



Prize Winner

**Programming, Apps &
Robotics**

Year 5 - 6

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Belair Primary School



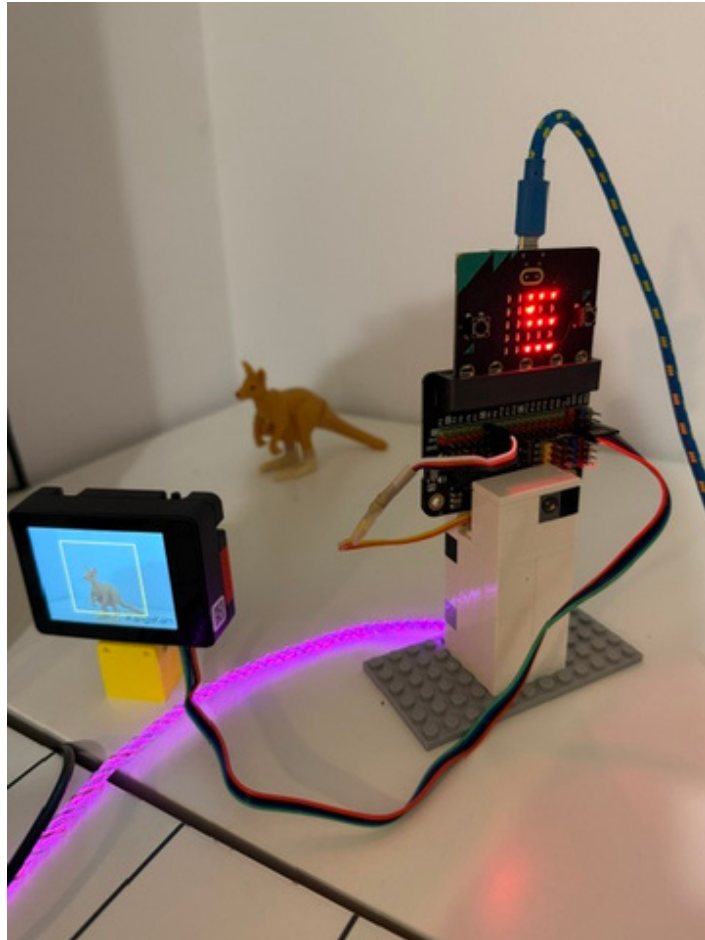


SCIENCE



KangaKam

By Oaki Bellison



Introduction

Living near a national park I often see kangaroos hopping down the street. Sometimes I see kangaroos that have been hit by cars. The council won't reduce the speed limit to 40km/h because it is a main road. I thought we might need a solution to make the roads a bit safer for kangaroos and drivers.

Aim

To detect when a kangaroo has exited a national park and warn people driving there are active kangaroos around then changing the speed limit to make it safer for drivers and kangaroos. The information from the sightings is exported so times of detection can be analysed.

Instructions

1. The KangaKam is to be set up at park entrances and exits.
2. The built-in camera can detect kangaroos when they exit the park.

- The Micro:Bit's matrix display will show the current speed you should be going at and the speed lowers if a kangaroo was recently detected.
- To read the serial output, plug in the micro:bit, open up a terminal and type “sudo dmesg | tail”.

```
~ ) sudo dmesg | tail
```

- It will tell you a bit of information about the device plugged in. The important bit is the part where it says “ttyAMCO” It may say something slightly different for you.

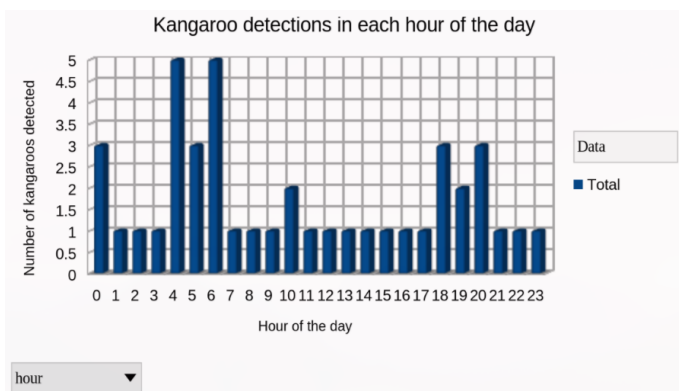
```
~ ) sudo dmesg | tail
[sudo] password for oak1:
[73427.387809] cdc_acm 3-6:1.1: ttyACM0: USB ACM device
[73427.389457] hid-generic 0003:0028:0204.0006: hiddev96,hidraw4: USB HID v1.00 Device [Arm BBC micro:bit CMSIS-DAP] on usb-0000:00:14.0-6/input3
[73428.421210] scsi 0:0:0:0: Direct-Access    MBED      VFS             0.1  PQ: 0 ANSI: 2
[73428.423898] sd 0:0:0:0: [sda] 131200 512-byte logical blocks: (67.2 MB/64.1 MiB)
[73428.424451] sd 0:0:0:0: [sda] Write Protect is off
[73428.424454] sd 0:0:0:0: [sda] Mode Sense: 03 00 00 00
[73428.424890] sd 0:0:0:0: [sda] No Caching mode page found
[73428.424893] sd 0:0:0:0: [sda] Assuming drive cache: write through
[73428.448596] sda:
[73428.448632] sd 0:0:0:0: [sda] Attached SCSI removable disk
~ )
```

- Type “sudo screen /dev/(what you got before) 115200

It will give you a blank screen and when the KangaKam detects a kangaroo, the hour, minute and second will be logged there.

```
0:1:54
0:2:0
0:2:6
|
```

- We can use this information to put it into a table. For example, here we can see there were more kangaroos coming out at 4:00 am and 6:00 am. This data could be analysed and given to local government to help them decide if speed limits should be changed for different times of day permanently.



Scientific Purpose

The scientific purpose of the KangaKam is to investigate which times of the day kangaroos are more likely to leave national parks so a speed sign can change and flashing light can turn on depending on the risk level.

Potential Applications

The KangaKam could be used on any road around Australia where there are often kangaroos.

Type

I created the KangaKam with a micro:bit, a Huskylens version 2, and a D.F. Robot micro:bit IO extender, a bit of Lego and a bit of 3D printing. I programmed it with Microsoft Make Code.

Improvements

In the future, the KangaKam could look at its own data to adjust the speed limits automatically on peak kangaroo times. It could also have a solar panel and an enclosure.

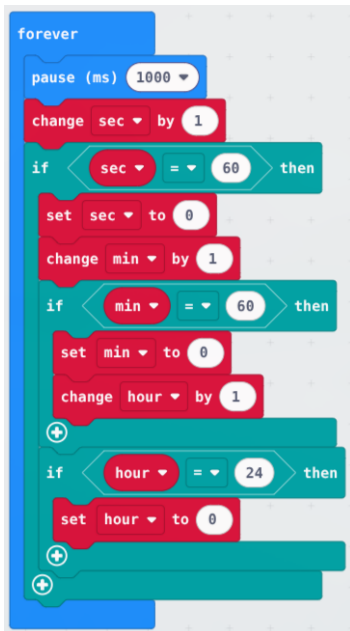
Code

```
forever
  if kdet1 == 1 then
    show leds
    serial write line join hour, :, min, : , sec
    serial write line " "
    set kdetect to 1
    play tone Middle C for 1 beat until done
    pause (ms) 1000
    set speed to 48
    pause (ms) 500
    set kdetect to 0
```

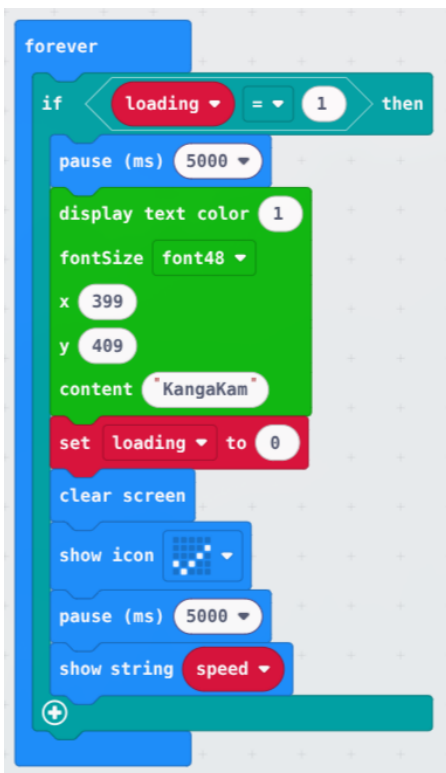
This part of the code tells the micro:bit what to do when it sees a kangaroo

```
forever
  if loading == 0 and not speed == 0 then
    show string speed
```

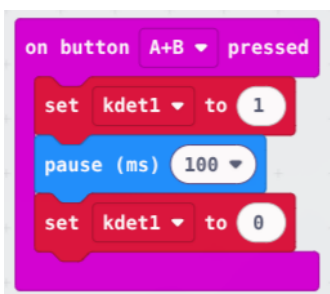
This part checks if the micro:bit should be showing the speed at the moment.



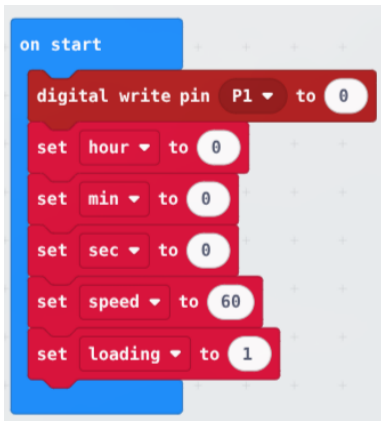
This code keeps track of the time.



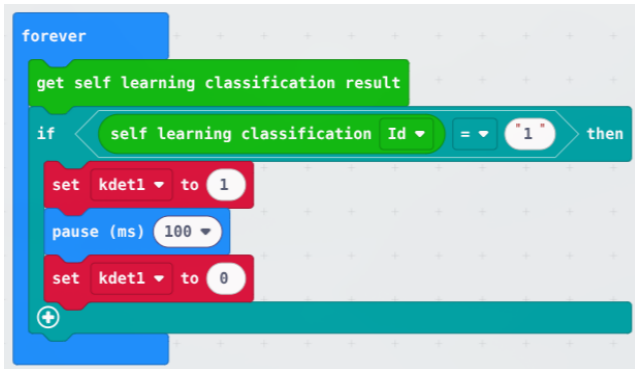
This code happens on startup and waits 5 seconds for the Huskylens to turn on and for a button to be pressed, then shows the text “KangaKam” on the display and shows a tick to verify that it is working.



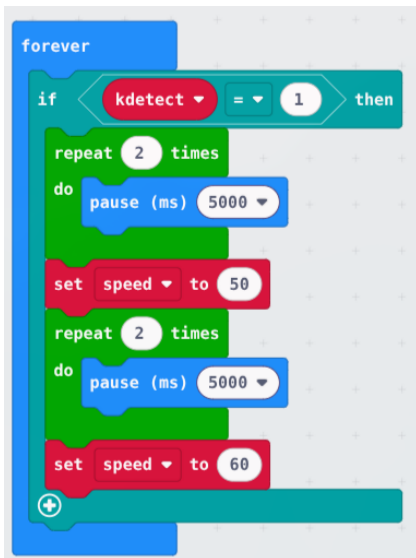
This code is for testing. If you press both buttons, it will pretend it sees a kangaroo.



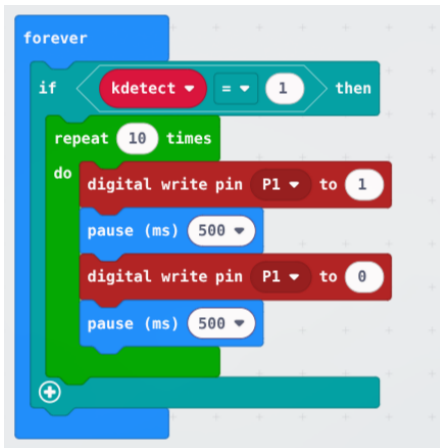
This code makes sure everything is set to default at the start.



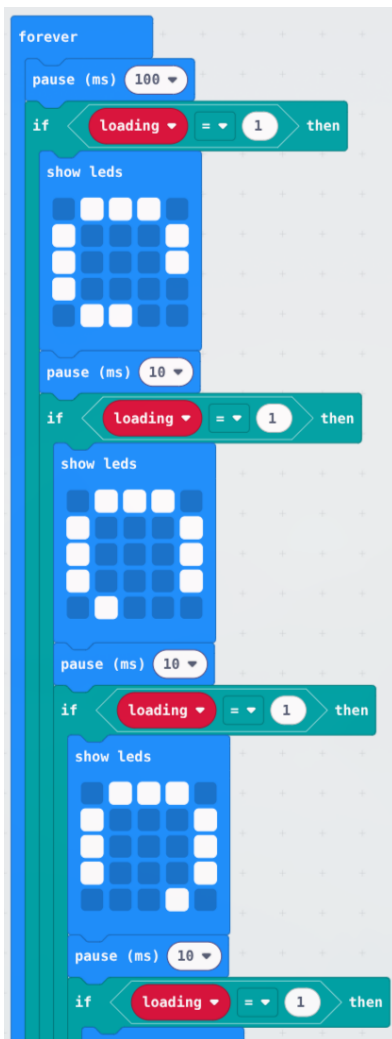
This checks if there is a kangaroo.



This slowly turns the speed back up after seeing a kangaroo.



This turns on a blinking light when a kangaroo is seen.



Sample of the code for the loading screen.

Acknowledgements

The 3D model was based on the design in this link by MakerSeed

[Erha Shitu 2 AI Vision Sensor HuskyLens 2 Adapter Bracket - Free 3D Print Model - Maker...](#)

I used ChatGPT for help with the table formulas in Libreoffice.

My mum helped me with time management.