Duke/DPS Robotics Program

11/12

Lesson Plan 5

Goal: Navigate a course with color sensing and advanced control flow

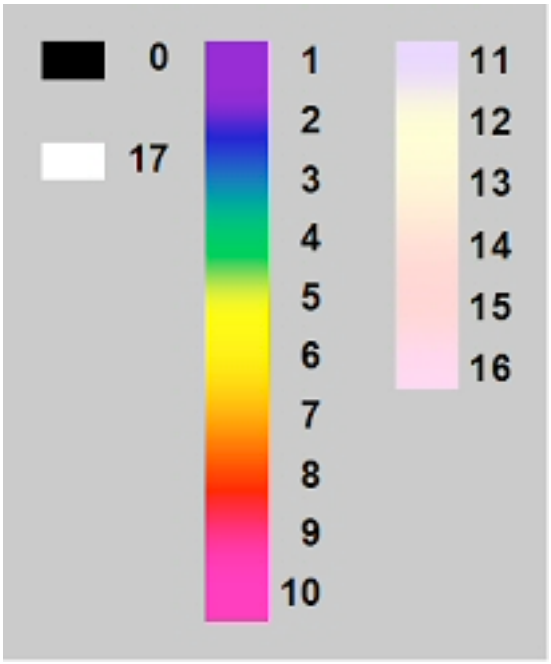
Materials Needed: *Brookbot with color and two light sensors*

Part 1: Discuss Exhibition

Today's session will begin with a discussion of the rules along and the goal of the exhibition that will take place on the first Saturday in December. Those students present at SD@D will know a bit about it, but it's important that the whole group is on the same page. Please consult the rules at the end of this lesson plan prior to going into your session. Highlight the size rules and the possible tiles along with whatever other aspects you find particularly important. Please not the varying size constraints depending on which division your team enters.

Part 2: Understanding the Color Sensor

Last weekend, teams added color sensors to the Brookbot. This means all teams should have two light sensors along with a color sensor. Take a few minutes at the beginning of the session to experiment with the view menu and the color sensor on a variety of colors. Consult the color number chart and compare your results with what hitechnic claims the sensor should read. Compare these readings with the light sensor readings.



Part 3: Navigating a course with a color sensor

Starting with your two sensor line follower code (if you haven't already done so, fix it first!) integrate additional code to accomplish the following:

While following a line…

- If the color sensor detects green, make a 90-degree right turn. (this marks a shortcut)
- If the color sensor detects red, stop and declare that you're finished. (this marks the end of the course)

The ability to detect green and turn will give you an advantage in the race around the track. If you miss a shortcut but continue following the line, you will make it to the finish, but will have to go through more challenging terrain.

```
#pragma config(Sensor, S1,     leftL,               sensorLightActive)
#pragma config(Sensor, S3,     rightL,              sensorLightActive)
#pragma config (Sensor, S2,   sColor,               sensorI2CCustomstd)
#pragma config(Motor,  motorA,          rightM,           tmotorNormal, PIDControl)
#pragma config(Motor,  motorC,          leftM,          tmotorNormal, PIDControl)
//*!!Code automatically generated by 'ROBOTC' configuration wizard               !!*//
task main ()
{
  while (true)
  {
    if (SensorValue[leftL] > 47 && SensorValue[rightL] > 47)
    {
      motor[rightM]= 30;
      motor[leftM]=30;
    }
    if (SensorValue[leftL] < 47 && SensorValue[rightL] > 47)
    {
      motor[rightM]= 30;
      motor[leftM] = 0;
    }
     if (SensorValue[leftL] > 47 && SensorValue[rightL] < 47)
    {
      motor[rightM]= 0;
      motor[leftM] = 30;
    }
    if(SensorValue[sColor] == 4) //green
    {
      // right turn (90 degrees)
      motor[rightM] = 30;
      motor[leftM] = -30;
      wait10Msec(70);
      motor[rightM] = 0;
      motor[leftM] = 0;
    }
    else
      if( SensorValue[sColor] == 9) //red
      {
        motor[rightM] = 0;
        motor[leftM] = 0;
        PlaySound(soundBeepBeep);
      }
  }
```