan. A random number is generated which determines the solar panels health. The LED turns green, orange or red depending on the random number. Gotta love the LED!

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Solar Panel Health Report

Now that we have our amazing code, let's try something cool!
Run the program 3 times and fill in following table:
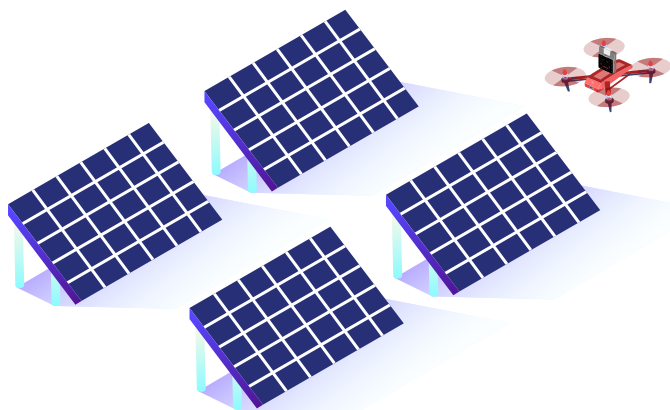
Run 1
    S1:   S2:
    S3:   S4:

Run 2
    S1:   S2:
    S3:   S4:

Run 3
    S1:   S2:
    S3:   S4:

How awesome is that? As you can see we have the results of three different runs. Some perfect, some OK and some bad.

As you can see the different LED color and status come from the randomNumber generated. We would always get the same LED color for all the solar panels if the randomNumber wasn't working.

As a homework assignment, determine what the code should look like if we needed to scan 2 rows of 3 solar panels?

User Is Signing Out

Well done on completing the first lesson. Let's go over a quick summary:

- The TT is an amazing upgrade
- Always upgrade to the latest firmware on your device
- Set color with color picker sets LED to stay on that color
- Set color with RBG uses Red, Green, Blue values
- Pulse with color pulses with selected color

The next lesson is going to deep dive into how the RBG LED works and what other clever cool things we can do with it. We will look at an RBG LED circuit and program the TT to use Morse Code with the LED. How exciting is that?

Looking forward to seeing you in the next lesson.

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