Ambulance

Contents

Time required: 60 minutes

IDE: Arduino

Please read all the directions carefully before beginning the assignment.

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

Understanding

Demonstrate understanding of:

random numbers, LED's, for loops

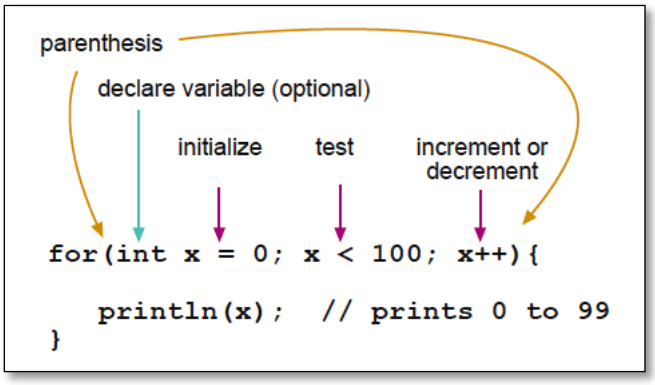
Knowledge Points

The **for** loop is used to repeat a block of statements enclosed in curly braces. This serves the same purpose as Repeat in mBlock.

For Loop

A "for" loop in Arduino C is a control structure used for repeating a block of code a specific number of times. It consists of three parts: initialization, condition, and increment/decrement.

1. **Initialization:** You set an initial value for a variable (usually an integer) that acts as a counter. This is done at the beginning of the loop.
2. **Condition:** You define a condition (test) that is evaluated before each iteration of the loop. If the condition is true, the loop continues; if false, the loop exits.
3. **Increment/Decrement:** You specify how the counter variable is modified after each iteration. It can be incremented (increased) or decremented (decreased).



This is an example of a for loop which iterates 5 times. This is the same as mBlock's


```
for (int i = 0; i < 5; i++ ){
  // Code to be repeated goes here
}
```

In this example:

1. **Initialization: int i = 0** initializes a variable **i** to 0.
2. **Condition: i < 5** checks if **i** is less than 5.
3. **Increment: i++** increments **i** by 1 after each iteration.

The loop runs as long as **i** is less than 5. It will execute the code within its block (the code between the curly braces **{}**) and increment **i** by 1 after each iteration, stopping when **i** is no longer less than 5.

The Buzzer

```
buzzer.tone(600, 1000); //Buzzer sounds 600Hz for 1000ms
```

Use Left and Right LED's

```
led.setColorAt(0, 40, 0, 0); // Set LED0 (RGBLED1) (RightSide) to Red
led.setColorAt(1, 0, 0, 0);  // Set LED1 (RGBLED2) (LeftSide)  to Blue
led.show();
```

Requirements

- The program will run when you press the remote button on the mBot.
- The program will play an ambulance siren and move forward.
- Comment your code.

Assignment

Use the pictured mBlock program as a model for this program. Convert the code concepts into the corresponding Arduino code. Notice how the blocks in mBlock are like the Arduino C code.

You may want to look at previous Arduino assignments.

1. Start the Arduino IDE. Save the sketch as **Ambulance**.
2. You are to build the ambulance function.
3. Use a for loop to repeat the siren 5 times.

Program Starter Code

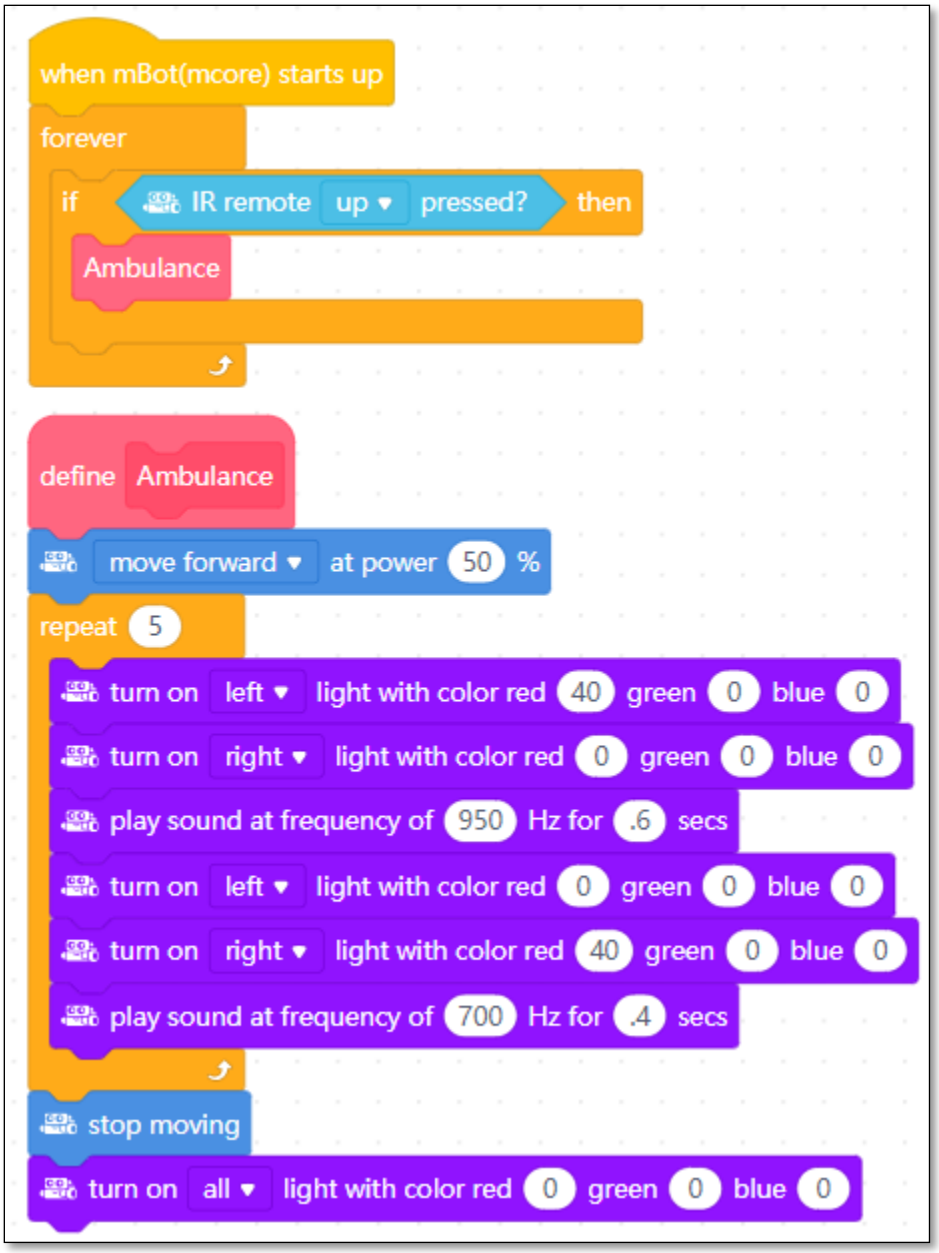
```
/**
  @file    Ambulance.ino
  @author  William A Loring
  @version v1.0.0
  @Revised 05/17/18  Created: 02/27/18
  @Description: Play ambulance sounds and move forward
*/
// ****** DON'T CHANGE CODE BELOW ******** //
#include <MeMCore.h>  // Include mBot library
MeRGBLed led(0, 30);  // Create an LED object to control mBot LED's
MeIR ir;              // Setup IR remote object
MeBuzzer buzzer;      // Setup buzzer object
// Create motor control objects
MeDCMotor MotorL(M1);  // MotorL is Left Motor
MeDCMotor MotorR(M2);  // MotorR is Right
uint32_t value;        // Holds ir value

void setup() {
  led.setpin(13);
  // Start listening to the ir remote
  ir.begin();
}
// ****** DON'T CHANGE CODE ABOVE ******** //

void loop() {
  // Wait until forward remote button is pressed
  if (ir.keyPressed(IR_BUTTON_UP)) {
    ambulance();  // Call the ambulance function
  }
}

// Play Ambulance Sounds 5 times while mBot moves forward
void ambulance() {
  // Your code goes here

}
```



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.