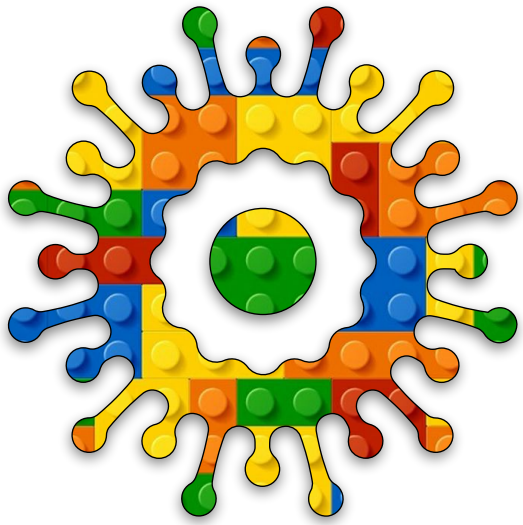
Creative Coding Module D Unit #4 push and splice



Content

Module D Unit #4 push and splice

Introduction to push and splice

Having a bit of a deeper dive into arrays and then some fun stuff. The first part, we use the `console.log()` to see inside the array, and then we are back on the `bubbles`.

We will also introduce the adding of more functions to a class, in this case, the `Bubble` class.

Sketch D4.1 recap

❗ A new sketch.

A simple way to add an element to an array is as follows: we are saying that element [5] is 21.

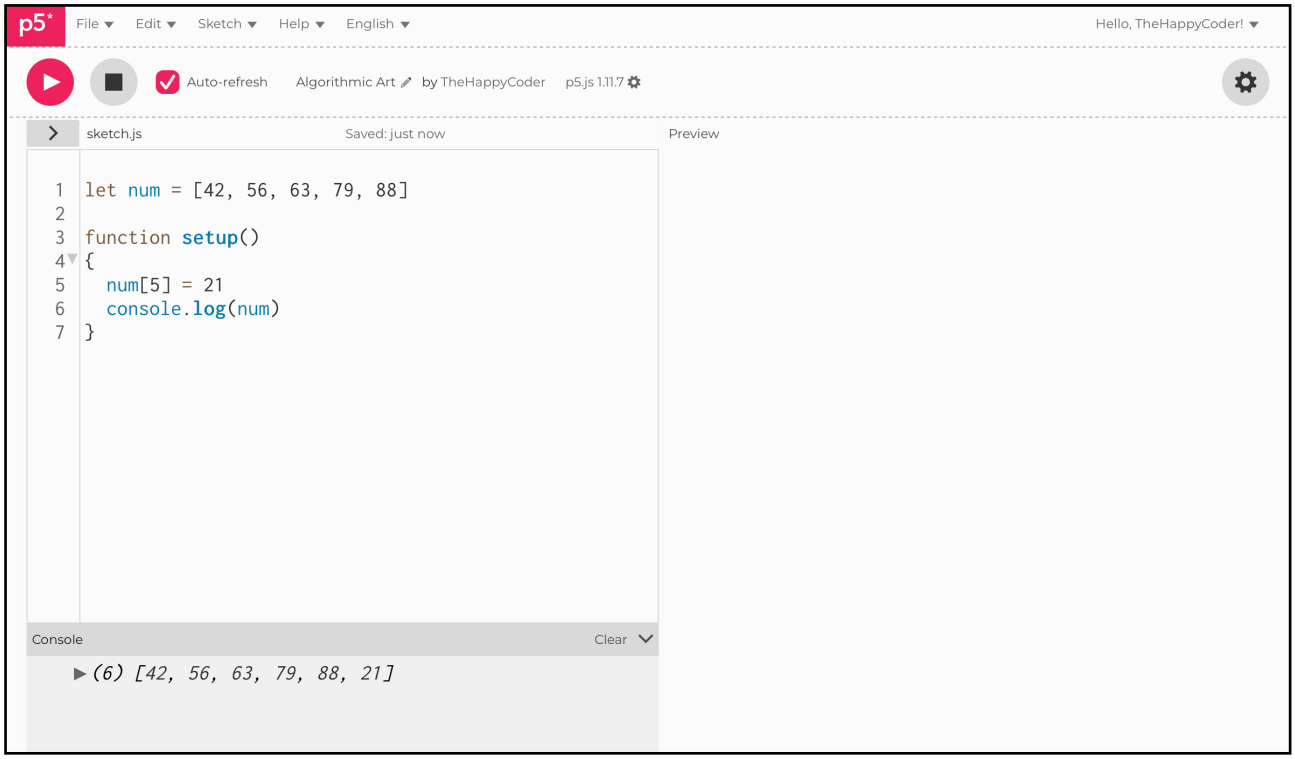
```
let num = [42, 56, 63, 79, 88]

function setup()
{
  num[5] = 21
  console.log(num)
}
```

🗒️ Notes

You will need to make sure you know how long your array is; this is challenging when you might be adding or removing elements all the time. There is a better way.

Figure D4.1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sketch.js
Saved: just now
Preview
1 let num = [42, 56, 63, 79, 88]
2
3 function setup()
4 {
5 num[5] = 21
6 console.log(num)
7 }
Console
Clear
▶ (6) [42, 56, 63, 79, 88, 21]

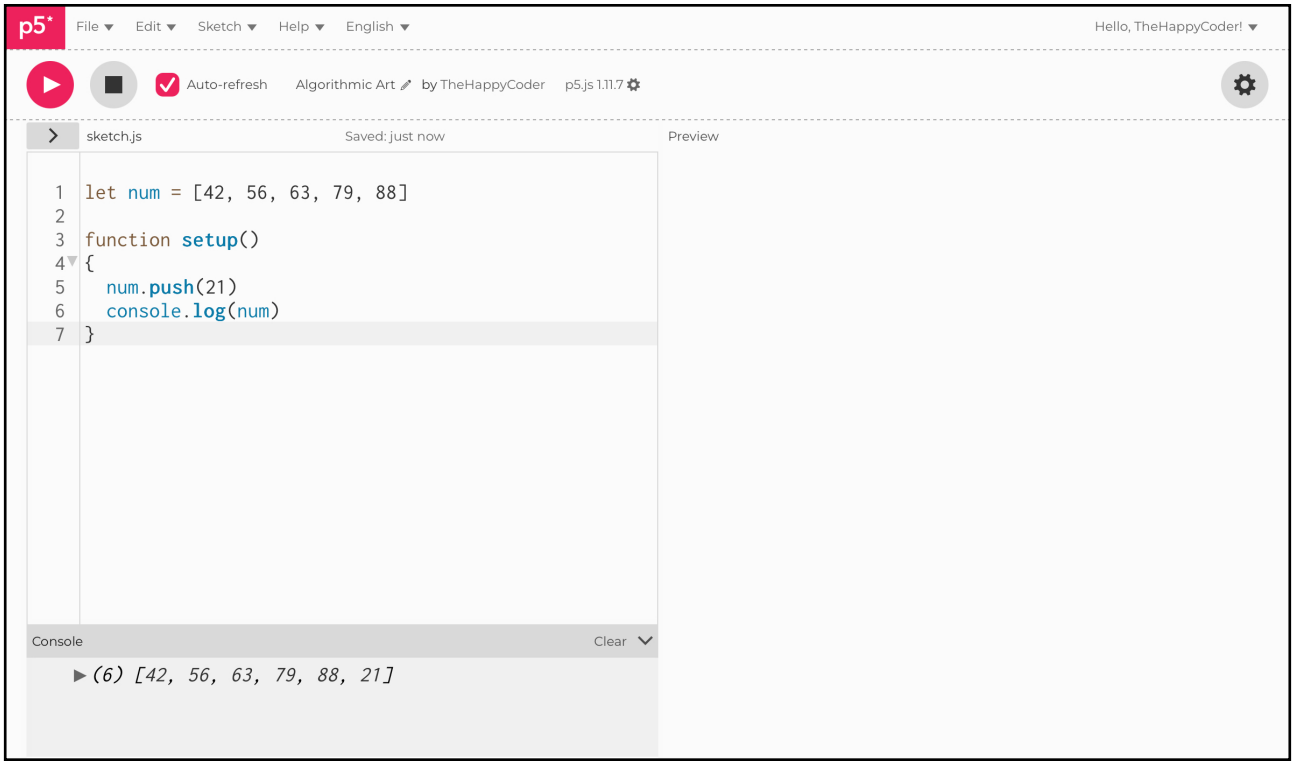
Sketch D4.2 push()

Using the `push()` function, it simply adds another element onto the end of the array, as we saw in the previous sketch.

```
let num = [42, 56, 63, 79, 88]


function setup()
{
  num.push(21)
  console.log(num)
}
```

Figure D4.2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sketch.js
Saved: just now
Preview
let num = [42, 56, 63, 79, 88]
function setup()
{
num.push(21)
console.log(num)
}
Console
Clear
(6) [42, 56, 63, 79, 88, 21]

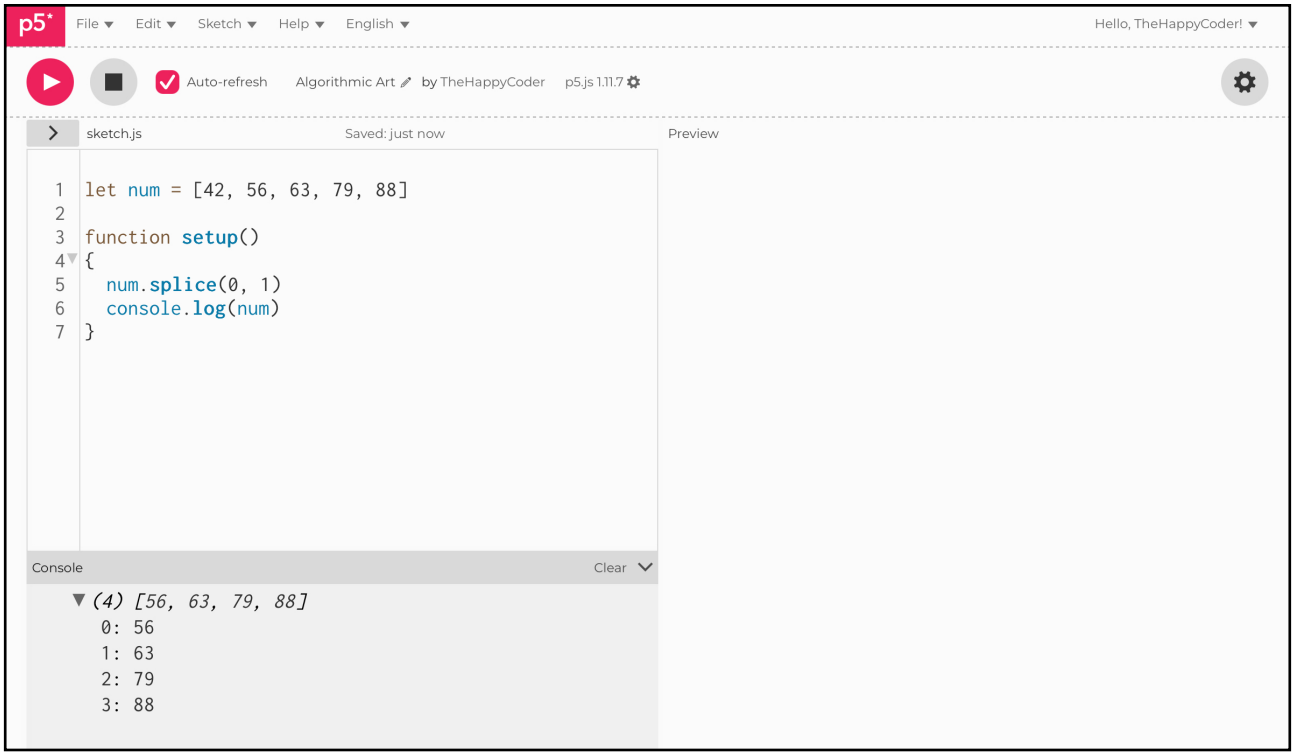
Sketch D4.3 splice() up your life

But what if we want to delete an element from an array? We use a function called `splice()`. It has two arguments: the first is the index, and the second tells you how many to delete (starting at the index). We want to delete the first one in the array, so it is `splice(0, 1)`.

```
let num = [42, 56, 63, 79, 88]


function setup()
{
  num.splice(0, 1)
  console.log(num)
}
```

Figure D4.3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sketch.js
Saved: just now
Preview
1 let num = [42, 56, 63, 79, 88]
2
3 function setup()
4 {
5 num.splice(0, 1)
6 console.log(num)
7 }
Console
Clear
(4) [56, 63, 79, 88]
0: 56
1: 63
2: 79
3: 88

Sketch D4.4 splicing a bubble

❗ new bubble sketch, I have highlighted the major changes.
To delete a bubble, we create a function called `keyPressed()` which will activate when you press a key on your keyboard. Also, I have reduced the random wobble so that you can see how they are deleted every time you hit a key.
❗ remember to click on the canvas first.

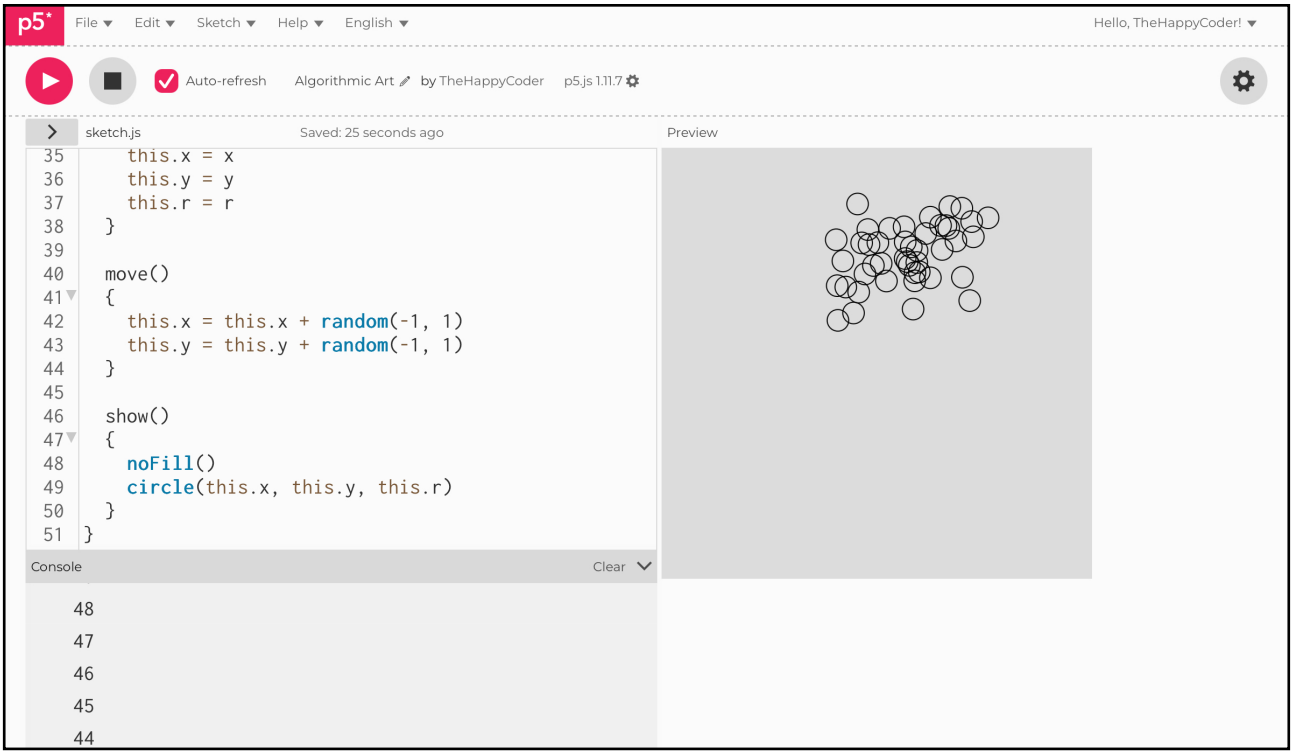
```
let bubbles = []
let bubble

function setup()
{
  createCanvas(400, 400)
}

function mouseDragged()
{
  bubble = new Bubble(mouseX, mouseY, 20)
  bubbles.push(bubble)
}

function keyPressed()
{
  bubbles.splice(0, 1)
  console.log(bubbles.length)
}

function draw()
{
  background(220)
  for (let i = 0; i < bubbles.length; i++)
  {
```

```
    bubbles[i].show()
    bubbles[i].move()
  }
}

class Bubble
{
  constructor(x, y, r)
  {
    this.x = x
    this.y = y
    this.r = r
  }

  move()
  {
    this.x = this.x + random(-1, 1)
    this.y = this.y + random(-1, 1)
  }

  show()
  {
    noFill()
    circle(this.x, this.y, this.r)
  }
}
```

🗒️ Notes

I have included a `console.log()` so that you can see how many are in the array and see the number go down. Every time you press a key, you should see a bubble disappear, the oldest or first in the array.

Figure D4.4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p5.js 1.11.7
sketch.js
Saved: 25 seconds ago
Preview
35 this.x = x
36 this.y = y
37 this.r = r
38 }
39
40 move()
41 {
42 this.x = this.x + random(-1, 1)
43 this.y = this.y + random(-1, 1)
44 }
45
46 show()
47 {
48 noFill()
49 circle(this.x, this.y, this.r)
50 }
51 }
Console
Clear
48
47
46
45
44

Sketch D4.5 oversized array

Something else we can do is delete them if the array is over a certain size. For this, we remove the `keyPressed()` function completely. Here, the array is never bigger than `50` bubbles.

```
let bubbles = []
let bubble

function setup()
{
  createCanvas(400, 400)
}

function mouseDragged()
{
  bubble = new Bubble(mouseX, mouseY, 20)
  bubbles.push(bubble)
}

function draw()
{
  background(220)
  for (let i = 0; i < bubbles.length; i++)
  {
    bubbles[i].show()
    bubbles[i].move()
  }
  if (bubbles.length > 50)
  {
    bubbles.splice(0, 1)
  }
}
```

```
class Bubble
{
  constructor(x, y, r)
  {
    this.x = x
    this.y = y
    this.r = r
  }

  move()
  {
    this.x = this.x + random(-1, 1)
    this.y = this.y + random(-1, 1)
  }

  show()
  {
    noFill()
    circle(this.x, this.y, this.r)
  }
}
```

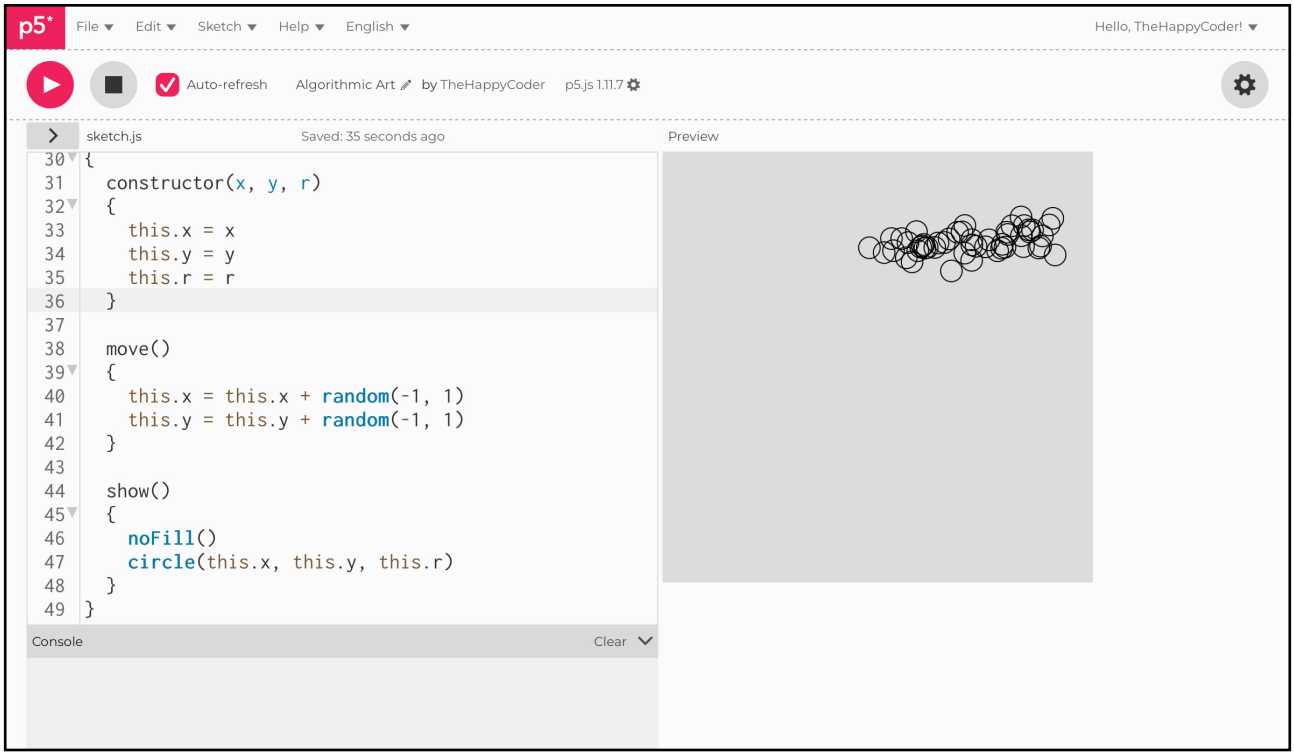
🗒️ Notes

What you get is what looks like a trail following you, which never gets too long.

🌻 Challenge

Have them delete themselves if they wander off the canvas.

Figure D4.5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Hello, TheHappyCoder!
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p5.js 1.11.7
sketch.js
Saved: 35 seconds ago
Preview
{
constructor(x, y, r)
{
this.x = x
this.y = y
this.r = r
}
move()
{
this.x = this.x + random(-1, 1)
this.y = this.y + random(-1, 1)
}
show()
{
noFill()
circle(this.x, this.y, this.r)
}
}
Console
Clear

Sketch D4.6 just roll over

Changing the colour of the bubble when the mouse rolls over the bubble. First, we will create a function called `changeColour()` in the bubble class. It will have an argument called `bright`, which is set to `0` by default.

```
let bubbles = []
let bubble

function setup()
{
  createCanvas(400, 400)
}

function mouseDragged()
{
  bubble = new Bubble(mouseX, mouseY, 20)
  bubbles.push(bubble)
}

function draw()
{
  background(220)
  for (let i = 0; i < bubbles.length; i++)
  {
    bubbles[i].show()
    bubbles[i].move()
  }
  if (bubbles.length > 50)
  {
    bubbles.splice(0, 1)
  }
```

```
}

class Bubble
{
  constructor(x, y, r)
  {
    this.x = x
    this.y = y
    this.r = r
    this.brightness = 0
  }

  move()
  {
    this.x = this.x + random(-1, 1)
    this.y = this.y + random(-1, 1)
  }

  show()
  {
    noFill()
    circle(this.x, this.y, this.r)
  }

  changeColour(bright)
  {
    this.brightness = bright
  }
}
```

🗒️ Notes

Nothing is yet changing, just building the sketch.

Sketch D4.7 just a short dist()

Next, we want a function that measures when the mouse is over the bubble. We create a function in the bubble class called `rollover()`. It receives two arguments, `px` and `py`, which are the `mouse X` and `mouseY` co-ordinates (which we will get to in a moment).

The function `dist()` measures the distance between two sets of co-ordinates; in this case, it is the distance between the centre of the bubble, `this.x`, `this.y`, and the `mouseX` and `mouseY` positions.

```
let bubbles = []
let bubble

function setup()
{
  createCanvas(400, 400)
}

function mouseDragged()
{
  bubble = new Bubble(mouseX, mouseY, 20)
  bubbles.push(bubble)
}

function draw()
{
  background(220)
  for (let i = 0; i < bubbles.length; i++)
  {
    bubbles[i].show()
    bubbles[i].move()
  }
  if (bubbles.length > 50)
```

```
  {
    bubbles.splice(0, 1)
  }
}

class Bubble
{
  constructor(x, y, r)
  {
    this.x = x
    this.y = y
    this.r = r
    this.brightness = 0
  }

  move()
  {
    this.x = this.x + random(-1, 1)
    this.y = this.y + random(-1, 1)
  }

  show()
  {
    noFill()
    circle(this.x, this.y, this.r)
  }

  changeColour(bright)
  {
    this.brightness = bright
  }

  rollover(px, py)
```

```
  {
    let d = dist(px, py, this.x, this.y)
  }
}
```

Notes

Still nothing to see.

Sketch D4.8 inside the bubble

The radius of the bubble is `r` (`this.r`), so if `px` and `py` are less than the radius, we know that the mouse is inside the bubble. We use a simple boolean, `true` or `false`.

```
let bubbles = []
let bubble

function setup()
{
  createCanvas(400, 400)
}

function mouseDragged()
{
  bubble = new Bubble(mouseX, mouseY, 20)
  bubbles.push(bubble)
}

function draw()
{
  background(220)
  for (let i = 0; i < bubbles.length; i++)
  {
    bubbles[i].show()
    bubbles[i].move()
  }
  if (bubbles.length > 50)
  {
    bubbles.splice(0, 1)
  }
}
```

```
class Bubble
{
  constructor(x, y, r)
  {
    this.x = x
    this.y = y
    this.r = r
    this.brightness = 0
  }

  move()
  {
    this.x = this.x + random(-1, 1)
    this.y = this.y + random(-1, 1)
  }

  show()
  {
    noFill()
    circle(this.x, this.y, this.r)
  }

  changeColour(bright)
  {
    this.brightness = bright
  }

  rollover(px, py)
  {
    let d = dist(px, py, this.x, this.y)
    if (d < this.r)
    {
```

```
      return true
    }
    else
    {
      return false
    }
  }
}
```

Notes

Still the same old...

Sketch D4.9 true colour

We want to fill the bubble with whatever colour is true (255) or false (0), the default, so we use the `fill()` function with a little bit of alpha.

```
let bubbles = []
let bubble

function setup()
{
  createCanvas(400, 400)
}

function mouseDragged()
{
  bubble = new Bubble(mouseX, mouseY, 20)
  bubbles.push(bubble)
}

function draw()
{
  background(220)
  for (let i = 0; i < bubbles.length; i++)
  {
    bubbles[i].show()
    bubbles[i].move()
  }
  if (bubbles.length > 50)
  {
    bubbles.splice(0, 1)
  }
}
```

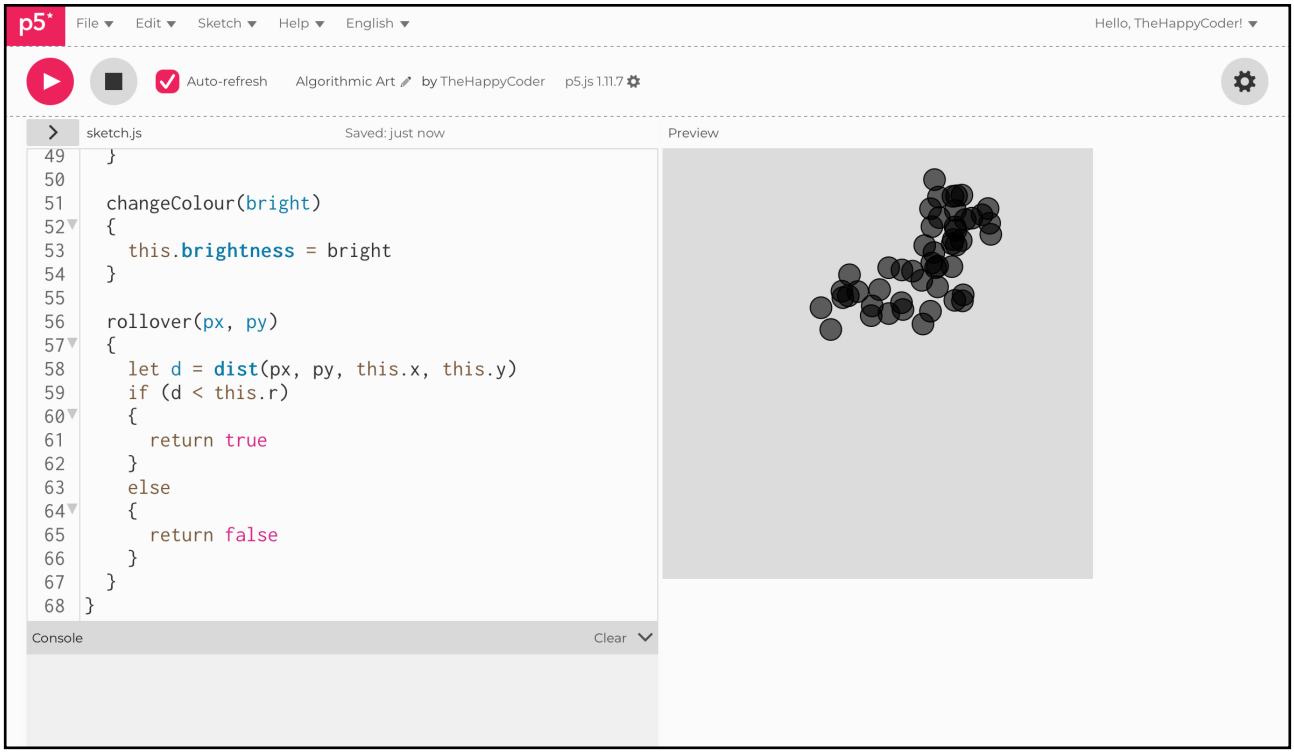
```
class Bubble
{
  constructor(x, y, r)
  {
    this.x = x
    this.y = y
    this.r = r
    this.brightness = 0
  }

  move()
  {
    this.x = this.x + random(-1, 1)
    this.y = this.y + random(-1, 1)
  }

  show()
  {
    fill(this.brightness, 150)
    circle(this.x, this.y, this.r)
  }

  changeColour(bright)
  {
    this.brightness = bright
  }

  rollover(px, py)
  {
    let d = dist(px, py, this.x, this.y)
    if (d < this.r)
    {
      return true
```

```
    }
    else
    {
      return false
    }
  }
}
```

🗒️ Notes

You get something, what you get is the default dark grey (black with alpha) bubbles. We are not finished yet.

Figure D4.9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sketch.js
Saved: just now
Preview
49 }
50
51 changeColour(bright)
52 {
53 this.brightness = bright
54 }
55
56 rollover(px, py)
57 {
58 let d = dist(px, py, this.x, this.y)
59 if (d < this.r)
60 {
61 return true
62 }
63 else
64 {
65 return false
66 }
67 }
68 }
Console
Clear

Sketch D4.10 array of bubbles check

We need to check through the array of bubbles to see if any of the bubbles contain the `mouseX` or `mouseY`. We use an `if()` statement for this job.

```
let bubbles = []
let bubble

function setup()
{
  createCanvas(400, 400)
}

function mouseDragged()
{
  bubble = new Bubble(mouseX, mouseY, 20)
  bubbles.push(bubble)
}

function draw()
{
  background(220)
  for (let i = 0; i < bubbles.length; i++)
  {
    if (bubbles[i].rollover(mouseX, mouseY))
    {
      bubbles[i].changeColour(255)
    }
    else
    {
      bubbles[i].changeColour(0)
    }
```

```
    bubbles[i].show()
    bubbles[i].move()
  }
  if (bubbles.length > 50)
  {
    bubbles.splice(0, 1)
  }
}

class Bubble
{
  constructor(x, y, r)
  {
    this.x = x
    this.y = y
    this.r = r
    this.brightness = 0
  }

  move()
  {
    this.x = this.x + random(-1, 1)
    this.y = this.y + random(-1, 1)
  }

  show()
  {
    fill(this.brightness, 150)
    circle(this.x, this.y, this.r)
  }

  changeColour(bright)
  {
```

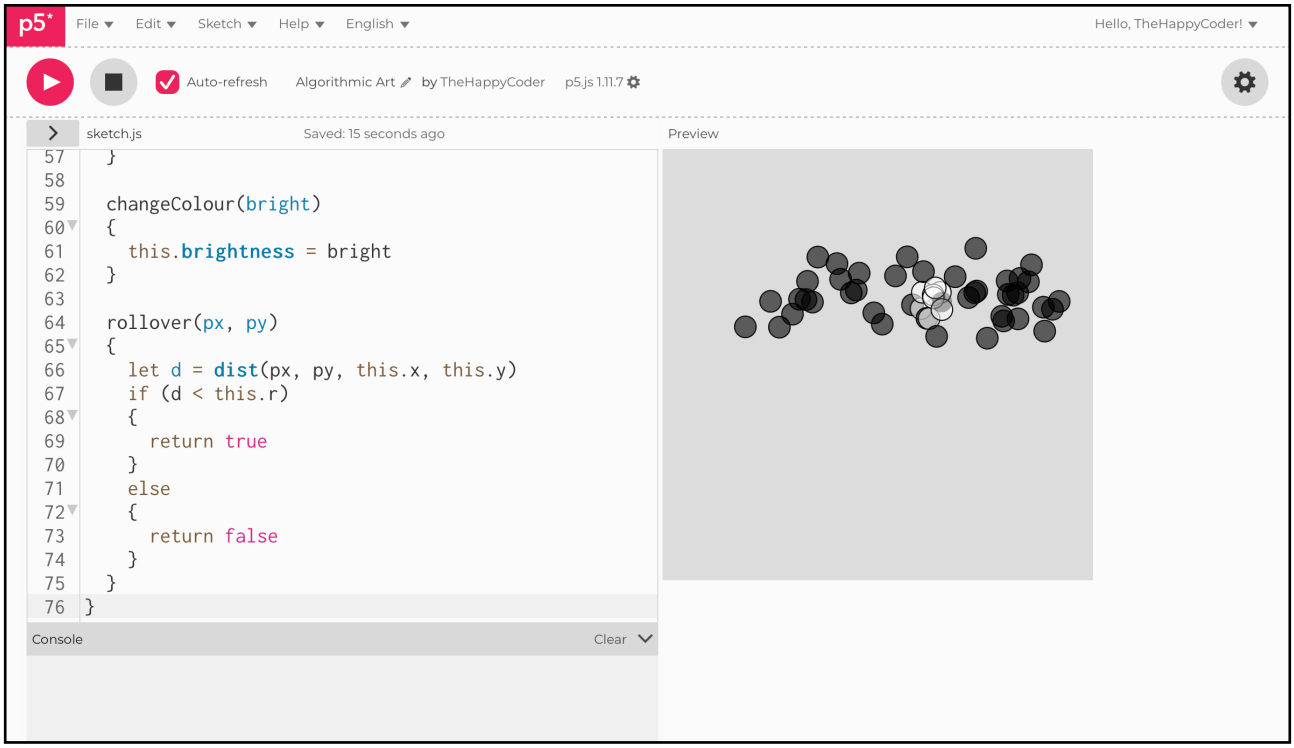
```
    this.brightness = bright
  }

  rollover(px, py)
  {
    let d = dist(px, py, this.x, this.y)
    if (d < this.r)
    {
      return true
    }
    else
    {
      return false
    }
  }
}
```

🗒️ Notes

Now the bubble changes to white when you hover or roll over it.

Figure D4.10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sketch.js
Saved: 15 seconds ago
Preview
57 }
58
59 changeColour(bright)
60 {
61 this.brightness = bright
62 }
63
64 rollover(px, py)
65 {
66 let d = dist(px, py, this.x, this.y)
67 if (d < this.r)
68 {
69 return true
70 }
71 else
72 {
73 return false
74 }
75 }
76 }
Console
Clear

Sketch D4.11 click of a mouse

! remove `mouseDragged()` and all its components.

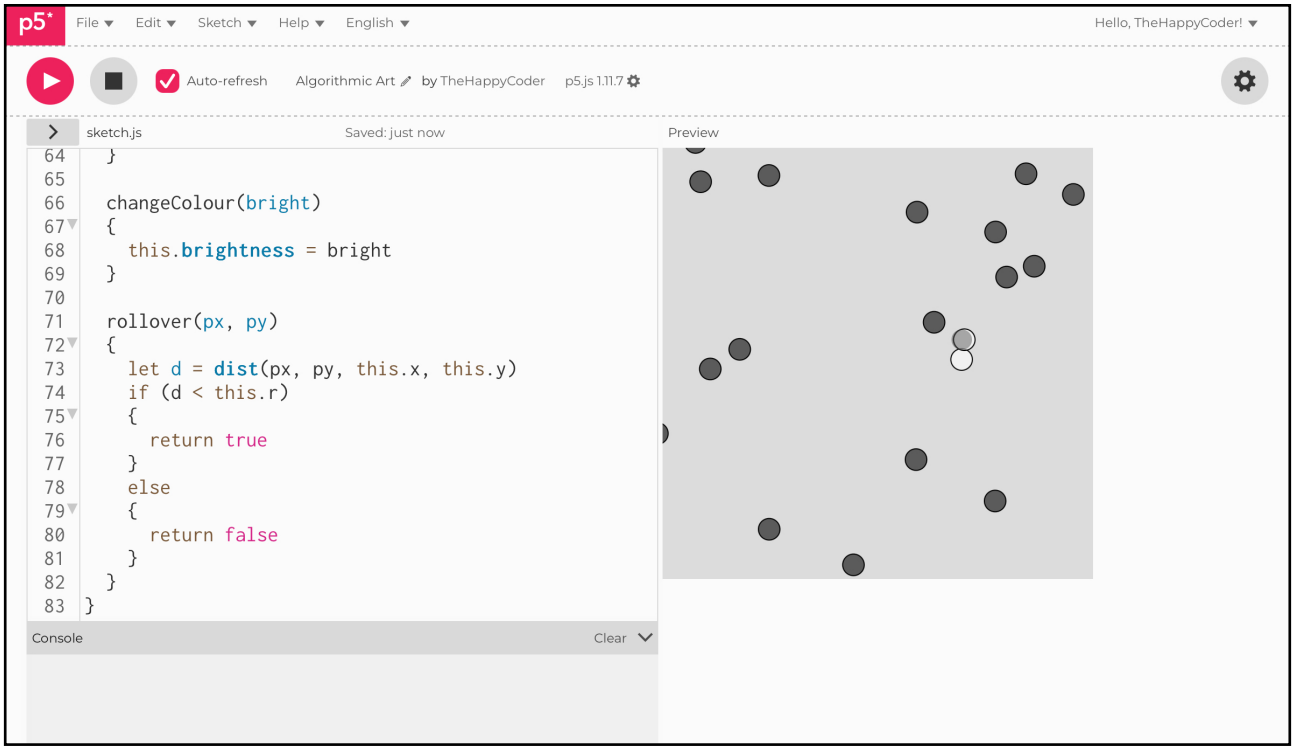
We want to delete a bubble with the click of a mouse. We use the `splice()` function for this. It removes one or more elements from an array and returns those spliced values. First, let us create `20` randomly distributed bubbles and change the colour when we roll over them.

```
let bubbles = []
let bubble

function setup()
{
  createCanvas(400, 400)
  for (let i = 0; i < 20; i++)
  {
    let x = random(width)
    let y = random(height)
    bubble = new Bubble(x, y, 20)
    bubbles.push(bubble)
  }
}

// function mouseDragged()
// {
//   bubble = new Bubble(mouseX, mouseY, 20)
//   bubbles.push(bubble)
// }

function draw()
{
  background(220)
  for (let i = 0; i < bubbles.length; i++)
  {
```

```
    if (bubbles[i].rollover(mouseX, mouseY))
    {
      bubbles[i].changeColour(255)
    }
    else
    {
      bubbles[i].changeColour(0)
    }
    bubbles[i].show()
    bubbles[i].move()
  }
  if (bubbles.length > 50)
  {
    bubbles.splice(0, 1)
  }
}

class Bubble
{
  constructor(x, y, r)
  {
    this.x = x
    this.y = y
    this.r = r
    this.brightness = 0
  }

  move()
  {
    this.x = this.x + random(-1, 1)
    this.y = this.y + random(-1, 1)
  }
```

```
  show()
  {
    fill(this.brightness, 150)
    circle(this.x, this.y, this.r)
  }

  changeColour(bright)
  {
    this.brightness = bright
  }

  rollover(px, py)
  {
    let d = dist(px, py, this.x, this.y)
    if (d < this.r)
    {
      return true
    }
    else
    {
      return false
    }
  }
}
```

Figure D4.11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Algorithmic Art
by TheHappyCoder
p5.js 1.11.7
sketch.js
Saved: just now
Preview
64 }
65
66 changeColour(bright)
67 {
68 this.brightness = bright
69 }
70
71 rollover(px, py)
72 {
73 let d = dist(px, py, this.x, this.y)
74 if (d < this.r)
75 {
76 return true
77 }
78 else
79 {
80 return false
81 }
82 }
83 }
Console
Clear

Sketch D4.12 mousePressed()

Now we introduce `mousePressed()` and when there is a rollover and the mouse is pressed, we delete that `bubble` with `splice()`. The `mousePressed()` function has a `for()` loop that checks the array from the end and works backwards to the beginning to see if any of the bubbles have been clicked on.

The reason for doing it backwards is because of the index numbering. If you delete through starting at the beginning of the array, you will then change the indexing of the whole array, even though you are still working through the array one element at a time. It is possible you will miss an element otherwise.

```
let bubbles = []
let bubble

function setup()
{
  createCanvas(400, 400)
  for (let i = 0; i < 20; i++)
  {
    let x = random(width)
    let y = random(height)
    bubble = new Bubble(x, y, 20)
    bubbles.push(bubble)
  }
}

function mousePressed()
{
  for (let i = bubbles.length - 1; i >= 0; i--)
  {

  }
```

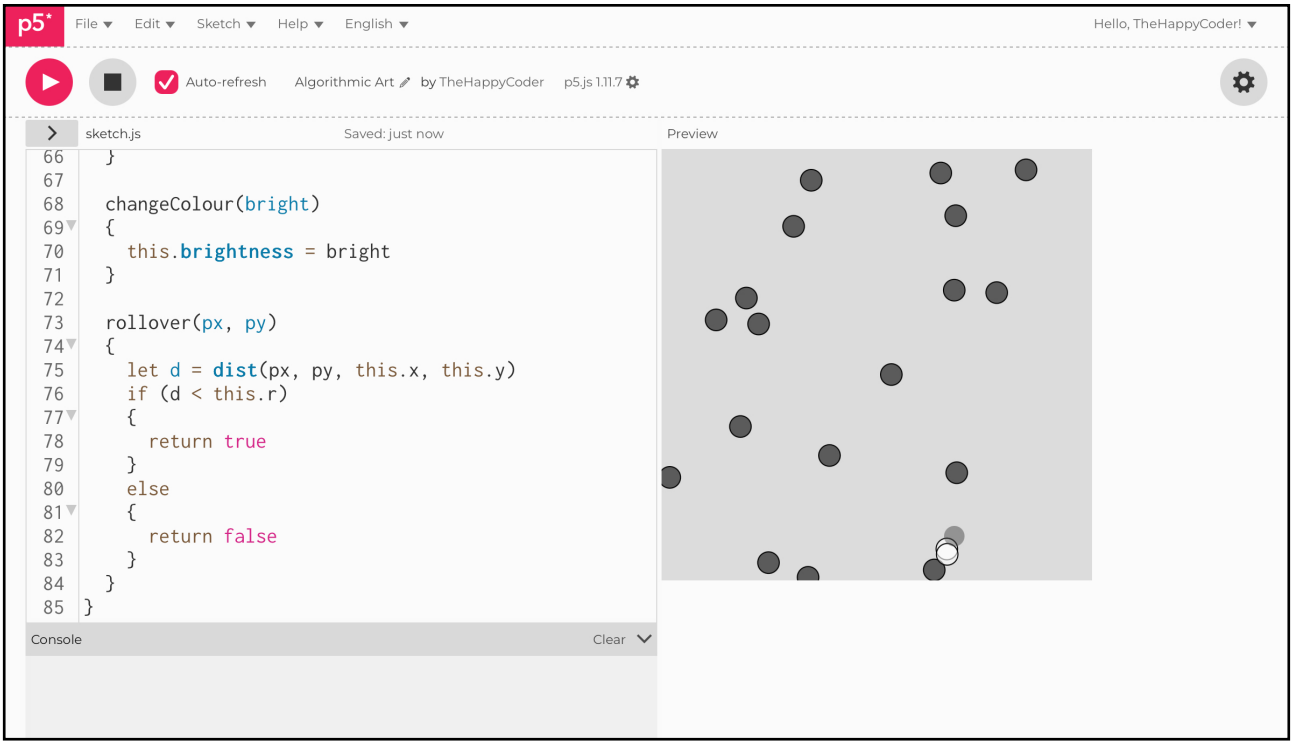
```
}

function draw()
{
  background(220)
  for (let i = 0; i < bubbles.length; i++)
  {
    if (bubbles[i].rollover(mouseX, mouseY))
    {
      bubbles[i].changeColour(255)
    }
    else
    {
      bubbles[i].changeColour(0)
    }
    bubbles[i].show()
    bubbles[i].move()
  }
  if (bubbles.length > 50)
  {
    bubbles.splice(0, 1)
  }
}

class Bubble
{
  constructor(x, y, r)
  {
    this.x = x
    this.y = y
    this.r = r
    this.brightness = 0
  }
```

```
  move()
  {
    this.x = this.x + random(-1, 1)
    this.y = this.y + random(-1, 1)
  }

  show()
  {
    fill(this.brightness, 150)
    circle(this.x, this.y, this.r)
  }

  changeColour(bright)
  {
    this.brightness = bright
  }

  rollover(px, py)
  {
    let d = dist(px, py, this.x, this.y)
    if (d < this.r)
    {
      return true
    }
    else
    {
      return false
    }
  }
}
```

🗒️ Notes

Nothing new is happening just yet. We are just checking; we have an empty `for()` loop at the moment.

Figure D4.12


p5*
File
Edit
Sketch
Help
English
Hello, TheHappyCoder!
Auto-refresh
Algorithmic Art
by TheHappyCoder
p5.js 1.11.7
sketch.js
Saved: just now
Preview
66 }
67
68 changeColour(bright)
69 {
70 this.brightness = bright
71 }
72
73 rollover(px, py)
74 {
75 let d = dist(px, py, this.x, this.y)
76 if (d < this.r)
77 {
78 return true
79 }
80 else
81 {
82 return false
83 }
84 }
85 }
Console
Clear

Sketch D4.13 mouse delete

Now we can delete a bubble when it is clicked.

```
let bubbles = []
let bubble

function setup()
{
  createCanvas(400, 400)
  for (let i = 0; i < 20; i++)
  {
    let x = random(width)
    let y = random(height)
    bubble = new Bubble(x, y, 20)
    bubbles.push(bubble)
  }
}

function mousePressed()
{
  for (let i = bubbles.length - 1; i >= 0; i--)
  {
    if (bubbles[i].rollover(mouseX, mouseY))
    {
      bubbles.splice(i, 1)
    }
  }
}

function draw()
{
  background(220)
```

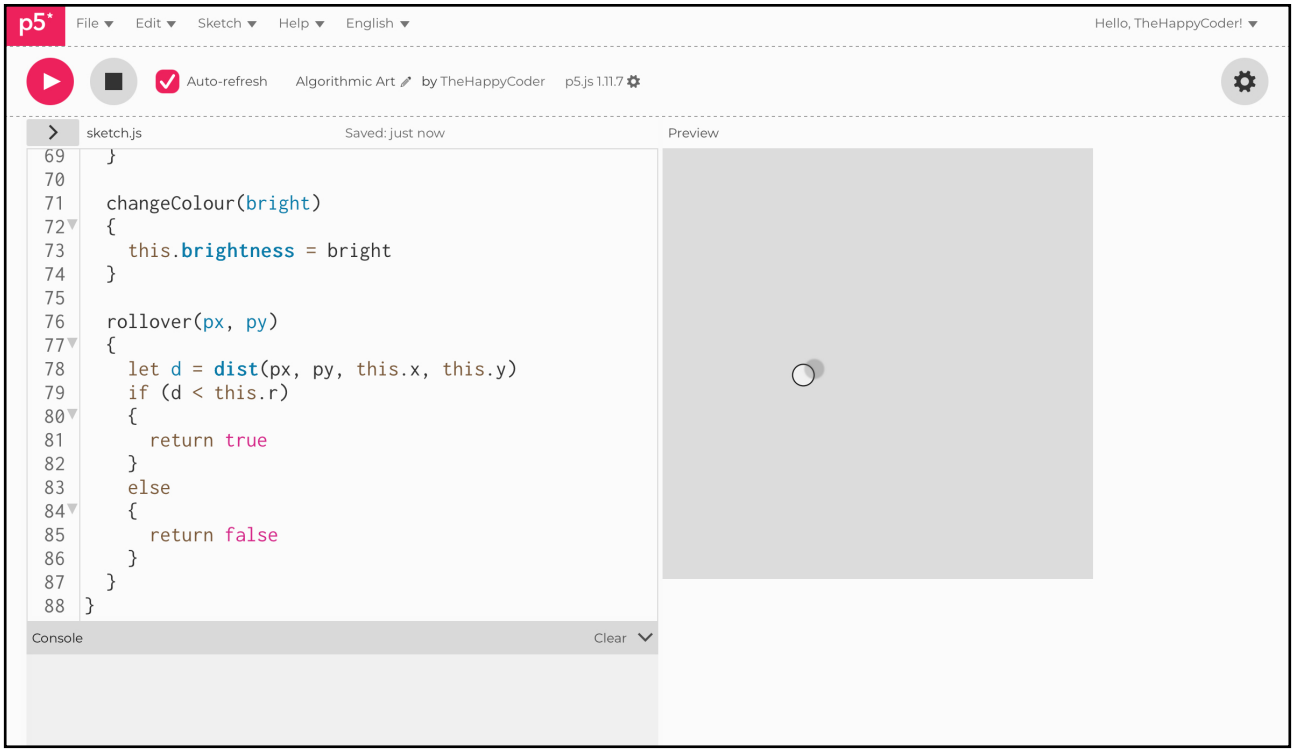
```
  for (let i = 0; i < bubbles.length; i++)
  {
    if (bubbles[i].rollover(mouseX, mouseY))
    {
      bubbles[i].changeColour(255)
    }
    else
    {
      bubbles[i].changeColour(0)
    }
    bubbles[i].show()
    bubbles[i].move()
  }
  if (bubbles.length > 50)
  {
    bubbles.splice(0, 1)
  }
}

class Bubble
{
  constructor(x, y, r)
  {
    this.x = x
    this.y = y
    this.r = r
    this.brightness = 0
  }

  move()
  {
    this.x = this.x + random(-1, 1)
    this.y = this.y + random(-1, 1)
```

```
  }

  show()
  {
    fill(this.brightness, 150)
    circle(this.x, this.y, this.r)
  }

  changeColour(bright)
  {
    this.brightness = bright
  }

  rollover(px, py)
  {
    let d = dist(px, py, this.x, this.y)
    if (d < this.r)
    {
      return true
    }
    else
    {
      return false
    }
  }
}
```

🗒️ Notes

You should see the bubble change colour still when you hover over it, but then when you click on it, it should disappear.

Figure D4.13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86 }
87 }
88 }
Console
Clear