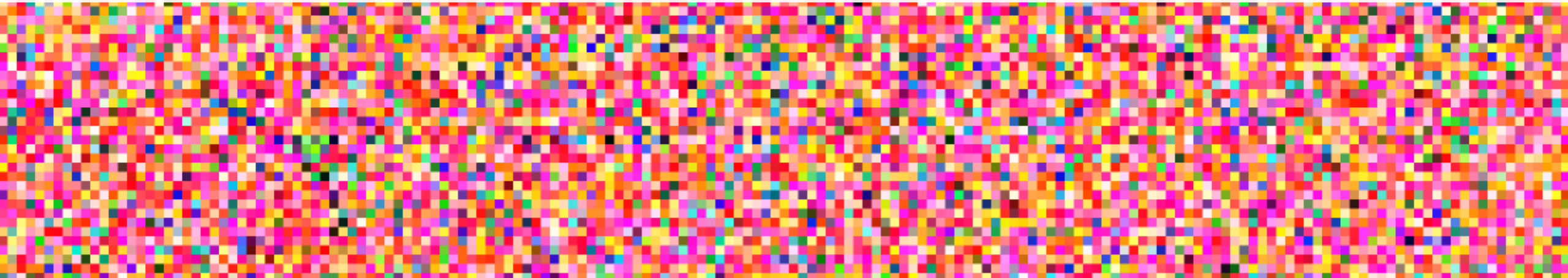
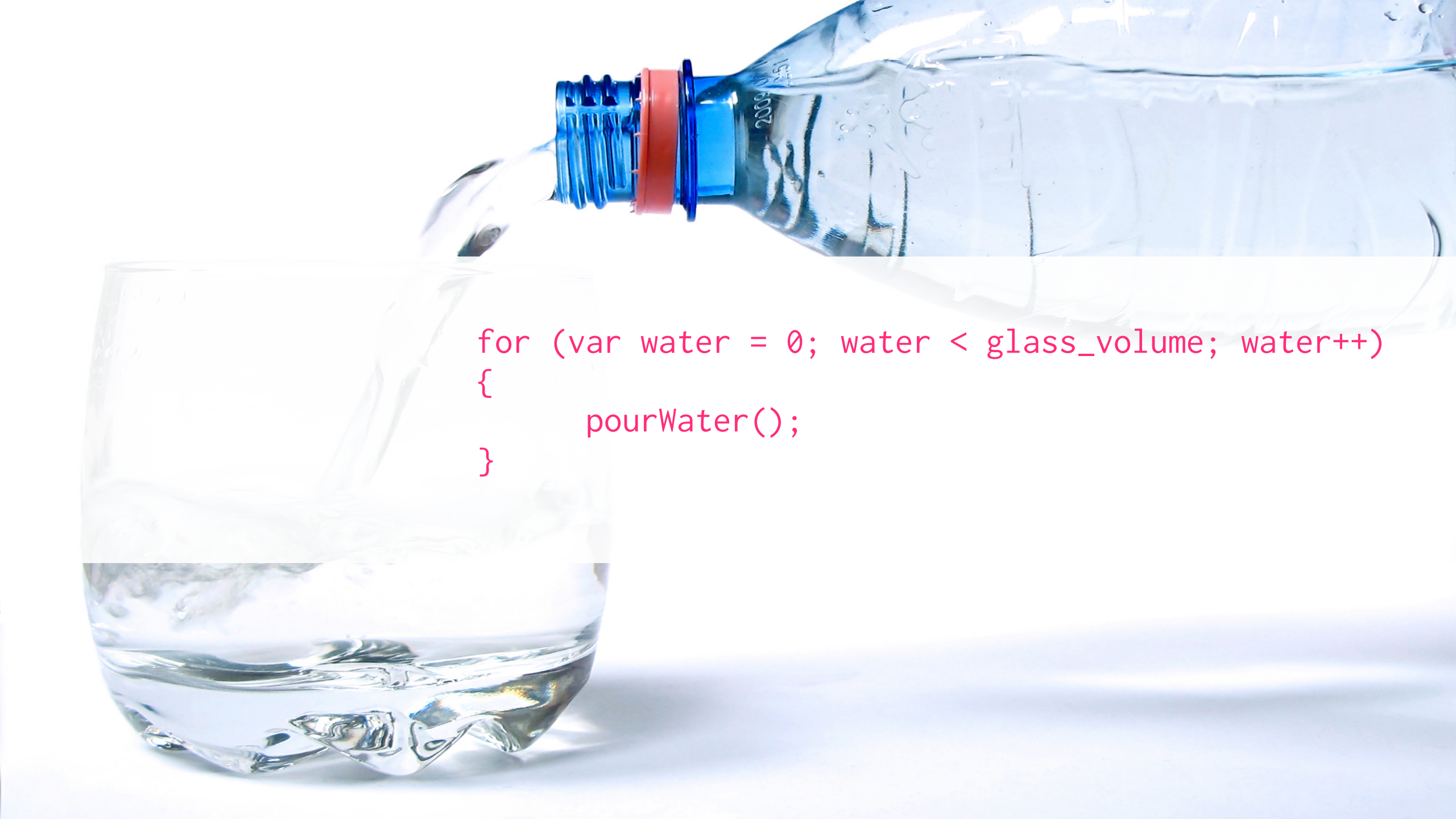
P5js: loops, HSB and Arrays

How would we fill a screen with boxes?




for loops(){}



```
for (var water = 0; water < glass_volume; water++)
{
        pourWater();
}
```

```
for (var positionOfPlayHead = 1000; positonOfPlayHead >
0;  positionOfPlayHead--)
{
      rotate();
}
```

For loops

- **Initializer:** There's an initial state, the initializer at the start of the loop.
- **Conditional:** A statement of which the outcome will change during the loop's duration. (eventually, the glass will be full);
  - When the conditional eventually changes state from true to false or false to true, the loop ends. (stop pouring water)
- **Iteration step:** There's a way to increment through each iteration of the loop by incrementing (or decrementing) a value. (adding more water)

Exercise!

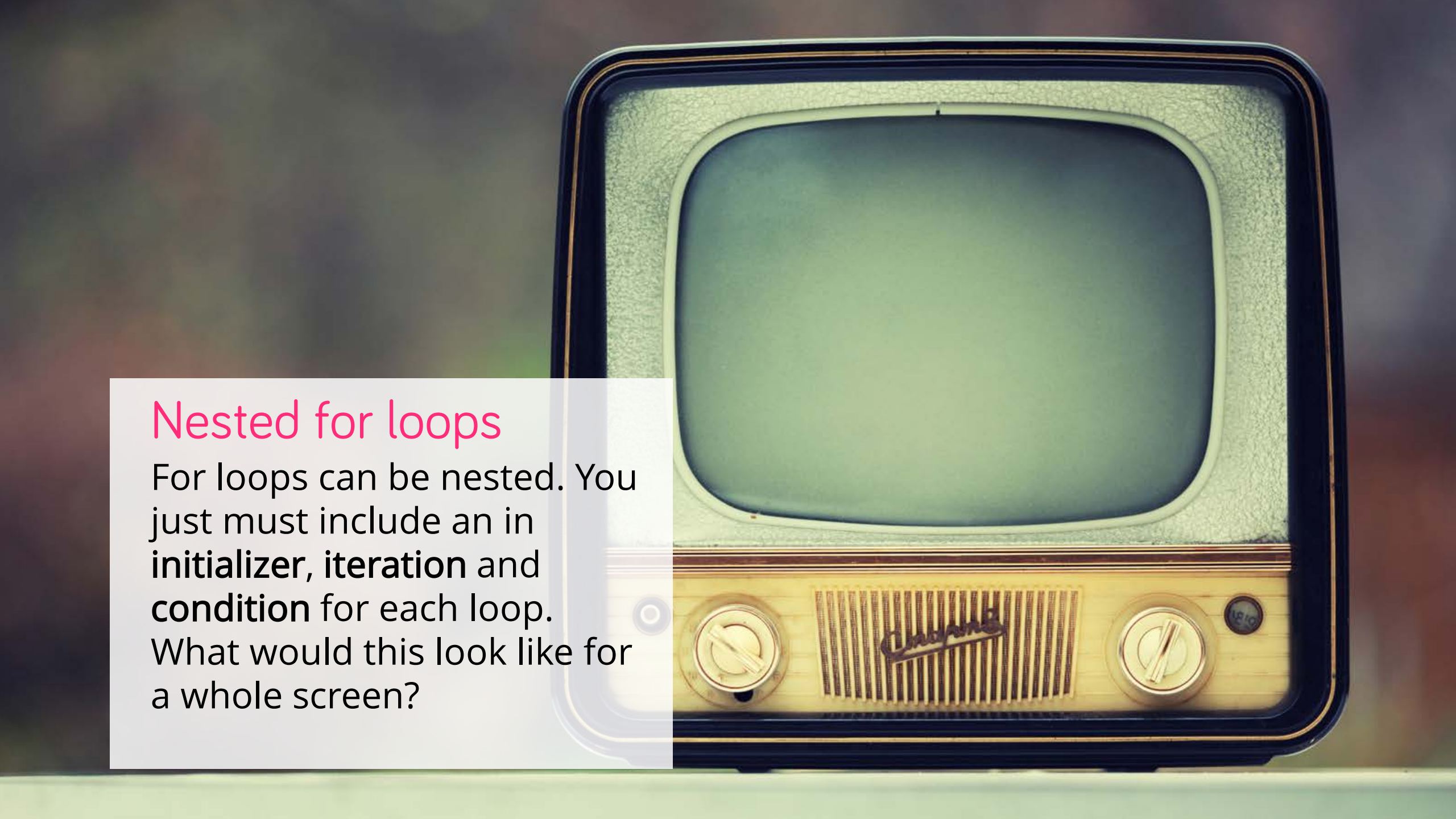
Think through the logic of making one row of boxes spanning the whole screen's width all exactly 20 pixels wide and tall.

*Don't worry about code yet use words to describe the process of doing it by hand using code like logic (pseudo code).

Racing the beam

the Atari 2600, initially branded the VCS (Video Computer System), did not have a video frame buffer, and required the programmers to write each line of video to the television, one line at a time. As there were only a limited number of machine cycles in which to do this, the programmers were literally racing a high speed electron beam across the screen

But what about the rest of the rows?



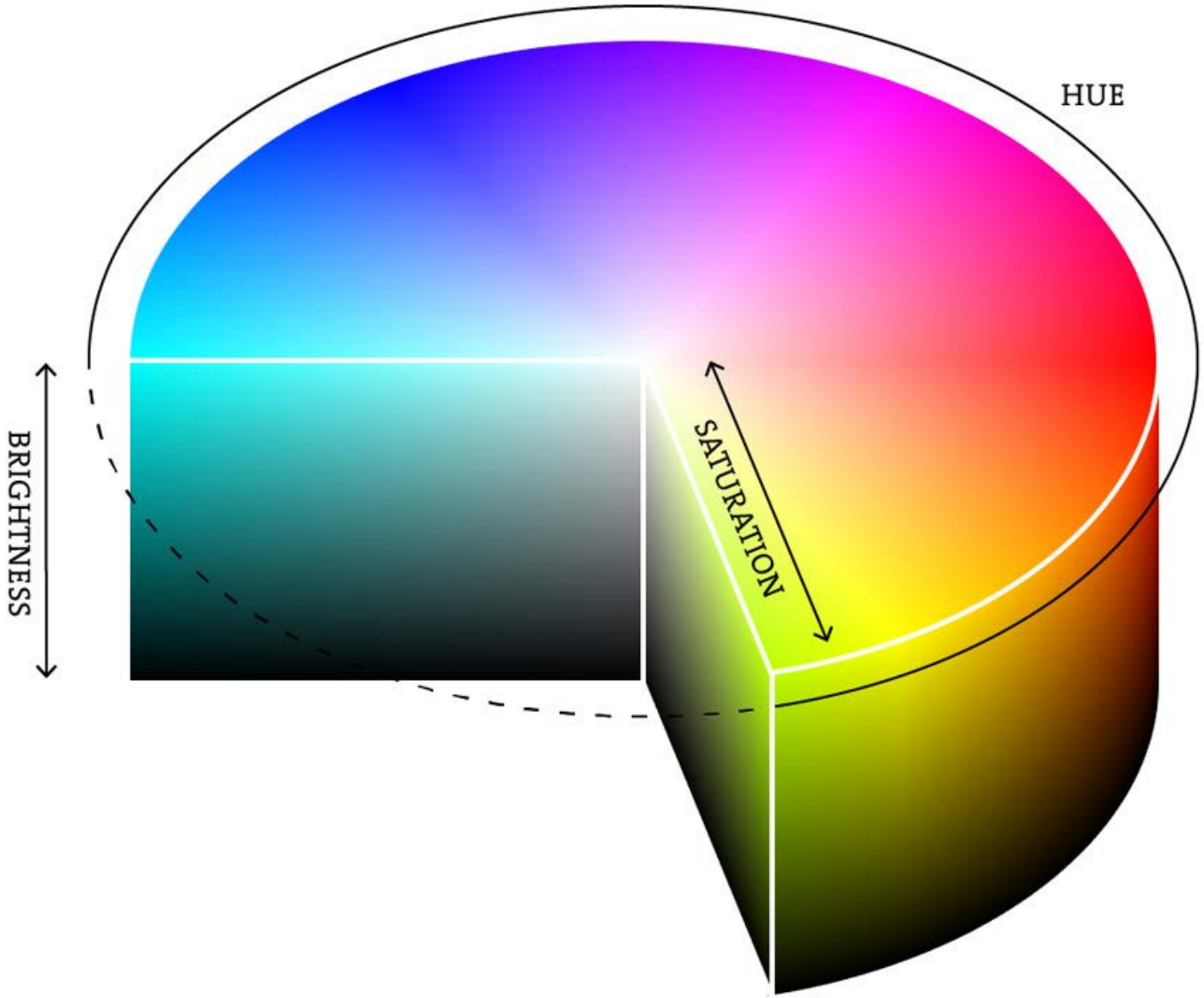
Nested for loops

For loops can be nested. You just must include an in **initializer**, **iteration** and **condition** for each loop. What would this look like for a whole screen?

Exercise!

Think through the logic of making many rows of boxes, each which spans the whole width of the screen until you're at the height of the canvas.

*Don't worry about code yet use words to describe the process of doing it by hand using code like logic (pseudo code).

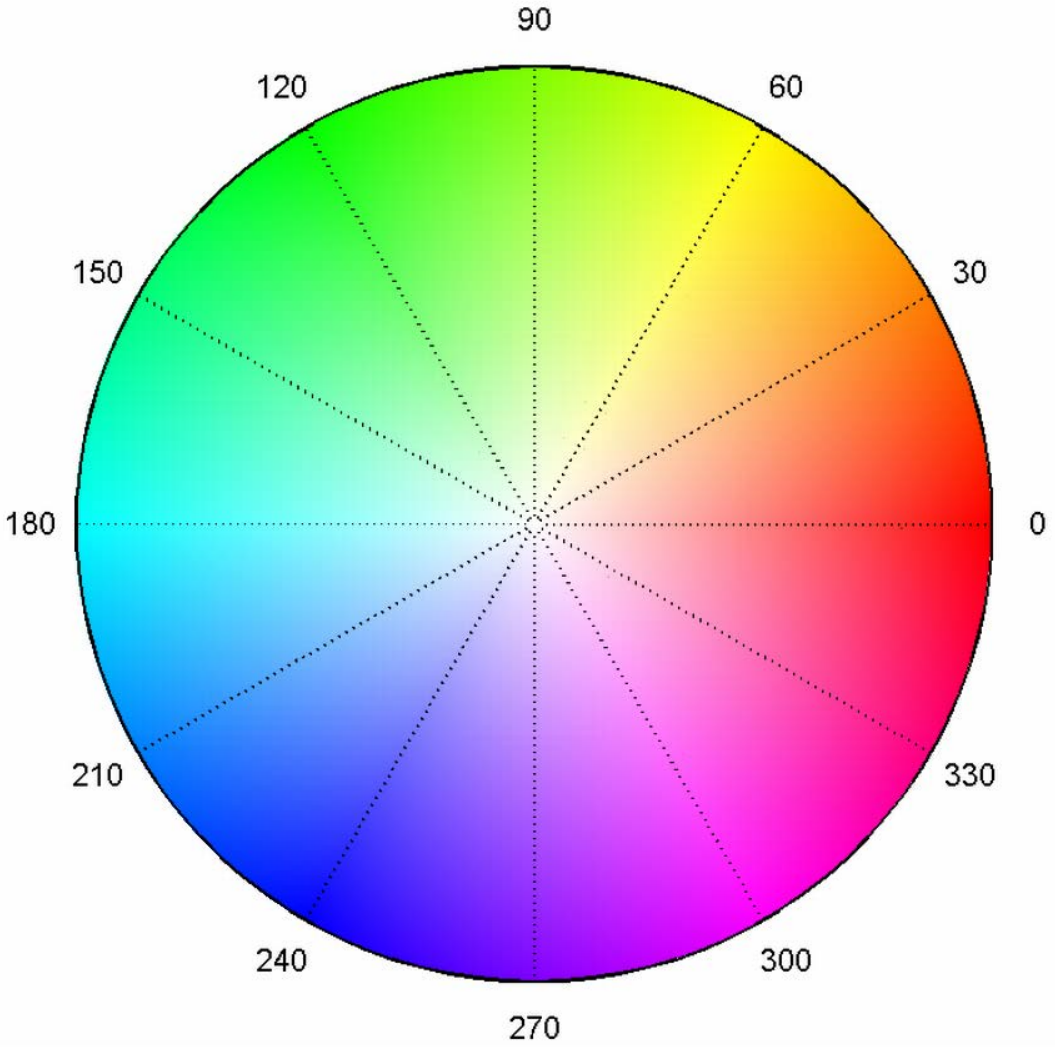


HSB: Hue, Saturation, Brightness

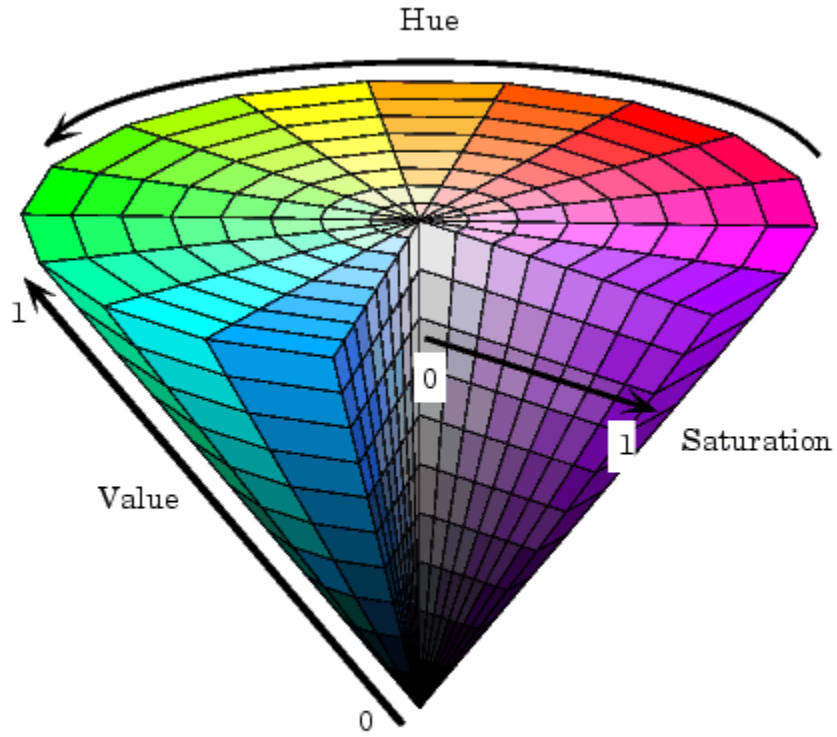
HSB or HSV

- **Hue:** The color.
- **Saturation:** the amount of white in the color;
- **Brightness (or value):** the amount of black in the color;

Hue as a circle from 0 to 360 degrees



Saturation and Brightness (or Value) from 0 – 100 or 0 to 1



How to use HSB/HSV in p5

Syntax

```
colorMode(mode,[max])
```

```
colorMode(mode,max1,max2,max3,[maxA])
```

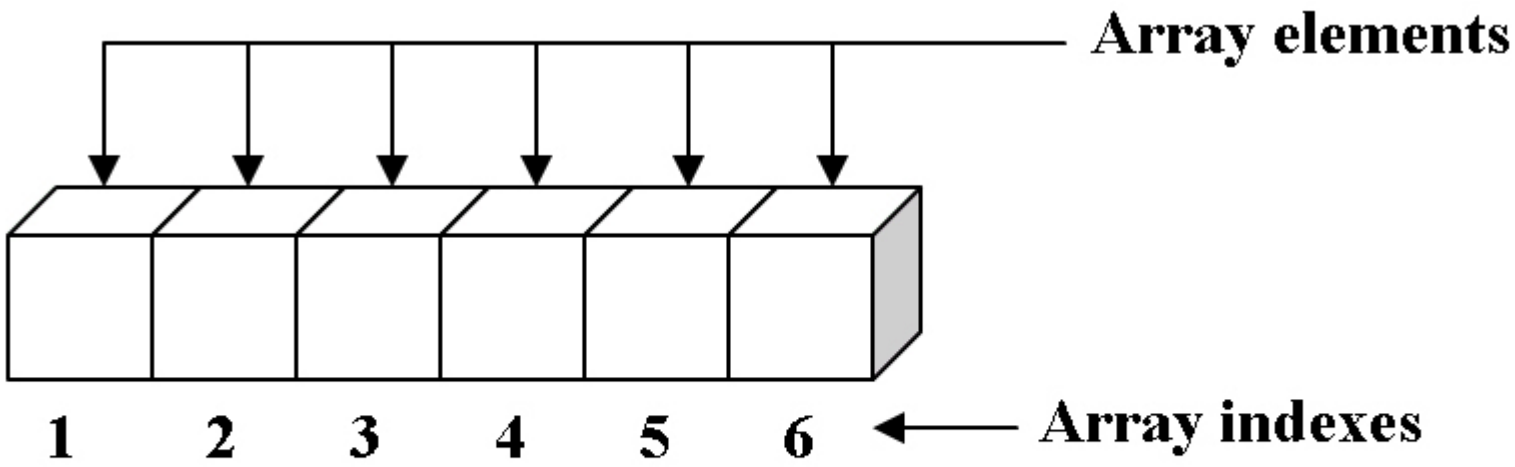
```
colorMode(HSB, 360, 100,100);
colorMode(RGB, 1, 1, 1); //this is tricky! 1 is now just equal to full color, up until now that's been 255
```

Exercise!

Tie the color of the box to the position of the mouse in HSB

Let’s make a spectrum

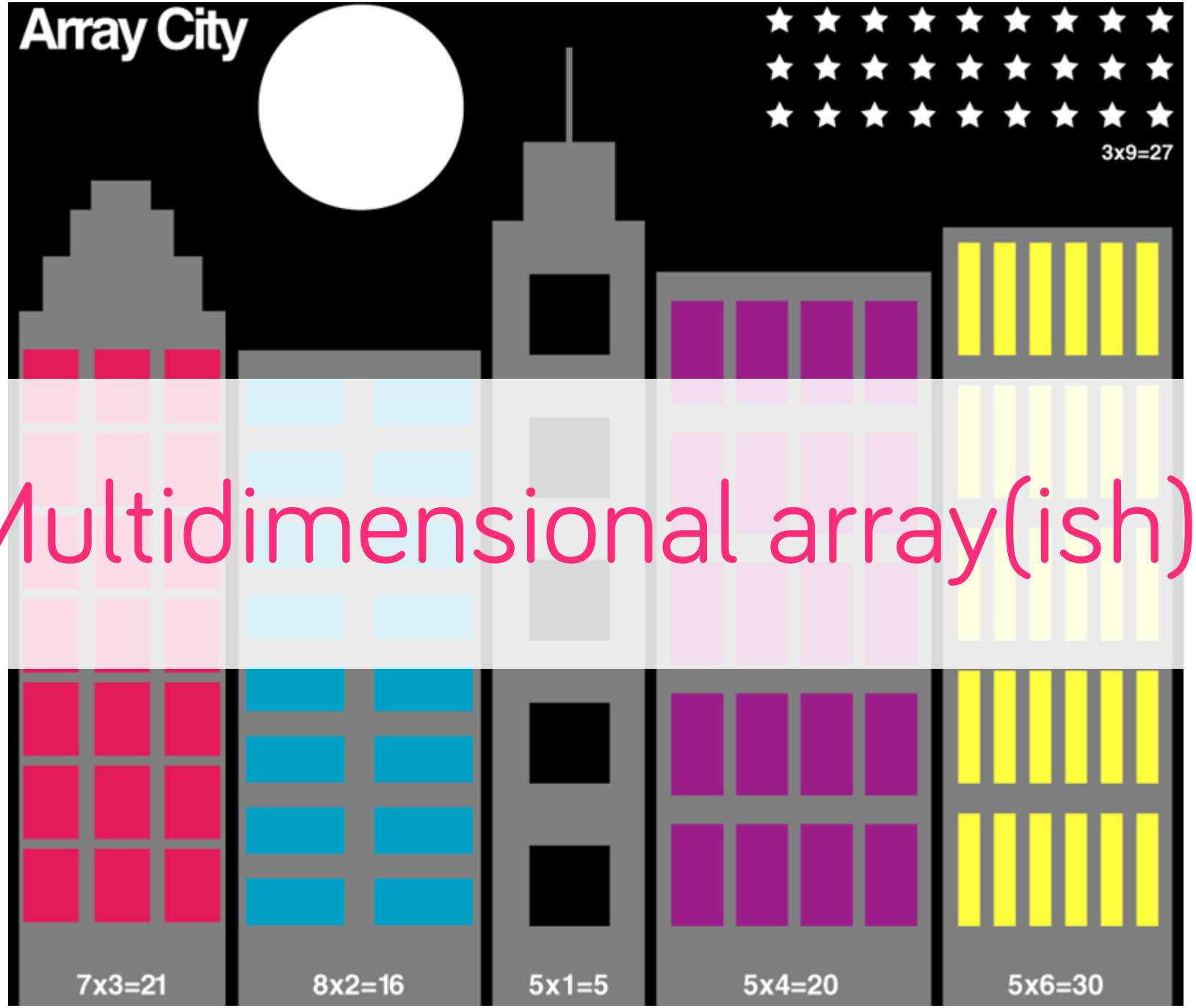
Arrays



One-dimensional array with six elements

Arrays

- **Arrays:** collections of groups of objects
- **Array Size:** the length of the array
- **Array Element:** An object in an array
- **Array Index:** Position of an object in an array



Multidimensional array(ish)

Homework:

Draw a tic tac toe board on screen and think about how we can use arrays to create the game