AlgoHack micro:bit

ACCELEROMETER SENSING

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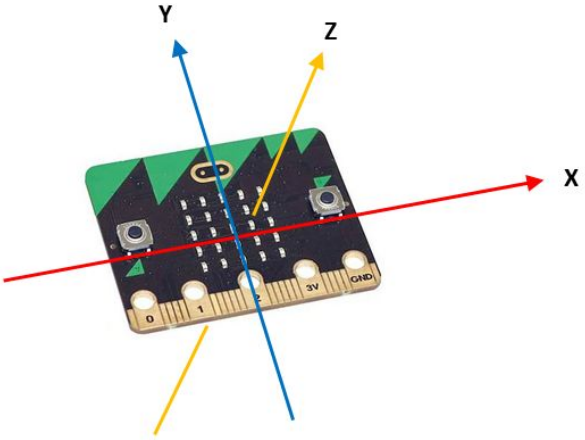
AlgoHack aims to teach Computer Science and Programing to young people, initiated by Shilpa Sayura Foundation, supported by GOOGLE RISE and Computer Society of Sri Lanka.

Understanding Accelerometer

Accelerometers measure *acceleration* and express this as three values which we refer to as X, Y and Z. These values are "vectors" meaning they express both a magnitude (amount) and direction.

In the case of the BBC micro:bit, with the micro:bit held flat with its LED display facing upwards and the edge connector facing toward you, the X value measures the amount of acceleration to the left and right of you.

Y measures the acceleration in the direction away from you or back towards you whilst Z measures acceleration up or down. So X and Y describe acceleration in the two horizontal planes whereas Z measures acceleration in the vertical plane.



The micro:bit uses values which are in multiples of one "milli-g" i.e. one thousandth of the acceleration due to gravity. Bitty Data Logger scales the values up to be relative to g itself.

Study following program

https://makecode.microbit.org/_aAtFoHVEVDq4

```
//Accelerometer Game - light of LEDs by moving microbit
//Niranjan Meegammana for AlgoHack microbit club project

let player: game.LedSprite = null
let xgame = new gameboard()
let px = -2
let py = -2
let started = false
basic.forever(() => {
    gx = input.acceleration(Dimension.X)
    gy = input.acceleration(Dimension.Y)
    let bxv = divdecimal(gx, seg)
    let byv = divdecimal(gy, seg)
    let bx = getLed(bxv)
    let by = getLed(byv)
    let obj = game.createSprite(bx, by)
    xgame.grid[bx][by] = true
    if ((bx == px) && (by == py)) {
        for (let i = 0; i < 3; i++) {
            obj.setBrightness(0)
            basic.pause(100)
            obj.setBrightness(255)
            basic.pause(100)
            obj.setBrightness(150)
        }
    }
    else {
        px = bx
```

```
        py = by
        obj.setBrightness(150)
    }
    let win = gamecheck()
    if (win == true) {
        xgame.score = xgame.score + 1
        basic.pause(300)
        basic.showIcon(IconNames.Diamond)
        basic.showNumber(xgame.score)
        basic.pause(300)
        init()
    }
    else {
        basic.pause(100)
    }
    basic.pause(100)
})

let gx = 0
let gy = 0
let seg = 511

//player = game.createSprite(2, 2)
function init() {
    let player: game.LedSprite = null
    let xgame = new gameboard()
}
function getLed(bxv: number) {
    let r = 2 + bxv
    return r
}
function divdecimal(n: number, m: number) {
```

```
    let s = n % m
    let p = n - s
    let q = p / m
    if (s >= (m / 2)) {
        q = q + 1
    }
    return q
}

function gamecheck() {
    let win = true
    for (let t = 0; t < 5; t++) {
        for (let u = 0; u < 5; u++) {
            if (xgame.grid[t][u] == false) {
                win = false
                break
            }
        }
        if (win == false) {
            break
        }
    }
    return win
}

class gameboard {
    public score: number
    public grid: Array<Array<boolean>>;

    constructor() {
        this.score = 0
        this.grid = [];
```

```
        for (let i = 0; i < 5; i++) {
            this.grid.push([false, false, false, false, false]);
        }
    }
}
```

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