



BotSTEM – Erasmus+ KA2 Project

2017-1-ES01-KA201-038204

Good practice

1. Title of the activity / practice	Creating digital drawings with Python
2. Origin of the activity	Nelson Correia is a high school and middle school Physics and Chemistry teacher, since 1995, and projects' coordinator at Gil Paes Schools Group in Torres Novas, Portugal. Presently is also teacher of Programming and Robotics to fifth grade students.
3. Age of the students	8 to 10 years old
4. Target group (type of the learners, size of the group)	General curriculum Groups of 2-3
5. School subjects + topics concerned	Interdisciplinary and cross-curricular, involving technology, drawing, Programming and Robotics
6. Educational goals of the practice	Learn what is a pixel and that digital images are made of pixels; Calculate the number of pixels of a digital image; Learn how the pixel colour is created from RGB leds; Develop the knowledge of Python programming language; Improve the creativity and collaborative work.
7. Duration	90 min
8. Place	Classroom / ICT room



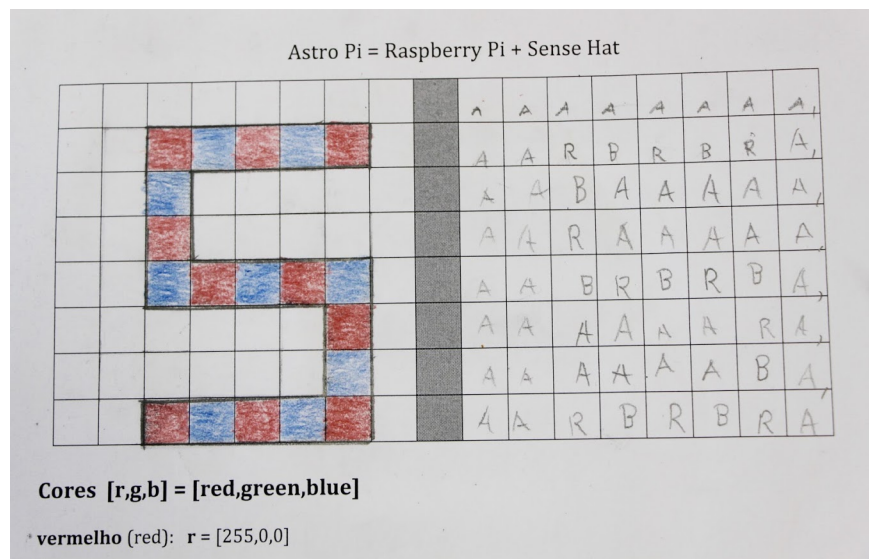
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9. Short description of the activity

Create a digital drawing with Python programming language

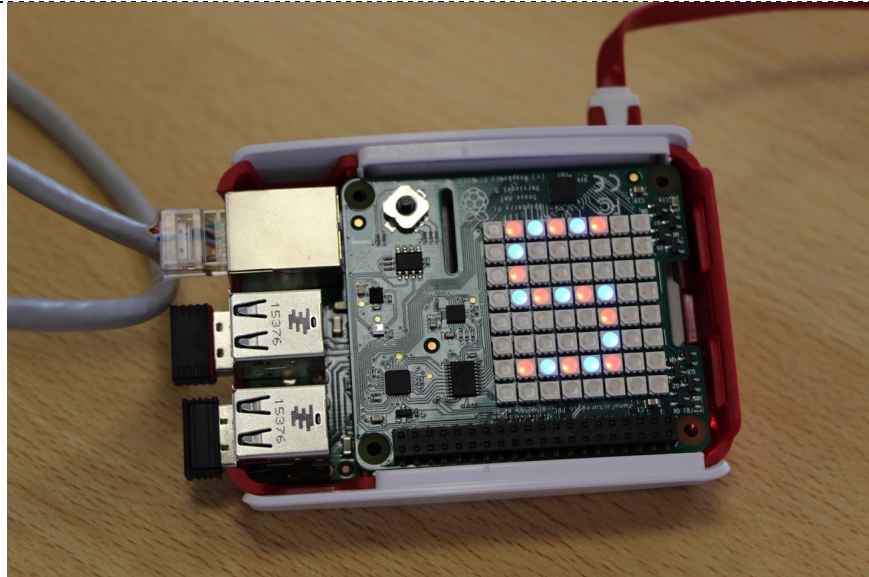
1. The class is divided in groups of 2 or 3 students.
2. Students make a drawing inside a 8x8 grid in a paper sheet (annex).
3. Each square of the grid must have only one colour, selected from a list.
4. The colours of the drawing will be transformed in a letters code, selected from a list.
5. This letters code will be written in a Python program prepared by the teacher in a Raspberry Pi with a Sense Hat.
6. Run the program and the drawing will appear in the Sense Hat.
7. Students will count the number of pixels of the drawing.





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More photos: <https://goo.gl/photos/v5DPoz5Sd5dwKMwz9>

Python program:

```
from sense_hat import SenseHat
```

```
sense = SenseHat()
```

```
r = [255,0,0]
```

```
o = [255,127,0]
```

```
y = [255,255,0]
```

```
g = [0,255,0]
```

```
b = [0,0,255]
```

```
i = [75,0,130]
```

```
v = [143,0,255]
```

```
a = [0,0,0]
```

```
image = [
```

```
a,a,a,a,a,a,a,
```

```
a,a,a,r,r,a,a,
```

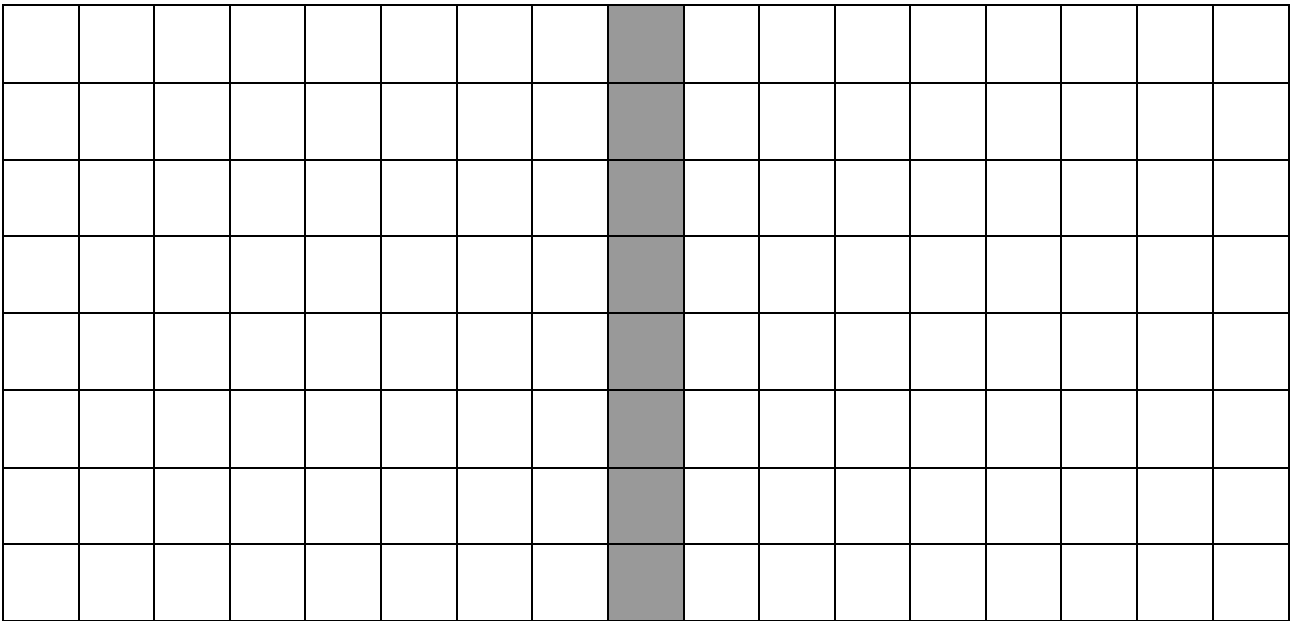


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	<pre>a,r,r,o,o,r,r,a, r,o,o,y,y,o,o,r, o,y,y,g,g,y,y,o, y,g,g,b,b,g,g,y, b,b,b,i,i,b,b,b, b,i,i,v,v,i,i,b]</pre> <p>sense.set_pixels(image)</p>
<p>10. Evaluation</p>	<p>Questions, rubric for group work, peer evaluation, teacher’s observation</p>
<p>11. Materials / Resources / technical requirements</p>	<p>Computer Raspberry Pi Sense HAT Color pencils Paper sheets</p>
<p>12. Tips for educators / theoretical background (if applicable) or curriculum context</p>	<p>https://projects.raspberrypi.org/en/projects/getting-started-with-the-sense-hat https://raspberrypi.org/magpi-issues/Essentials_SenseHAT_v1.pdf</p>

Astro Pi = Raspberry Pi + Sense Hat



Cores [r,g,b] = [red,green,blue]

vermelho (red): **r** = [255,0,0]

laranja (orange): **o** = [255,127,0]

amarelo (yellow): **y** = [255,255,0]

verde (green): **g** = [0,255,0]

azul (blue): **b** = [0,0,255]

ciano (cyan): **c** = [0,255,255]

violeta (violet): **v** = [143,0,255]

magenta (magenta): **m** = [255,0,255]

branco (white): **w** = [255,255,255]

anil (indigo): **i** = [75,0,130]

púrpura (purple): **p** = [128,0,128]

rosa (pink): **k** = [255,192,203]

castanho (brown): **n** = [150, 75, 0]

sem cor (apagado): **a** = [0,0,0]