AlgoHack micro:bit

MAGNETOMETER SENSING

THE MINI COMPASS

Authors

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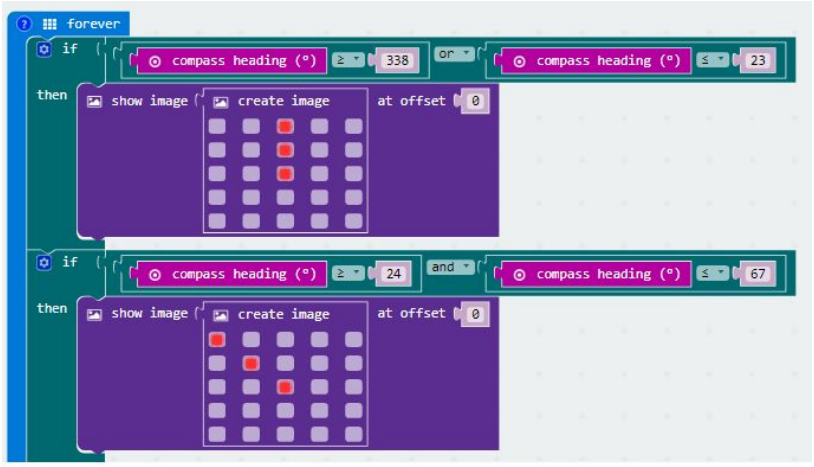
AlgoHack aims to teach Computer Science and Programing to young people, initiated by Shilpa Sayura Foundation, supported by GOOGLE RISE and Computer Society of Sri Lanka.

Understanding Magnetometer

It's possible to obtain 'bearing' measured in degrees from magnetic north from microbit.

You can get Magnetometer block in microbit from **Input** menu.



Review this microbit program
https://makecode.microbit.org/_YcqaAYXv2Tic

Calibrating the micro:bit magnetometer

https://www.youtube.com/watch?v=tzK1AKUiGy0&t=458s

When you first power up your micro:bit after installing program, you will be prompted to "draw a circle" by a message which scrolls across the display.

Hold your micro:bit so that the display is oriented in the vertical plane and then slowly rotate it through 360 degrees. You should see a single LED pixel lit and it should move to the bottom of the display with respect to gravity. T

This process involves collecting both data about magnetic fields in the local environment and motion and results in your micro:bit being properly calibrated for use in that environment.

The magnetometer may generate strange looking data if used in an environment other than that in which the calibration procedure was performed.

Motion may also affect magnetometer data. For best results, always reinstall the hex file and recalibrate in any environment in which you want to capture magnetometer data.

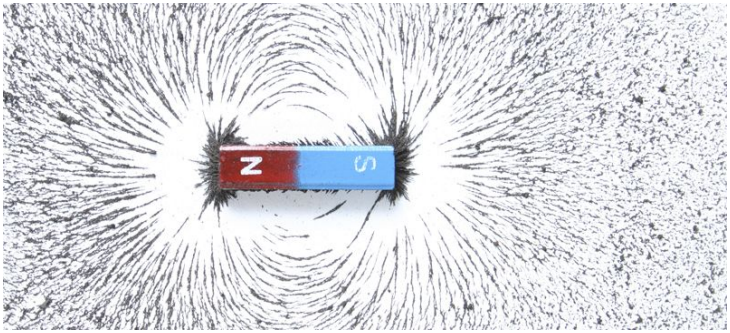
```
// Field Compass Niranjan Meegammana Compass heading
// checked and arrow drawn to North Shilpa64.lk
// AlgoHack microbit club https://goo.gl/vWvohs

basic.forever(() => {
 if (input.compassHeading() >= 338 || input.compassHeading() <= 23) {
        images.createImage(`
            . . # . .
            . . # . .
            . . # . .
            . . . . .
            . . . . .
            `).showImage(0)
    }
    if (input.compassHeading() >= 24 && input.compassHeading() <= 67) {
        images.createImage(`
            # . . . .
            . # . . .
            . . # . .
            . . . . .
            . . . . .
            `).showImage(0)
    }
    if (input.compassHeading() >= 68 && input.compassHeading() <= 113) {
        images.createImage(`
            . . . . .
            . . . . .
            # # # . .
            . . . . .
            . . . . .
            `).showImage(0)
    }
    if (input.compassHeading() >= 114 && input.compassHeading() <= 157) {
        images.createImage(`
            . . . . .
            . . . . .
            . . # . .
```

```
        . # . . .
        # . . . .
        `).showImage(0)
    }
    if (input.compassHeading() >= 158 && input.compassHeading() <= 203) {
        images.createImage(`
            . . . . .
            . . . . .
            . . # . .
            . . # . .
            . . # . .
            `).showImage(0)
    }
    if (input.compassHeading() >= 204 && input.compassHeading() <= 248) {
        images.createImage(`
            . . . . .
            . . . . .
            . . # . .
            . . . # .
            . . . . #
            `).showImage(0)
    }
    if (input.compassHeading() >= 249 && input.compassHeading() <= 293) {
        images.createImage(`
            . . . . .
            . . . . .
            . . # # #
            . . . . .
            . . . . .
            `).showImage(0)
    }
    if (input.compassHeading() >= 294 && input.compassHeading() <= 337) {
        images.createImage(`
            . . . . #
            . . . # .
            . . # . .
            . . . . .
```

```
        . . . . .
        `).showImage(0)
    }
})
```

Raw magnetometer data

The magnetic forces are expressed as a collection of X, Y and Z vector values very much like the data we can obtain from the micro:bit accelerometer. The vector values measure the strength of magnetic force in the following three directions:



X is the magnetic field strength of magnetic north

Y is the magnetic field strength iof magnetic east
90 degrees from magnetic north

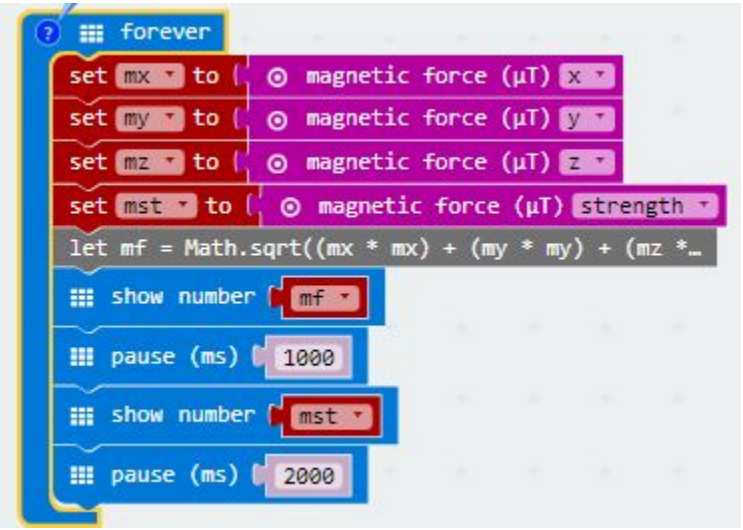
Z is the magnetic field strength vertically down.

You can calculate the overall magnetic field strength from these values using a simple mathematical formula:

MF = sqrt(X*X + Y*Y + Z*Z)

Strength is the overall magnetic field strength based on the latest update from the magnetometer.

The magnetic force measured across all axis, in nano teslas.




```
basic.forever(() => {
    let mx = input.magneticForce(Dimension.X)
    let my = input.magneticForce(Dimension.Y)
    let mz = input.magneticForce(Dimension.Z)
    let mst = input.magneticForce(Dimension.Strength)
    let mf = Math.sqrt((mx * mx) + (my * my) + (mz * mz))
    basic.showNumber(mf)
    basic.pause(1000)
    basic.showNumber(mst)
    basic.pause(2000)
})
```

කැමති විෂය
කැමති වෙලාවක
කැමති තැනක
නිදහසේ ඉගන ගන්න
පාඩම් සහ ප්‍රශ්න

Shilpa64.lk

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AlgoHack micro:bit

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