Lesson 1: Introduction to Robotics and MicroBits

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Course Overview

- Lesson 1: Introduction to Robotics and MicroBits
- Lesson 2: Introduction to Cutebots and Basic Movement
- Lesson 3: Sensors and Data Collection
- Lesson 4: Project
- Lesson 5: Obstacle Avoidance
- Lesson 6: Radio signals and remote control
- Lesson 7: Servo Motor Control
- Lesson 8: Integrating Multiple Behaviors
- Lesson 9-10: Mini-Hackathon

Technology Contract

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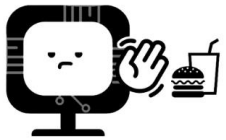
To protect all students and classroom technology, students need to follow some important rules and procedures. The choice of a student to violate these requirements will result in their suspension to use any technology for the program.

1. I will be gentle with the technology.

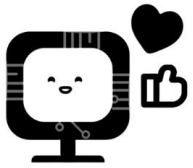
2. I will keep all food and drinks away from technology.



3. I will not surf the internet during class.

4. I will take required breaks from the computer.

5. I will be a good digital citizen. By keeping everything I do kind and respectful on my computer.



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Top 5 Coding Strategies

1 Debugging with Testing

- Use prints statement, lights, or sounds to find errors.
- Change one thing at a time to see the effect.
- Ask: “What did I expect? What happened?”

2 Breaking Problems into Steps

- Plan your goal into steps before you code.
- Tackle one problem at a time.
- Use flowcharts or pseudocode to organize ideas.

3 Finding Patterns & Reusing Solutions

- Reduce repeating code into smaller loops or function.
- Use available libraries or templates for a help start.
- Spot common errors like missing brackets or semicolons.

4 Working Together & Asking Questions

- Rubber Duck Method – Explain your problem to someone (or duck!).
- Ask: What’s working/not working/changed before the issue?
- Search online smartly for solutions.

5 Experimenting & Improving

- Try different approaches if one doesn’t work.
- Save code versions (e.g., copy one, two) before major changes.
- Make small changes and test them, don’t rewrite everything.

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Learning Objectives

- Understand the basic principles of robotics and how they apply to real-world scenarios.
- Demonstrate proficiency in using MicroBits and Cutebots for various robotic applications.
- Develop and execute programs that control the movement and behavior of robots.
- Integrate sensor data to enable robots to interact with their environment.
- Code and utilize servos for precise control of robotic components.
- Apply problem-solving and critical thinking skills to troubleshoot and refine robotic programs.
- Collaborate effectively in teams to complete robotics challenges and projects.
- Communicate their ideas and solutions effectively through presentations and demonstrations.

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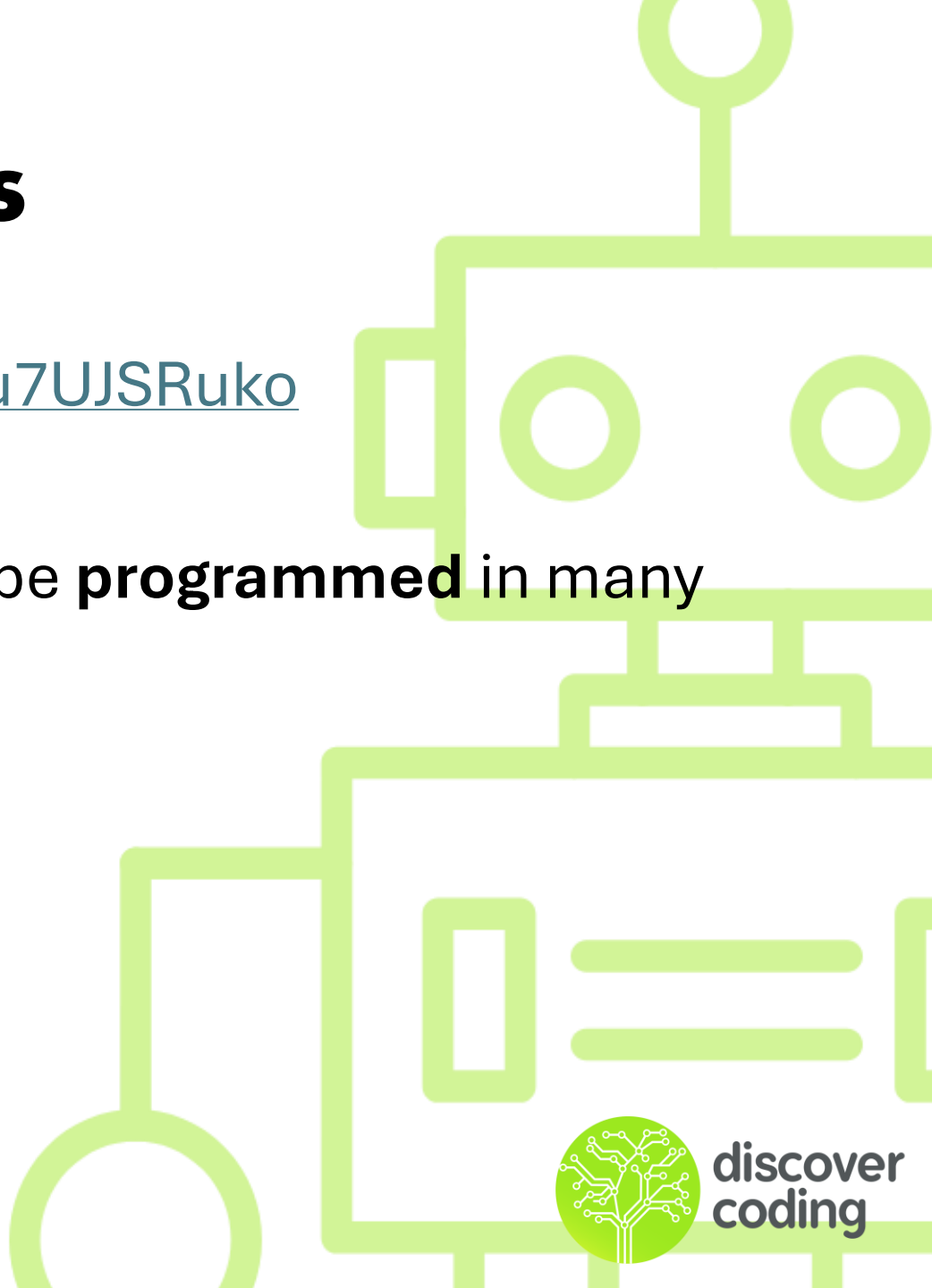
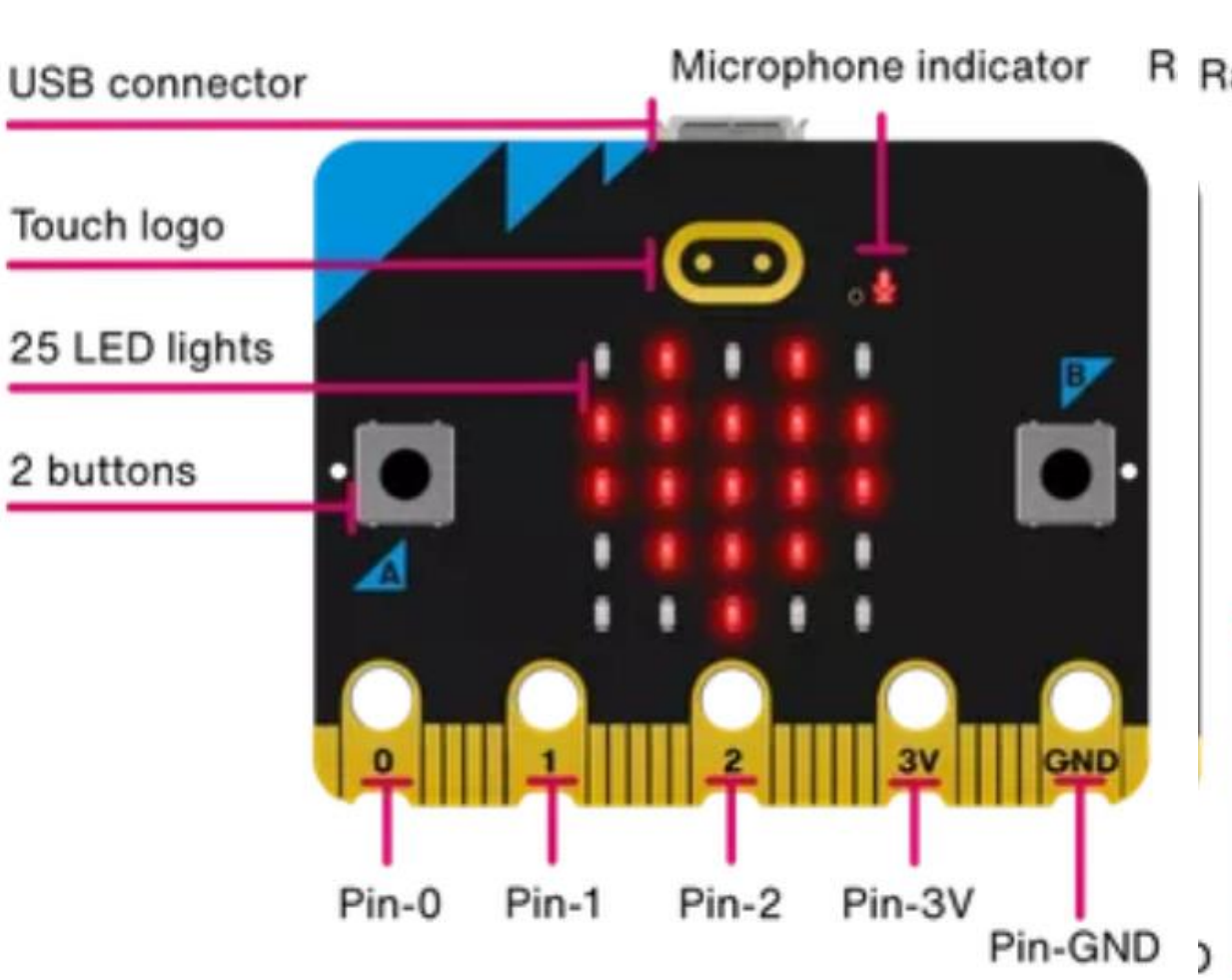
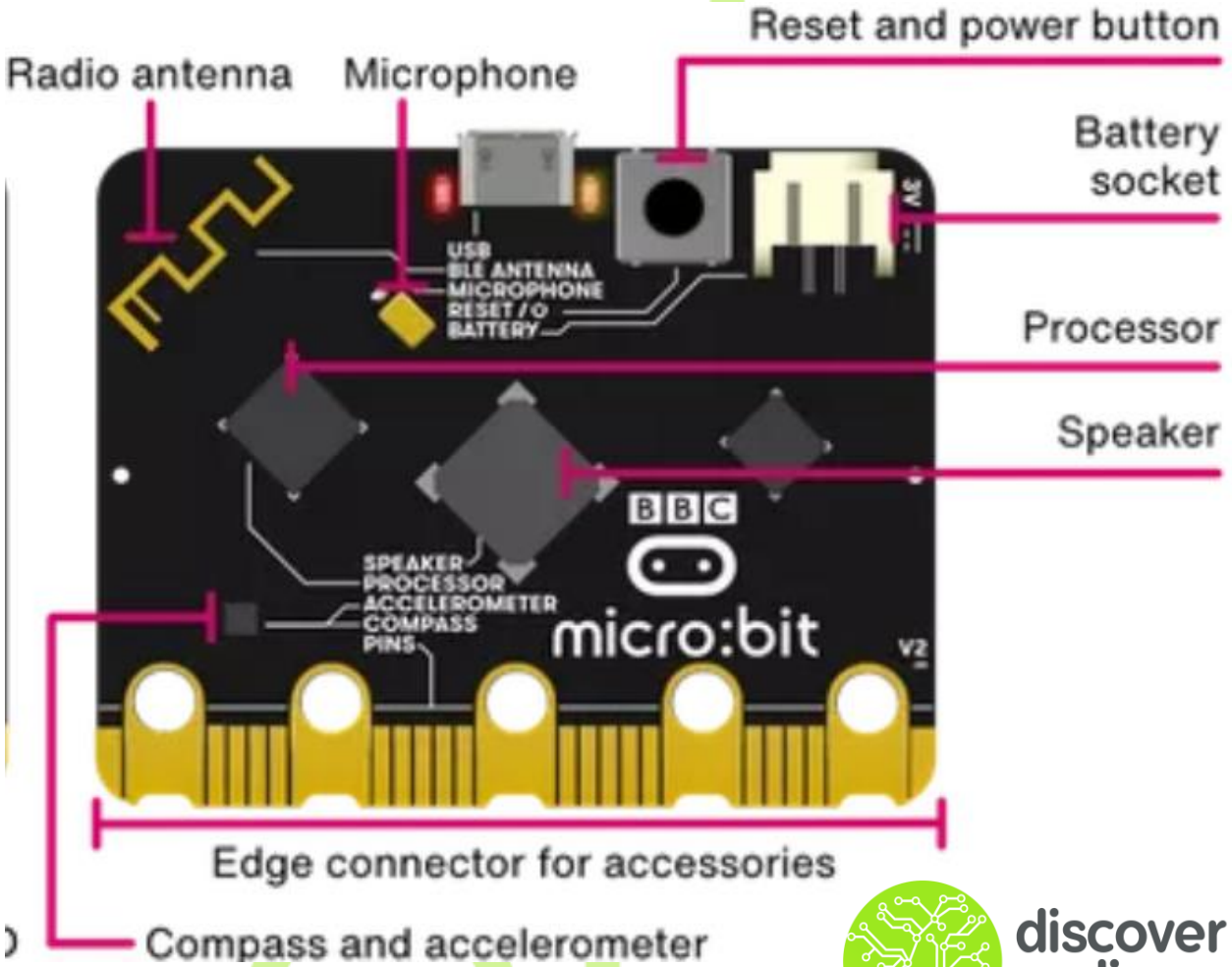
Introduction to MicroBits

- https://www.youtube.com/watch?v=u2u7UJSRuko
- The first MicroBit was created in 2015
- It is a **pocket-sized computer** that can be **programmed** in many ways



MicroBit Components





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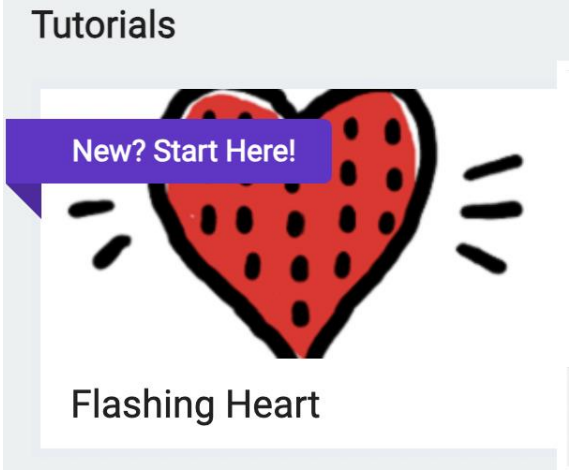
Our First Program

- We're going to write our very first Micro:Bit program!
- Go to makecode.microbit.org and look for the **Flashing Heart Tutorial**



- Do **not** plug in your Micro:Bit yet and follow along!

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Downloading our Program

- Now that we finished writing our code, we can download it onto the Micro:Bit
- Connect your Micro:bit to your computer using the USB cable

More Tutorials!

- Congratulations! You made your first Micro:Bit program!
- Some tutorials to get even more familiar with Micro:Bits

1.

Smiley Buttons

2.

Dice

3.

Love Meter

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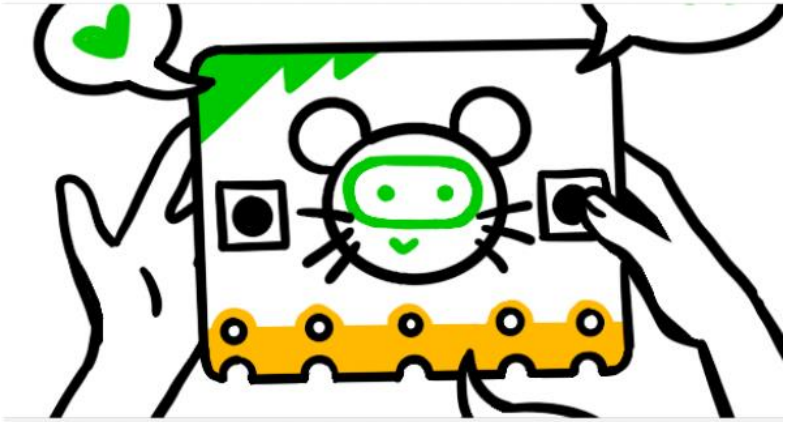
Even More Tutorials!

4.

Clap Lights

5.



Pet Hamster

6.

Rock Paper Scissors

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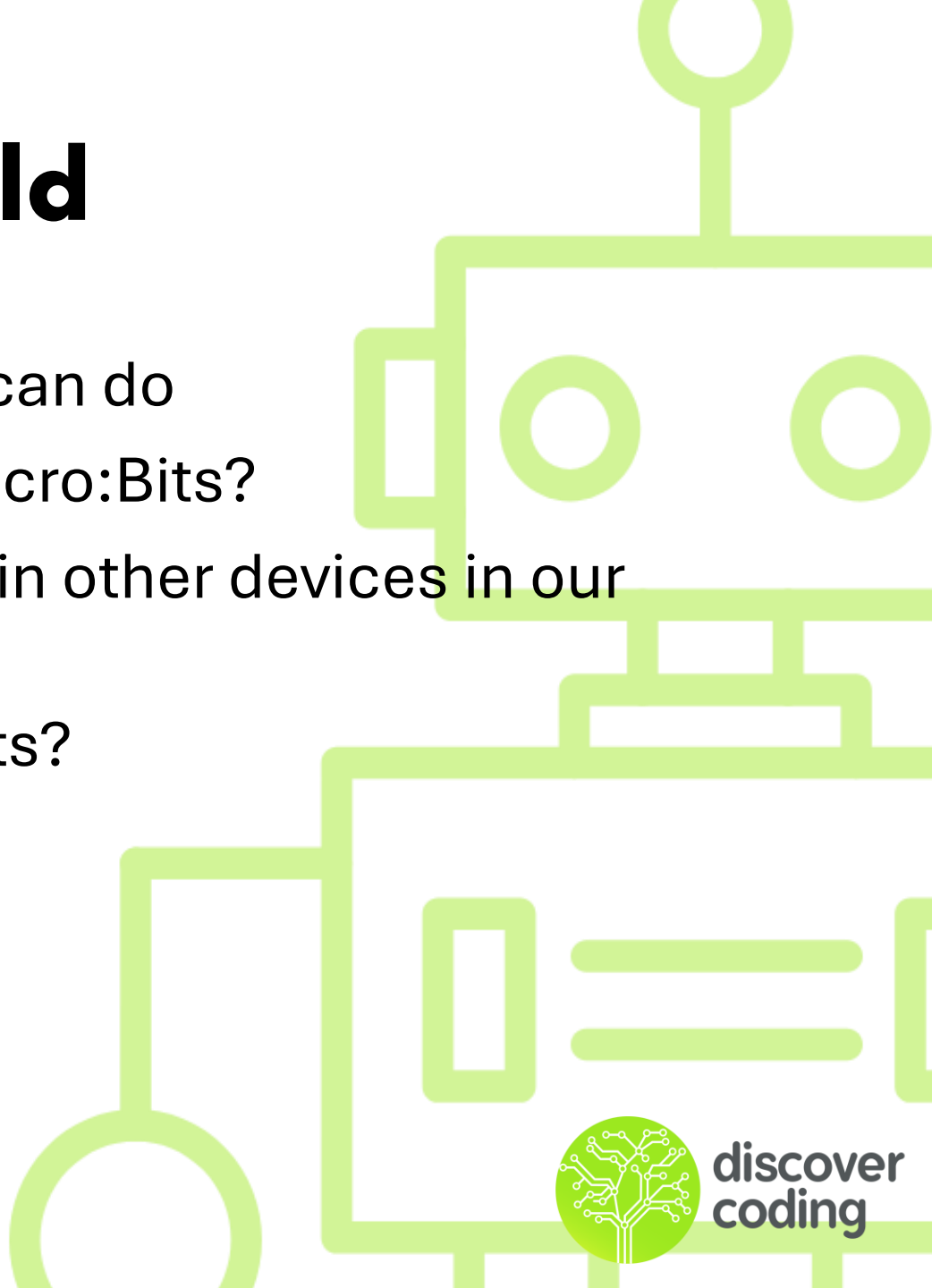
Applications to our World

- We learned a lot about what Micro:Bits can do
- What are some of the features on our Micro:Bits?
- Where are some of these features used in other devices in our world?
- How can we apply what learned to robots?



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