State Machine (Flags) Arduino

Time required: 60 minutes

Arduino assignment

Please read all the directions carefully before beginning the assignment.

1. Comment your code as shown in the tutorials and other code examples.
2. Follow all directions carefully and accurately.
3. Think of the directions as minimum requirements.

This program demonstrates how to store the state of the machine (mBot) in a flag variable. Flags are a way of keeping track of the state or history of a robot. The robot can then access that history and decide based on that history. Flags allow for fast switching and checking of task states. Checking a flag is a common Arduino practice for modular programming.

In this program, we are changing modes, which allows the remote buttons to be reused for other code blocks. This is how the default program that came with the mBot works. When the mBot is in **ModeA**, you can set remote button actions in that code block. Switch to **ModeB**, the buttons can have other actions in that code block.

How it Works

1. The **ModeFlag** is set to 0 in the Initialize block, the **ModeA** code block is active.
2. The forever loop checks for a remote key press in the **SetMode** block.
3. The **SetMode** block changes the **ModeFlag** to 1.
4. The **ModeA and ModeB** code blocks keep testing for a ModeFlag change. When **ModeB** sees the **ModeFlag** 1, it executes and **ModeA** stops.
5. When **SetMode** changes the **Modeflag** to 0, we go back to **ModeA**.

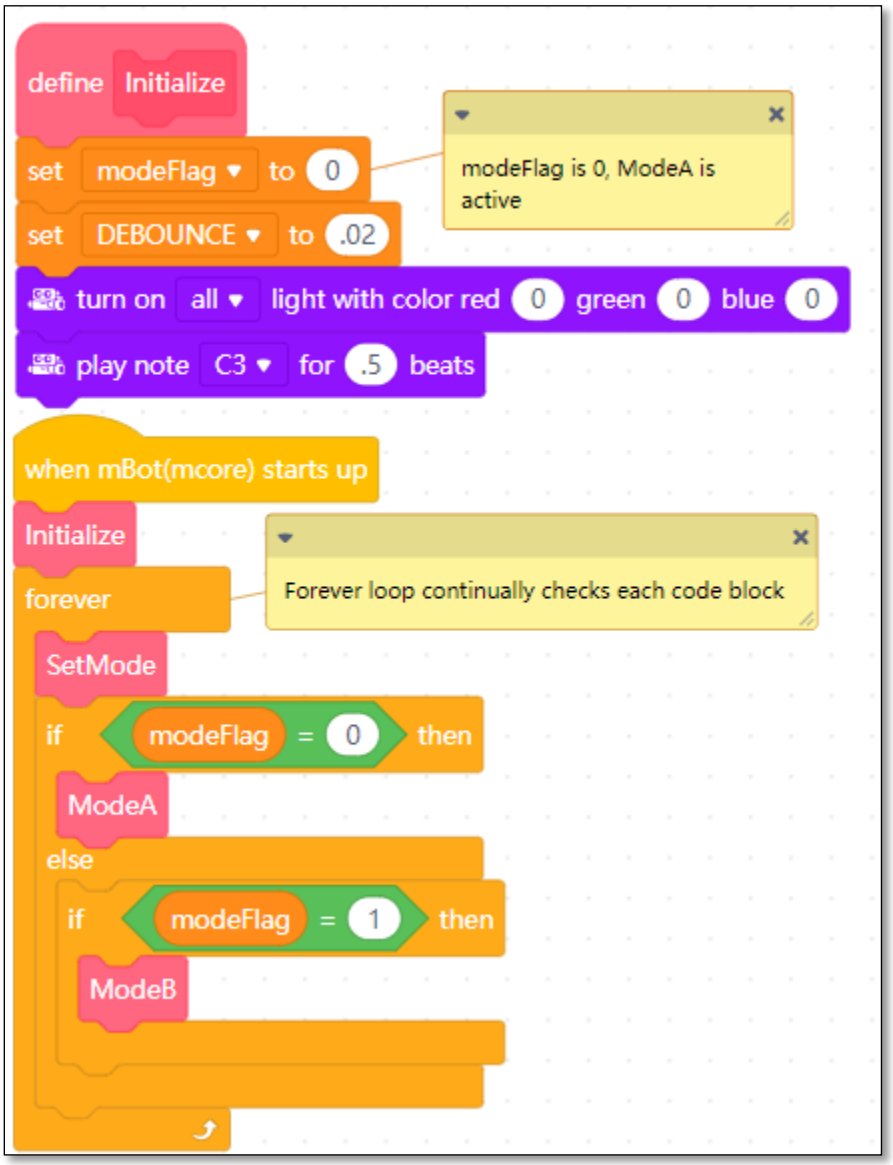
Requirements

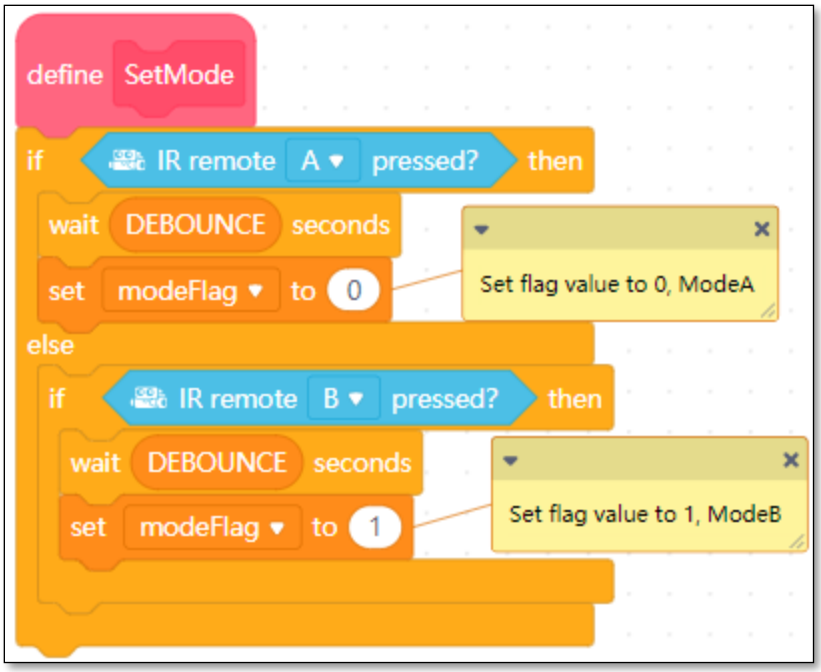
Create and test the program.

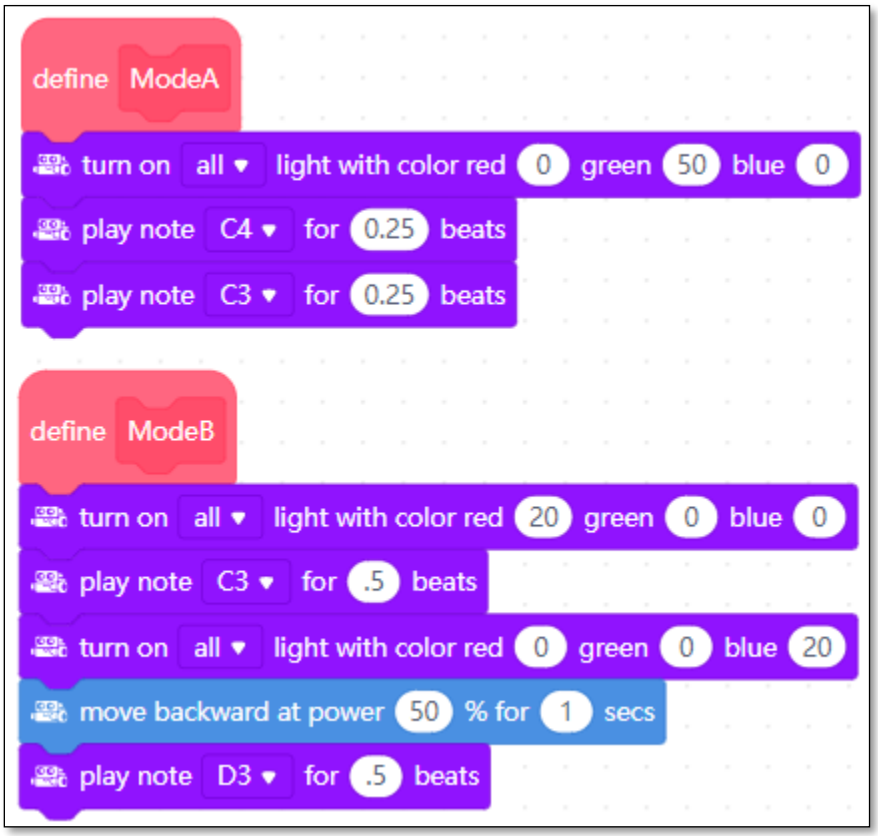
Tutorial Assignment

1. In the Arduino IDE, save the sketch as **StateMachine**.

2. Use the mBlock program shown to show the shape of what your Arduino program will be.
3. Complete and test the program with the requirements listed.
4. Set **const int DEBOUNCE = 200;**







Assignment

Start with your tutorial project and add the following.

- Add **ModeC** to the program. The Flag value would be 2.
- Have **ModeC** do something else.

Assignment Submission

- **All students** → Attach finished programs to the assignment in Blackboard.
- **In class assignment submission** → Demonstrate in person.
- **Online submission** → A link to a YouTube video recording showing the assignment placed in the submission area in BlackBoard.