mBot Default Program Part 1: Remote Control

Time required: 120 minutes

NOTE: Use your own COMP, TIME, and TURN_TIME_360 numbers from the Calibrate Distance and Calibrate program. These programs were tested on my mBot, not yours. Your mBot will run differently.

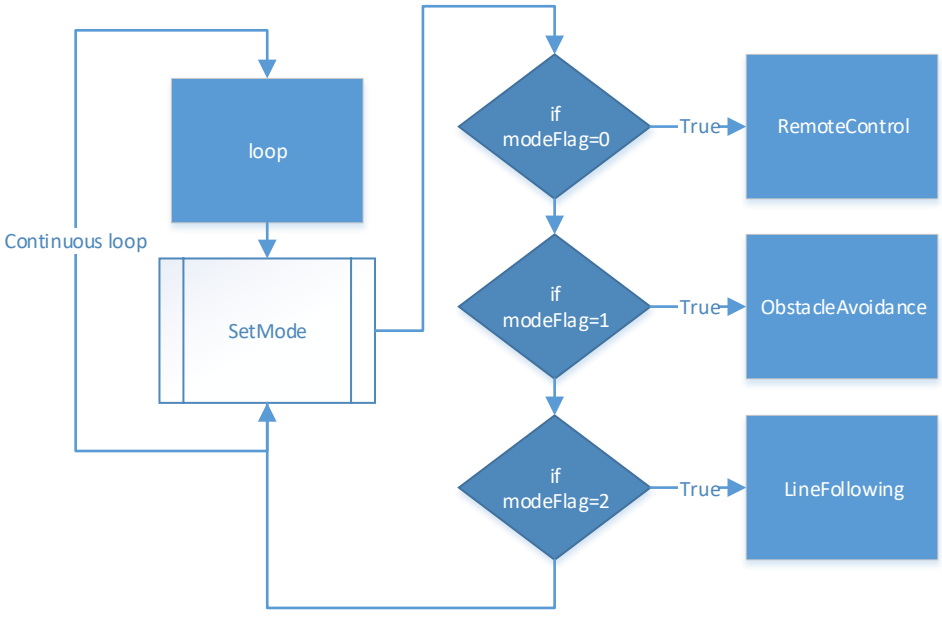
This program is the first of 3 steps to build a full featured mBot default program. This program uses the machine state/flag concept introduced in the Machine State assignment.

This program adds remote control features for the first part of the default program.

The SetSpeed numbers are a percentage of total power, 100 is 100%, 30 is 30%.

Knowledge Points

1. The program continuously watches or scans for input from the remote control by looping.
2. If the **modeFlag** is changed to 0, the **RemoteControl** portion of the program is active.
3. If it changes to 1, the **ObstacleAvoidance** is active. And so on.



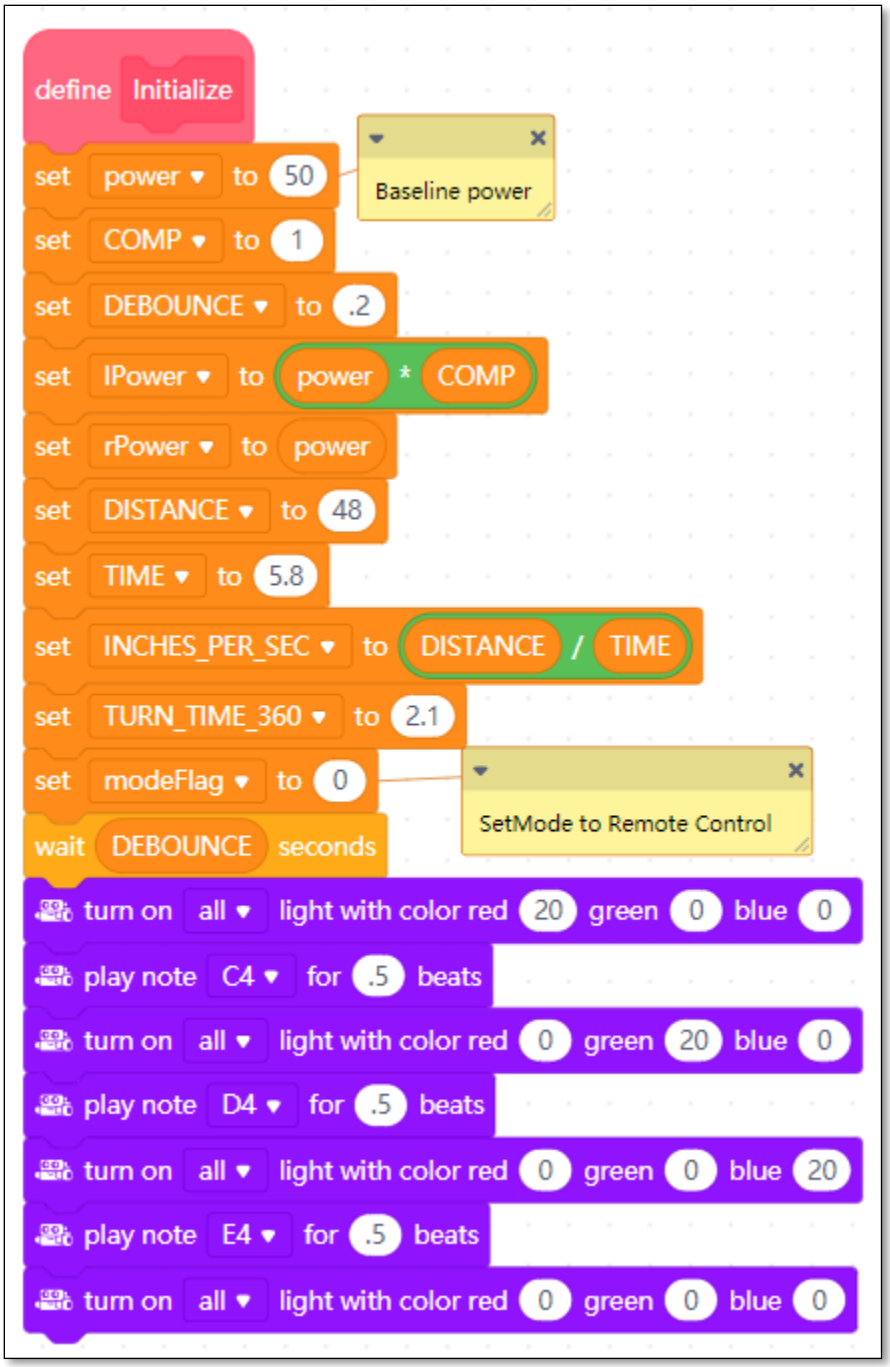
Tutorial Assignment

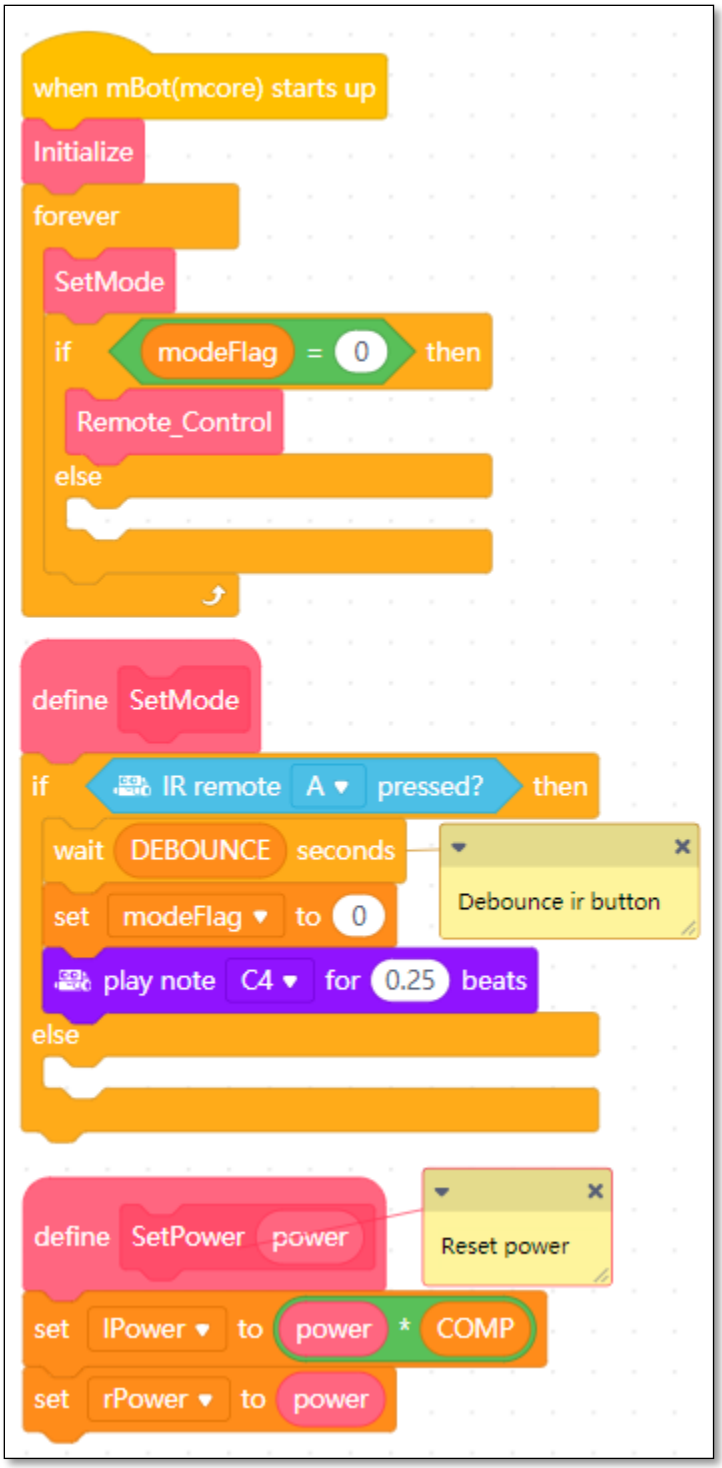
1. Start mBlock and open **Driving School 2**. Save as **mBot-Default-Program-Part-1 Remote Control**.
2. Complete and test the program as pictured with the requirements listed.

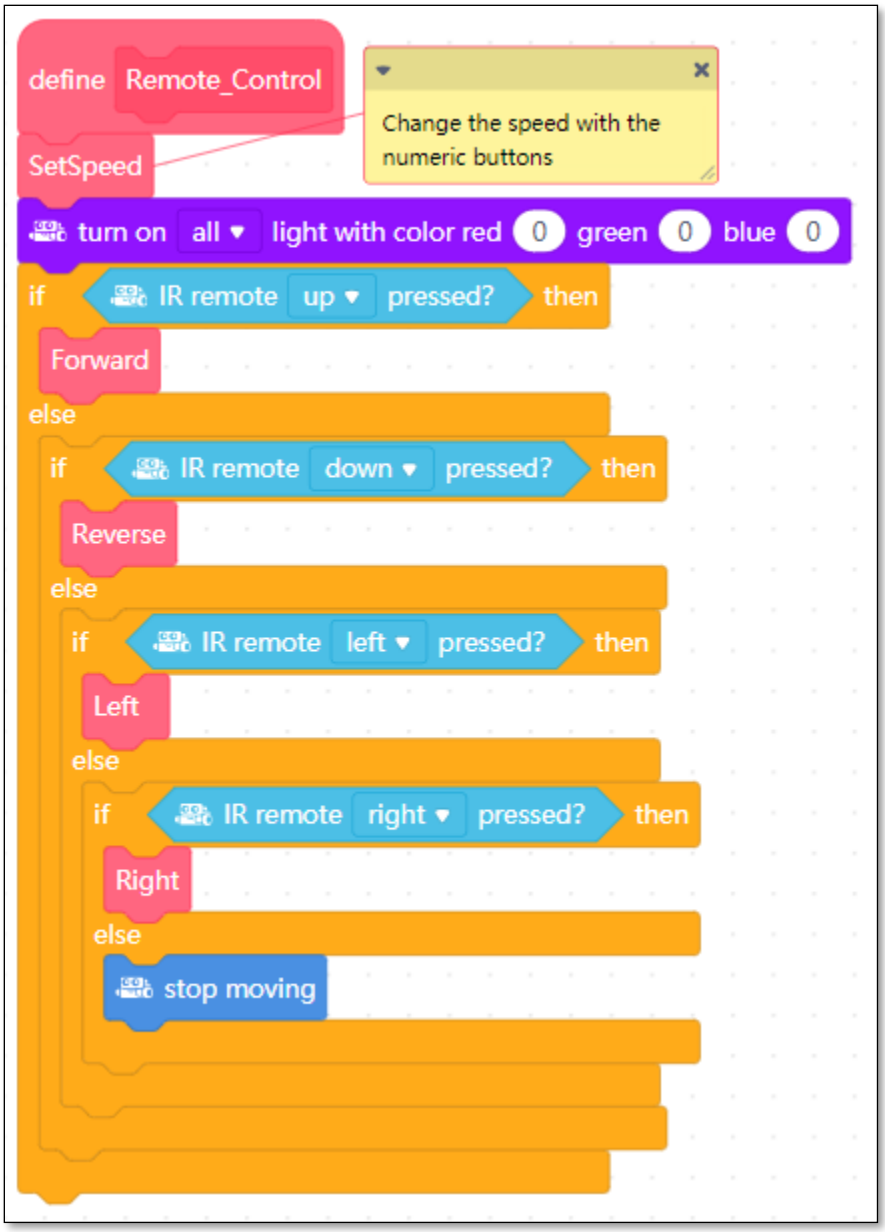
Requirements

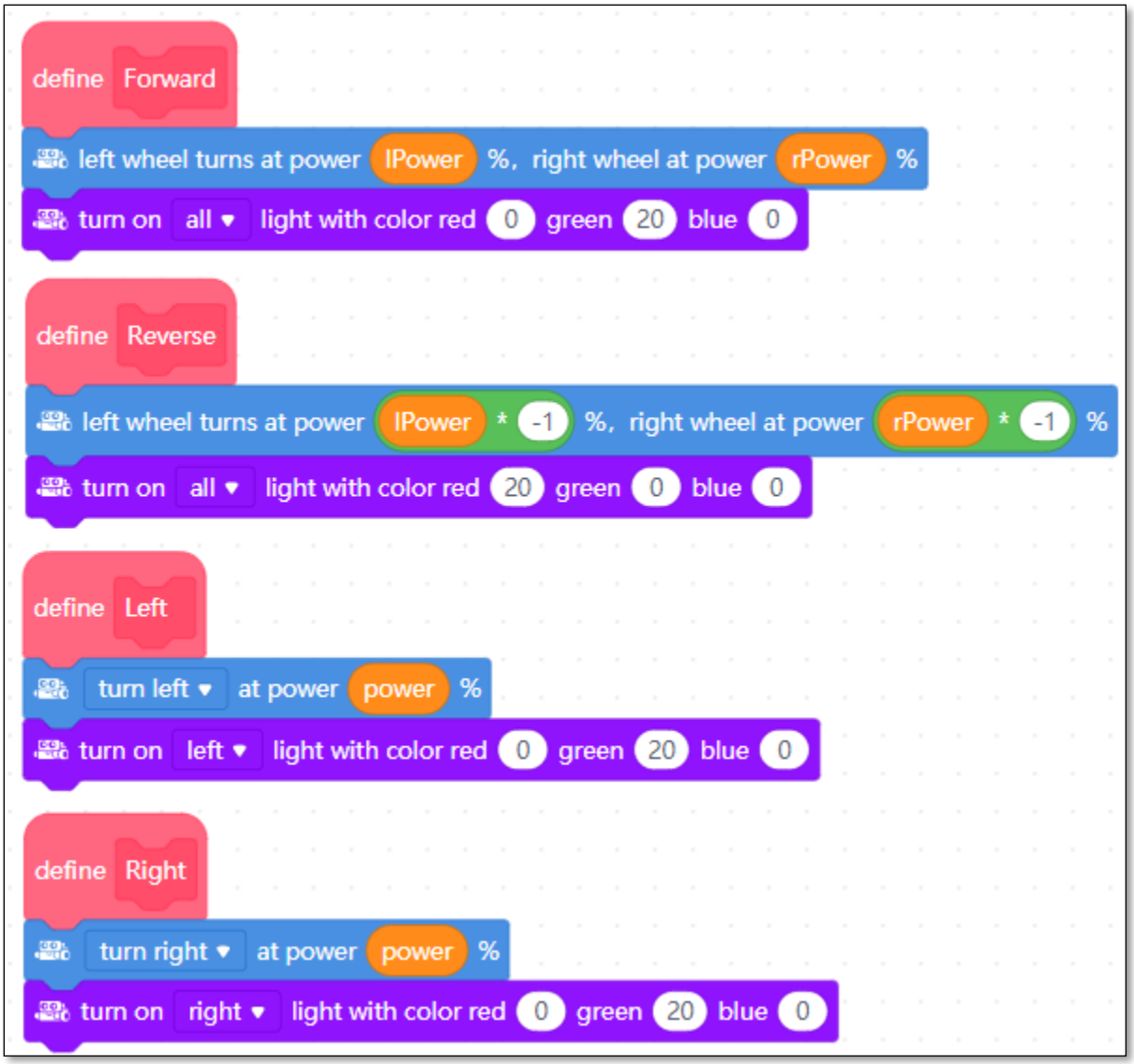
- Create and test the program.
- Button A starts remote control mode. The modeFlag = 0
- Set the speed of the robot with the number keys.

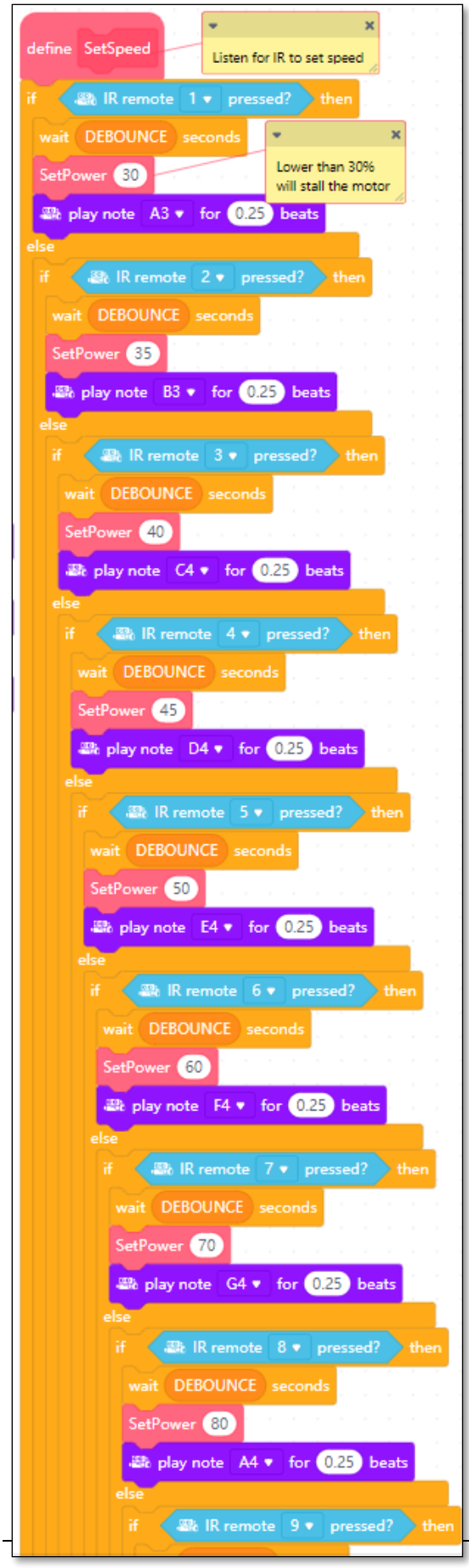
NOTE: The program below is shown in several screen shots to make the resolution big enough to see.

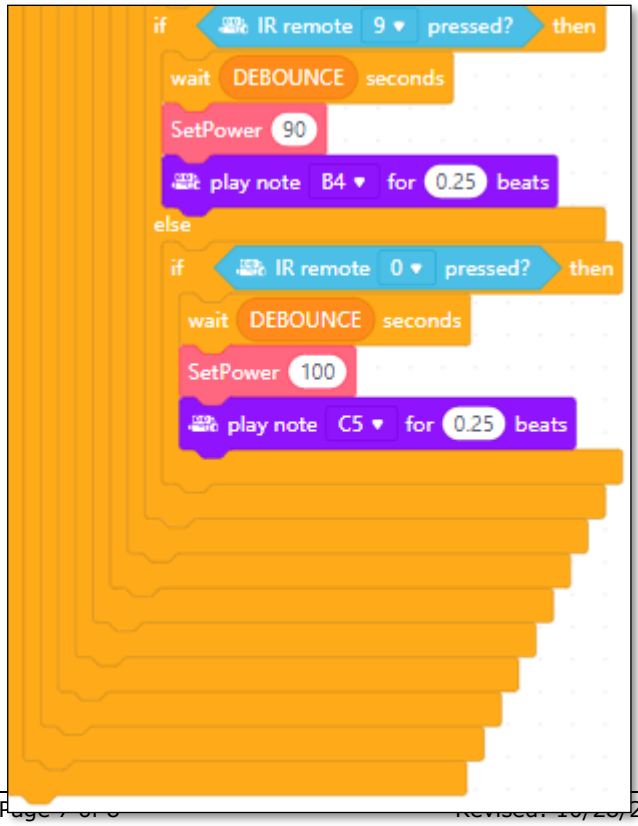

define Initialize
set power to 50
Baseline power
set COMP to 1
set DEBOUNCE to .2
set IPower to power * COMP
set rPower to power
set DISTANCE to 48
set TIME to 5.8
set INCHES_PER_SEC to DISTANCE / TIME
set TURN_TIME_360 to 2.1
set modeFlag to 0
SetMode to Remote Control
wait DEBOUNCE seconds
turn on all light with color red 20 green 0 blue 0
play note C4 for .5 beats
turn on all light with color red 0 green 20 blue 0
play note D4 for .5 beats
turn on all light with color red 0 green 0 blue 20
play note E4 for .5 beats
turn on all light with color red 0 green 0 blue 0


when mBot(mcore) starts up
Initialize
forever
SetMode
if modeFlag = 0 then
Remote_Control
else
define SetMode
if IR remote A pressed? then
wait DEBOUNCE seconds
Debounce ir button
set modeFlag to 0
play note C4 for 0.25 beats
else
define SetPower power
Reset power
set lPower to power * COMP
set rPower to power


define Remote_Control
SetSpeed
Change the speed with the numeric buttons
turn on all light with color red 0 green 0 blue 0
if IR remote up pressed? then
Forward
else
if IR remote down pressed? then
Reverse
else
if IR remote left pressed? then
Left
else
if IR remote right pressed? then
Right
else
stop moving


define Forward
left wheel turns at power lPower %, right wheel at power rPower %
turn on all light with color red 0 green 20 blue 0
define Reverse
left wheel turns at power lPower * -1 %, right wheel at power rPower * -1 %
turn on all light with color red 20 green 0 blue 0
define Left
turn left at power power %
turn on left light with color red 0 green 20 blue 0
define Right
turn right at power power %
turn on right light with color red 0 green 20 blue 0


define SetSpeed
Listen for IR to set speed
if IR remote 1 pressed? then
wait DEBOUNCE seconds
SetPower 30
Lower than 30% will stall the motor
play note A3 for 0.25 beats
else
if IR remote 2 pressed? then
wait DEBOUNCE seconds
SetPower 35
play note B3 for 0.25 beats
else
if IR remote 3 pressed? then
wait DEBOUNCE seconds
SetPower 40
play note C4 for 0.25 beats
else
if IR remote 4 pressed? then
wait DEBOUNCE seconds
SetPower 45
play note D4 for 0.25 beats
else
if IR remote 5 pressed? then
wait DEBOUNCE seconds
SetPower 50
play note E4 for 0.25 beats
else
if IR remote 6 pressed? then
wait DEBOUNCE seconds
SetPower 60
play note F4 for 0.25 beats
else
if IR remote 7 pressed? then
wait DEBOUNCE seconds
SetPower 70
play note G4 for 0.25 beats
else
if IR remote 8 pressed? then
wait DEBOUNCE seconds
SetPower 80
play note A4 for 0.25 beats
else
if IR remote 9 pressed? then


if IR remote 9 pressed? then
wait DEBOUNCE seconds
SetPower 90
play note B4 for 0.25 beats
else
if IR remote 0 pressed? then
wait DEBOUNCE seconds
SetPower 100
play note C5 for 0.25 beats

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.