



Prize Winner

Programming, Apps & Robotics Year 5-6

Daniel Song

St Peter's College



MIND INVENTOR

The aim of Mind Inventor was to create a code for the Robot Inventor, a lego MINDSTORMS kit, that allowed it to use the colour sensor to determine lumen levels. To run the code you need a computer running [MacOS](#), [WindowsOS](#) or a phone or tablet running [iOS](#), [iPadOS](#) or [AndroidOS](#).

To use the code, open the other file in the .zip file, copy the code, open the MINDSTORMS app, and find the create a new code button. Select Python(beta), delete all the code there, and paste the code from the file.

The purpose of the reader is to tell how bright something is. This may be useful if someone wants to know if the light is brighter in one room than another, or if the light bulb on the left is actually a bit darker, and does it need replacing? It would be better than having to go out and buy a lumen reader, as we are assuming that they already bought a MINDSTORMS kit to mess around with.

The explanation of the code is to be found within the code itself, marked with a # at the start of each explaining line.

Unfortunately, the code does not work, as the sensor is not accurate enough. The result was varying by up to 20%.

Thanks to the people at [Reddit.com](#) on r/mindstorms and [Extends Class](#) for some basic syntax checking.

```
from mindstorms import MSHub, Motor, MotorPair, ColorSensor,
DistanceSensor, App
from mindstorms.control import wait_for_seconds, wait_until, Timer
from mindstorms.operator import greater_than, greater_than_or_equal_to,
less_than, less_than_or_equal_to, equal_to, not_equal_to
import math
```

```
# This initialises everything
paper_scanner = ColorSensor('A')
motor = Motor('F')
from mindstorms import DistanceSensor
from mindstorms.control import wait_for_seconds
distance = DistanceSensor('C')
dist_cm = distance.get_distance_cm()
from mindstorms import MSHub
```

```
hub = MSHub()
hub.speaker.set_volume(100)
```

```
# This tells me the program begun
hub.speaker.beep(60, 0.5)
hub.speaker.beep(67, 0.5)
hub.speaker.beep(60, 0.5)
```

```
# basically resets the control wheel
color = paper_scanner.get_ambient_light()
motor.run_to_position(10)
```

```
# This waits until you turn the wheel a certain distance, then, once the
distance sensor reads 50cm, the colour sensor reads ambient light, then it
checks 0-100% to write the number
wait_for_seconds(1)
wait_until(motor.get_position, greater_than,95)
wait_for_seconds(2.5)
hub.speaker.beep(60, 1)
wait_until(distance.get_distance_cm, equal_to,50)
wait_until(paper_scanner.get_ambient_light, greater_than_or_equal_to,0)
hub.speaker.beep(50, 0.11)
hub.speaker.beep(50, 0.11)
hub.speaker.beep(50, 0.11)
hub.speaker.beep(50, 0.11)
```

```
if paper_scanner.get_ambient_light() == 0 :
    wait_for_seconds(5)
    hub.light_matrix.write('0')
    hub.speaker.beep(60, 0.5)
    hub.speaker.beep(67, 0.5)
    hub.speaker.beep(60, 0.5)
    motor.run_to_position(10)
elif paper_scanner.get_ambient_light() == 1 :
    wait_for_seconds(5)
    hub.light_matrix.write('1')
    motor.run_to_position(10)
elif paper_scanner.get_ambient_light() == 2 :
    wait_for_seconds(5)
    hub.light_matrix.write('2')
    motor.run_to_position(10)
elif paper_scanner.get_ambient_light() == 3 :
    wait_for_seconds(5)
    hub.light_matrix.write('3')
    motor.run_to_position(10)
elif paper_scanner.get_ambient_light() == 4 :
    wait_for_seconds(5)
    hub.light_matrix.write('4')
    motor.run_to_position(10)
elif paper_scanner.get_ambient_light() == 5 :
    wait_for_seconds(5)
    hub.light_matrix.write('5')
    motor.run_to_position(10)
elif paper_scanner.get_ambient_light() == 6 :
    wait_for_seconds(5)
    hub.light_matrix.write('6')
    motor.run_to_position(10)
elif paper_scanner.get_ambient_light() == 7 :
    wait_for_seconds(5)
    hub.light_matrix.write('7');
    motor.run_to_position(10)
elif paper_scanner.get_ambient_light() == 8 :
    wait_for_seconds(5)
    hub.light_matrix.write('8')
    motor.run_to_position(10)
elif paper_scanner.get_ambient_light() == 9 :
    wait_for_seconds(5)
    hub.light_matrix.write('9')
```

```
motor.run_to_position(10)
elif paper_scanner.get_ambient_light() == 10 :
    wait_for_seconds(5)
    hub.light_matrix.write('10')
    motor.run_to_position(10)
elif paper_scanner.get_ambient_light() == 11 :
    wait_for_seconds(5)
    hub.light_matrix.write('11')
    motor.run_to_position(10)
elif paper_scanner.get_ambient_light() == 12 :
    wait_for_seconds(5)
    hub.light_matrix.write('12')
    motor.run_to_position(10)
elif paper_scanner.get_ambient_light() == 13 :
    wait_for_seconds(5)
    hub.light_matrix.write('13')
    motor.run_to_position(10)
elif paper_scanner.get_ambient_light() == 14 :
    wait_for_seconds(5)
    hub.light_matrix.write('14')
elif paper_scanner.get_ambient_light() == 15 :
    wait_for_seconds(5)
    hub.light_matrix.write('15')
elif paper_scanner.get_ambient_light() == 16 :
    wait_for_seconds(5)
    hub.light_matrix.write('16')
elif paper_scanner.get_ambient_light() == 17 :
    wait_for_seconds(5)
    hub.light_matrix.write('17')
elif paper_scanner.get_ambient_light() == 18 :
    wait_for_seconds(5)
    hub.light_matrix.write('18')
elif paper_scanner.get_ambient_light() == 19 :
    wait_for_seconds(5)
    hub.light_matrix.write('19')
elif paper_scanner.get_ambient_light() == 20 :
    wait_for_seconds(5)
    hub.light_matrix.write('20')
elif paper_scanner.get_ambient_light() == 21 :
    wait_for_seconds(5)
    hub.light_matrix.write('21')
elif paper_scanner.get_ambient_light() == 22 :
```

```
wait_for_seconds(5)
hub.light_matrix.write('22')
elif paper_scanner.get_ambient_light() == 23 :
wait_for_seconds(5)
hub.light_matrix.write('23')
elif paper_scanner.get_ambient_light() == 24 :
wait_for_seconds(5)
hub.light_matrix.write('24')
elif paper_scanner.get_ambient_light() == 25 :
wait_for_seconds(5)
hub.light_matrix.write('25')
elif paper_scanner.get_ambient_light() == 26 :
wait_for_seconds(5)
hub.light_matrix.write('26')
elif paper_scanner.get_ambient_light() == 27 :
wait_for_seconds(5)
hub.light_matrix.write('27')
elif paper_scanner.get_ambient_light() == 28 :
wait_for_seconds(5)
hub.light_matrix.write('28')
elif paper_scanner.get_ambient_light() == 29 :
wait_for_seconds(5)
hub.light_matrix.write('29')
elif paper_scanner.get_ambient_light() == 30 :
wait_for_seconds(5)
hub.light_matrix.write('30')
elif paper_scanner.get_ambient_light() == 31 :
wait_for_seconds(5)
hub.light_matrix.write('31')
elif paper_scanner.get_ambient_light() == 32 :
wait_for_seconds(5)
hub.light_matrix.write('32')
elif paper_scanner.get_ambient_light() == 33 :
wait_for_seconds(5)
hub.light_matrix.write('33')
elif paper_scanner.get_ambient_light() == 34 :
wait_for_seconds(5)
hub.light_matrix.write('34')
elif paper_scanner.get_ambient_light() == 35 :
wait_for_seconds(5)
hub.light_matrix.write('35')
elif paper_scanner.get_ambient_light() == 36 :
```

```
wait_for_seconds(5)
hub.light_matrix.write('36')
elif paper_scanner.get_ambient_light() == 37 :
wait_for_seconds(5)
hub.light_matrix.write('37')
elif paper_scanner.get_ambient_light() == 38 :
wait_for_seconds(5)
hub.light_matrix.write('38')
elif paper_scanner.get_ambient_light() == 39 :
wait_for_seconds(5)
hub.light_matrix.write('39')
elif paper_scanner.get_ambient_light() == 40 :
wait_for_seconds(5)
hub.light_matrix.write('40')
elif paper_scanner.get_ambient_light() == 41 :
wait_for_seconds(5)
hub.light_matrix.write('41')
elif paper_scanner.get_ambient_light() == 42 :
wait_for_seconds(5)
hub.light_matrix.write('42')
elif paper_scanner.get_ambient_light() == 43 :
wait_for_seconds(5)
hub.light_matrix.write('43')
elif paper_scanner.get_ambient_light() == 44 :
wait_for_seconds(5)
hub.light_matrix.write('44')
elif paper_scanner.get_ambient_light() == 45 :
wait_for_seconds(5)
hub.light_matrix.write('45')
elif paper_scanner.get_ambient_light() == 46 :
wait_for_seconds(5)
hub.light_matrix.write('46')
elif paper_scanner.get_ambient_light() == 47 :
wait_for_seconds(5)
hub.light_matrix.write('47')
elif paper_scanner.get_ambient_light() == 48 :
wait_for_seconds(5)
hub.light_matrix.write('48')
elif paper_scanner.get_ambient_light() == 49 :
wait_for_seconds(5)
hub.light_matrix.write('49')
elif paper_scanner.get_ambient_light() == 50 :
```

```
wait_for_seconds(5)
hub.light_matrix.write('50')
elif paper_scanner.get_ambient_light() == 51 :
wait_for_seconds(5)
hub.light_matrix.write(51)
elif paper_scanner.get_ambient_light() == 52 :
wait_for_seconds(5)
hub.light_matrix.write('52')
elif paper_scanner.get_ambient_light() == 53 :
wait_for_seconds(5)
hub.light_matrix.write(53)
elif paper_scanner.get_ambient_light() == 54 :
wait_for_seconds(5)
hub.light_matrix.write('55')
elif paper_scanner.get_ambient_light() == 56:
wait_for_seconds(5)
hub.light_matrix.write('56')
elif paper_scanner.get_ambient_light() == 57 :
wait_for_seconds(5)
hub.light_matrix.write('57')
elif paper_scanner.get_ambient_light() == 58 :
wait_for_seconds(5)
hub.light_matrix.write('58')
elif paper_scanner.get_ambient_light() == 59 :
wait_for_seconds(5)
hub.light_matrix.write('59')
elif paper_scanner.get_ambient_light() == 60 :
wait_for_seconds(5)
hub.light_matrix.write('60')
elif paper_scanner.get_ambient_light() == 61 :
wait_for_seconds(5)
hub.light_matrix.write('61')
elif paper_scanner.get_ambient_light() == 62 :
wait_for_seconds(5)
hub.light_matrix.write('62')
elif paper_scanner.get_ambient_light() == 63 :
wait_for_seconds(5)
hub.light_matrix.write('63')
elif paper_scanner.get_ambient_light() == 64 :
wait_for_seconds(5)
hub.light_matrix.write('64')
elif paper_scanner.get_ambient_light() == 65 :
```



```
wait_for_seconds(5)
hub.light_matrix.write('65')
elif paper_scanner.get_ambient_light() == 66 :
wait_for_seconds(5)
hub.light_matrix.write('66')
elif paper_scanner.get_ambient_light() == 67 :
wait_for_seconds(5)
hub.light_matrix.write('67')
elif paper_scanner.get_ambient_light() == 68 :
wait_for_seconds(5)
hub.light_matrix.write('68')
elif paper_scanner.get_ambient_light() == 69 :
wait_for_seconds(5)
hub.light_matrix.write('69')
elif paper_scanner.get_ambient_light() == 70 :
wait_for_seconds(5)
hub.light_matrix.write('70')
elif paper_scanner.get_ambient_light() == 71 :
wait_for_seconds(5)
hub.light_matrix.write('71')
elif paper_scanner.get_ambient_light() == 72 :
wait_for_seconds(5)
hub.light_matrix.write('72')
elif paper_scanner.get_ambient_light() == 73 :
wait_for_seconds(5)
hub.light_matrix.write('73')
elif paper_scanner.get_ambient_light() == 74 :
wait_for_seconds(5)
hub.light_matrix.write('74')
elif paper_scanner.get_ambient_light() == 75 :
wait_for_seconds(5)
hub.light_matrix.write('75')
elif paper_scanner.get_ambient_light() == 76 :
wait_for_seconds(5)
hub.light_matrix.write('76')
elif paper_scanner.get_ambient_light() == 77 :
wait_for_seconds(5)
hub.light_matrix.write('77')
elif paper_scanner.get_ambient_light() == 78 :
wait_for_seconds(5)
hub.light_matrix.write('78')
elif paper_scanner.get_ambient_light() == 79 :
```

```
wait_for_seconds(5)
hub.light_matrix.write('79')
elif paper_scanner.get_ambient_light() == 80 :
wait_for_seconds(5)
hub.light_matrix.write('80')
elif paper_scanner.get_ambient_light() == 81 :
wait_for_seconds(5)
hub.light_matrix.write('81')
elif paper_scanner.get_ambient_light() == 82 :
wait_for_seconds(5)
hub.light_matrix.write('82')
elif paper_scanner.get_ambient_light() == 83 :
wait_for_seconds(5)
hub.light_matrix.write('83')
elif paper_scanner.get_ambient_light() == 84 :
wait_for_seconds(5)
hub.light_matrix.write('84')
elif paper_scanner.get_ambient_light() == 85 :
wait_for_seconds(5)
hub.light_matrix.write('85')
elif paper_scanner.get_ambient_light() == 86 :
wait_for_seconds(5)
hub.light_matrix.write('86')
elif paper_scanner.get_ambient_light() == 87 :
wait_for_seconds(5)
hub.light_matrix.write('87')
elif paper_scanner.get_ambient_light() == 88 :
wait_for_seconds(5)
hub.light_matrix.write('88')
elif paper_scanner.get_ambient_light() == 89 :
wait_for_seconds(5)
hub.light_matrix.write('89')
elif paper_scanner.get_ambient_light() == 90 :
wait_for_seconds(5)
hub.light_matrix.write('90')
elif paper_scanner.get_ambient_light() == 91 :
wait_for_seconds(5)
hub.light_matrix.write('91')
elif paper_scanner.get_ambient_light() == 92 :
wait_for_seconds(5)
hub.light_matrix.write('92')
elif paper_scanner.get_ambient_light() == 93 :
```

```
wait_for_seconds(5)
hub.light_matrix.write('93')
elif paper_scanner.get_ambient_light() == 94 :
wait_for_seconds(5)
hub.light_matrix.write('94')
elif paper_scanner.get_ambient_light() == 95 :
wait_for_seconds(5)
hub.light_matrix.write('95')
elif paper_scanner.get_ambient_light() == 96 :
wait_for_seconds(5)
hub.light_matrix.write('96')
elif paper_scanner.get_ambient_light() == 97 :
wait_for_seconds(5)
hub.light_matrix.write('97')
elif paper_scanner.get_ambient_light() == 98 :
wait_for_seconds(5)
hub.light_matrix.write('98')
elif paper_scanner.get_ambient_light() == 99 :
wait_for_seconds(5)
hub.light_matrix.write('99')
elif paper_scanner.get_ambient_light() == 100 :
wait_for_seconds(5)
hub.light_matrix.write('100')
#RESET
motor.run_to_position(10)
=
```

2021 Oliphat Science Awards
Student Work - DO NOT COPY