

**TOP SECRET**

{ 20 intriguing apps to code }

**bitsbox**  
VOLUME 15.11



# HOW TO BITSBOX

With Bitsbox, you can code real apps that work on gadgets like phones and tablets. All you need is a computer with internet and a working brain.

1

## Find a computer with a physical keyboard.

The coding part of Bitsbox isn't meant to be done on tablets just yet.

2

## Open a web browser and go to [bitsbox.com](http://bitsbox.com)

We recommend Chrome, Firefox, Safari, or Internet Explorer 11.

3

## Click Get Started.

Have fun!

## How can I run my apps on a phone or a tablet?

Before you do these steps, install a QR reader app on your gadget. Go here for a couple of suggestions: [bitsbox.com/QRApps](http://bitsbox.com/QRApps)



- 1 On a computer, open the Bitsbox app you built.
- 2 Click the sharing icon  in the corner of the screen.
- 3 Scan the on-screen QR code with your gadget.

It looks like this!  




When you change the code on your computer, the app on your gadget changes, too!

**TOP SECRET**

A lot of people think that coding is a secret language, that only those with top security clearance can ever know how it all works. At Bitsbox, we reject that idea. **Coding is for everyone!**

In this book you'll find apps about spies, detectives, hackers, drones, mysteries, and even archaeologists! We hope you'll help us share the "secret of coding" with everyone you know.

**See you back at HQ,**

**Aidan, Scott, Anastasia, Jeff,  
Alexandra + Emma**

# mini apps to get you prepared

## 7 9 8 1 Grab Your Badge

```
1 stamp('wallet')
2 text('Special Agentface')
```



Can you put your name instead?

## 5 9 5 8 Get Your Orders

```
1 fill('spy phone')
2 stamp('hologram')
```

Can you change the 'hologram' to a 'monkey'?

## 1 8 1 7 Hit the Road

```
1 car = stamp('car7')
2 car.tap = sing
```

What happens if you change **sing** to **explode**?

## 6 7 6 1 Save the World!

```
1 function make() {
2   bot = stamp('bot').move()
3   bot.tap = explode
4 }
5 repeat(make,9)
```

How would you make more than 9 bots?



1 5 1 3

# PLAN YOUR NEXT MISSION

It's your city. Make sure you're protecting all the important sites.

Start by typing in this code:

```
1 fill('city4')
```

That gives us a map of the city.

Now let's draw a set of lines for where you want to drive.

Start a **line** command like so...

```
1 fill('city4')
2 line(
```



Now move your cursor across the tablet on your screen.

Do you see the little numbers?

They represent an exact location on the screen.

Put your cursor near the location "2" on the map and look at the numbers.

Type the "x" number first, then a **comma**.

Type the "y" number second, then a **comma**.

Type a third number for the thickness of the line.

```
1 fill('city4')
2 line(485,340,10)
```

Boom! You drew a line on the map.

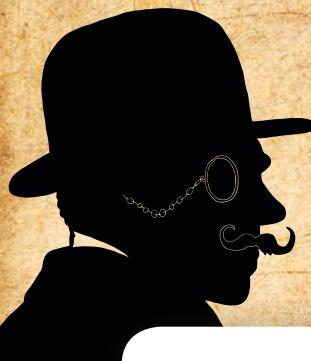
Can you add more lines to draw a path between all of the map's locations?

1 4 9 3

8 9 3 0

The power of  
programming,  
right at your  
fingertips.

# WANTED: MR.X



Make your own wanted poster for the evil Mr. X. Or maybe for your annoying little brother.

```

1 fill('poster')
2 stamp('mr x')
3
4 crimes = 10
5 reward = 1000
6 answer = crimes * reward
7 words = 'WANTED $' + answer
8 text(words,100,850,80,'impact')
```



## A MOST CALCULATING VILLAIN

Computers are masters when it comes to math. In programming, we use the `*` character for multiplication. Line 6 calculates an answer equal to `crimes` times `reward`.

**Can you change the numbers to increase the reward for Mr. X?**

# Fingerprint Detective

```

1 fill('desk')
2 clue = stamp('print',30)
3 mag = stamp('mag',550,800)
4
5 function touching() {
6   mag.move(x,y)
7   if (mag.hits(clue)) {
8     clue.size(200)
9   }
10 }
```



## A TOUCHING TALE

The magnifying glass moves to where you're touching the screen. Line 7 uses an if statement and the `.hits()` command to test if you've found the fingerprint.

Can you make the clue appear in a different spot on the screen?

HINT:  
`clue.move()`



3 3 8 9

Mr. X is  
"xtra" sneaky.

# Where in the World is Mr. X?

Can you change the code to make the line a different color?

You found his fingerprint, but can you find the man?  
Place pins on the globe to track his movements.

```
1 fill('north sea')
2 stamp('pin',200)
3
4 function tap() {
5   line(x,y,6,'red')
6   stamp('pin',x,y,200)
7 }
```

## GET IN LINE

Line 5 draws a line from the center of the screen to the location `(x,y)`. Using `x` and `y` inside a `tap()` function always refers to the point on the screen where you just tapped.

Line 6 uses `x` and `y` in precisely the same way!

# Hack Attack!

2 5 3 6

# HACKER DEFENSE

```
1 fill('black')
2 bg = stamp('cyber')
3 me = stamp('server',100)
4
5 function spawn() {
6     it = stamp('virus',50)
7     it.move().aim(me)
8     it.move(DOWN,300)
9     time = random(7000,15000)
10    it.move(375,512,time)
11    it.tap = pop
12 }
13 repeat(spawn,20)
14
15 function loop() {
16     bg.rotate(RIGHT,.1)
17     if (me.hits('virus')) {
18         me.explode()
19     }
20 }
```

Hackers are sending viruses to take down your server. Zap 'em before they reach the center.



## MULTIPLE MOVES

The `spawn()` function is neat. Every time you call it, it creates a new virus. To position the virus, it calls `.move()` twice: first to position it randomly, and again to move it away from the center.

Can you make more viruses?

Hint: Change the `repeat()` command.

Seriously, though.  
Don't panic.

PANIC

BUTTON



Hold down the big red button until the alarm goes off. Grownups will love you.

Can you make a totally  
different sound?

Hint: sound('rooster')

```
1 stamp('alarm')
2 count = 0
3
4 function touching() {
5   count = count + 5
6   fill(count,0,0)
7   if (count == 250) {
8     song('klaxon')
9   }
10 }
```

### RED ALERT!

If you use the `fill()` command with three numbers, you can make any color you like.

The numbers can be anything from 0 to 255, and they describe how much red, green, and blue you want to mix.

All the colors on your screen are made from a combination of red, green, and blue light.

6 0 1 9

Careful  
not to burn  
yourself!

# Invisible Ink



Can you change the "ink"  
to another stamp?

Drag the quill pen to draw with  
invisible ink. Then drag the flame  
to reveal your secret message.

```
1 fill('parchment')
2 fire = stamp('flame', 668, 925, 100)
3 quill = stamp('quill2', 100, 886, 400)
4
5 function select() {
6   brush.size(100)
7   brush = this
8   brush.size(400)
9 }
10
11 quill.tap = select
12 fire.tap = select
13 brush = quill
14
15 function drag() {
16   brush.move(x,y)
17   if (brush == quill) {
18     spot = stamp('crater',x,y,1)
19   } else {
20     find('crater').forEach(check)
21   }
22 }
23
24 function check(spot) {
25   if (fire.hits(spot)) {
26     spot.size(50,500)
27   }
28 }
```



## SMALL = INVISIBLE

The ink that you draw with in this game isn't actually invisible. It's just very, very small. Line 18 stamps a mark at size 1, which is so tiny you can't easily see it until the flame makes it grow.

3 5 1 6

2-PLAYER  
APP!

# MESSAGE IN A BOTTLE

```
1 fill('beach')
2 time = 2000
3
4 function tap() {
5   send(prompt('say what?'))
6   a = stamp('bottle3',375,1200,400)
7   a.move(575,600,time)
8   a.size(0,time)
9 }
10
11 function get(data) {
12   b = stamp('bottle3',100,600,1)
13   b.move(375,1200,time)
14   b.size(300,time)
15   words = data
16   delay(read,time)
17 }
18
19 function read() {
20   stamp('scroll',380,300)
21   text(words,100,300,'hand')
22 }
```

You're alone on a desert island.  
Good thing you have so many bottles!

## SEND AND GET

Bitsbox's `send()` and `get()` commands are this app's bottled lightning. Here, we use `send()` to mail a virtual letter to any gadgets running the app, and `get()` to read what they send back.



Visit [bitsbox.com/howtoshare](https://bitsbox.com/howtoshare) to learn how to play this app with another person.

# i spy

## 3 confounding code-free challenges

### GAME 1

Can you find all 5 fish?  
(Hint: whales aren't fish.)

### GAME 2

Find 2 campfires, a boat, a red motorcycle, 2 hot air balloons, and 2 lightbulb factories.

### GAME 3

Challenge your friend! "*I spy with my little eye something...red!*"





3 2 6 6 ACT 1:

# GEM HEIST

Tap the screen to drop down and get the gem.  
Watch out for those lasers!



## FOLLOW ME!

Line 28 shows how you can make one stamp follow another. When the spy .hits() the gem, the gem moves to the spy's x and y position.

```
1 fill('gallery')
2 spy = stamp('kat',390,200)
3 gem = stamp('gem',390,740,150)
4 dir = DOWN
5
6 stamp('laser2',100,700,5,5)
7 stamp('laser2',600,650,5,10)
8 stamp('laser2',200,800,5,-5)
9 stamp('laser2',700,350,5,0)
10
11 function tap() {
12   spy.move(dir,100,200)
13 }
14
15 function transform(laser) {
16   if (laser.width < 10) {
17     laser.size(900,random(1000,2000))
18   }
19   if (laser.width > 800) {
20     laser.size(0,random(1000,2000))
21   }
22 }
```

THE 4TH NUMBER IN THESE COMMANDS ROTATES THE LASERS.

*Lasers.  
Why is it always lasers?*



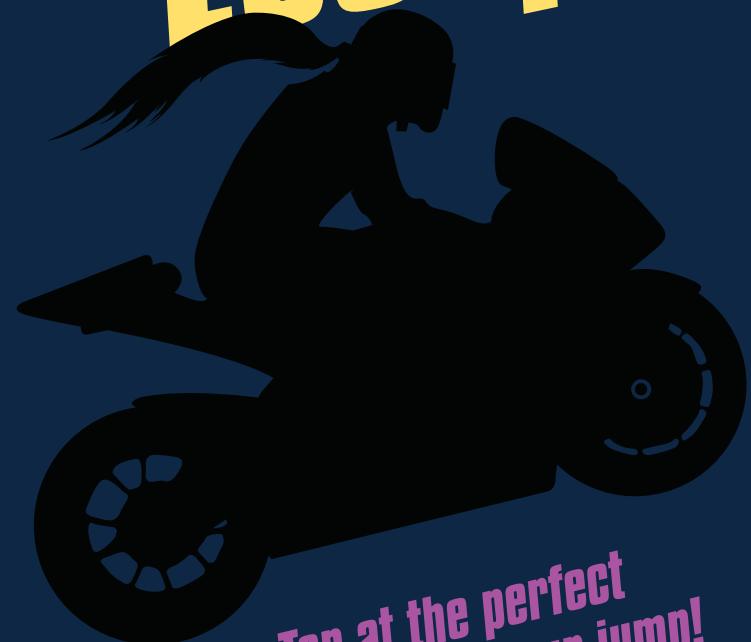
```
23
24 function loop() {
25   find('laser2').forEach(transform)
26   if (spy.hits(gem)) {
27     dir = UP
28     gem.move(spy.x,spy.y)
29   }
30   if (spy.hits('laser2')) {
31     spy.pop()
32     loop = null
33     sound('alarm')
34   }
35 }
```

Can you add a victory message once you make it off the screen?

2096

ACT 2:

# Motorcycle Escape



Tap at the perfect  
time to make your jump!

```
1 fill('night')
2 cone = stamp('cone3', 760, 535, 100)
3 bike = stamp('bike', 150, 500, 150)
4 speed = 10
5
6 function tap() {
7   bike.move(NORTH, 150).rotate(-30)
8   bike.move(150, 500, 1200).rotate(0, 1000)
9   speed = speed + 1
10 }
11
12 function loop() {
13   cone.move(LEFT, speed)
14   cone.wrap()
15   if (bike.hits(cone)) {
16     bike.explode()
17   }
18 }
```

## THAT'S A WRAP

It may seem like there are an infinite number of obstacles in this game, but there's really only one cone that moves LEFT constantly. The `wrap()` command detects when it's moved off the screen and automatically "wraps" it to the opposite side.

1 2 6 8

# MUMMY MEMORY

A game that's as old as the pyramids. Flip the tiles to match the pictures.



Can you out-think  
a guy who keeps  
his brain in a jar?

You can add other pictures to the game by typing more stamp names into the array on lines 26 and 27. Try 'pic4', 'pic5', 'pic6', and so on. Be sure to add each one twice!

```
1 fill('sandstone')
2 choice = null
3
4 function flip(it) {
5   it.size(1)
6   if (choice == null) {
7     choice = it
8   } else {
9     if (it.picture == choice.picture) {
10       it.hide()
11       choice.hide()
12     }
13   it.size(150,1000)
14   choice.size(150,1000)
15   choice = null
16 }
17 }
18
19 function place(name) {
20   s = stamp(name,150).move()
21   block = stamp('block2',150)
22   block.move(s.x,s.y)
23   block.picture = s.name
24   block.tap = flip
25 }
26 tiles = ['pic','pic','pic2',
27           'pic2','pic3','pic3']
28
29 tiles.forEach(place)
```



## MOVING RANDOMLY

Do you notice how every time you run this program, the tiles scatter across the screen? If you call the move() command without any numbers in it, your stamp jumps to a random spot on the screen.

3 6 5 8

# DESERT DIG

Sweep the sand to  
find the treasures.



```
1 fill('sandbox')
2
3 function place(name) {
4   stamp(name).move().size()
5 }
6 place('pot2')
7 place('coin2')
8 place('knife2')
9
10 function sand() {
11   place('sand2')
12 }
13 repeat(sand,250)
14
15 function sweep(item) {
16   if (item.hits(x,y)) {
17     item.size(0,200)
18   }
19 }
20
21 function touching() {
22   find('sand2').forEach(sweep)
23 }
```

Can you add more  
treasures to uncover?

## TINY HIDING

There are two ways to hide a stamp.  
One is to use the `.hide()` command.

Another is to make it size 0, which is  
what's happening on line 17.

The number 200 tells the command  
to animate the resizing over 200  
milliseconds (1/5th of a second).



5 7 4 2

# SPY RACER

Drive fast.  
Hug curves.  
Blast robots.

① CAR!

```
1 fill('onyx')
2 me = stamp('car7', 375, 900, 150)
3
4 function touching() {
5   me.move(x, 900, 300)
6   me.aim(x, y)
7 }
8
9 function tap() {
10  r = stamp('rocket6', me.x, me.y)
11  r.rotate(me.rotation)
12  r.move(UP, 1600, 2000)
13  sound('rocket', 20)
14 }
```

② ROAD!

```
15
16 lane = 300
17 time = 1500
18 count = 0
19
20 function swerve() {}
21 function danger() {}
22 function drones() {}
23
24 function loop() {
25   mid = 375 + Math.sin(count) * lane
26   x1 = mid - lane
27   x2 = mid + lane
28   stamp('pillar', x1, 0).move(DOWN, 1300, time).back()
29   stamp('pillar', x2, 0).move(DOWN, 1300, time).back()
30   stamp('circle', mid, 0).move(DOWN, 1300, time).back()
31   swerve()
32   danger()
33   drones()
34 }
```

**CODING ONWARD**

Can you add a  
second type of enemy?

### 3 CURVES!

```
35 curve = 0
36
37 function swerve() {
38   count = count + curve / 100
39   if (random(10) == 1) {
40     curve = random(10) + count/10
41     lane = lane + random(-12,10)
42     lane = Math.max(lane,100)
43   }
44 }
45 }
```

### 4 DANGER!

```
46 pts = 0
47 score = text(pts,'impact',20,50,'silver')
48
49 function danger() {
50   pts = pts + 10
51   score.change(pts)
52   if (me.hits('pillar') || me.hits('drone2')) {
53     loop = null
54     me.explode()
55     sound('evil laugh')
56     stamp('skull6',375,0).move(DOWN,500,time)
57   }
58 }
59 }
```

### 5 DRONES!

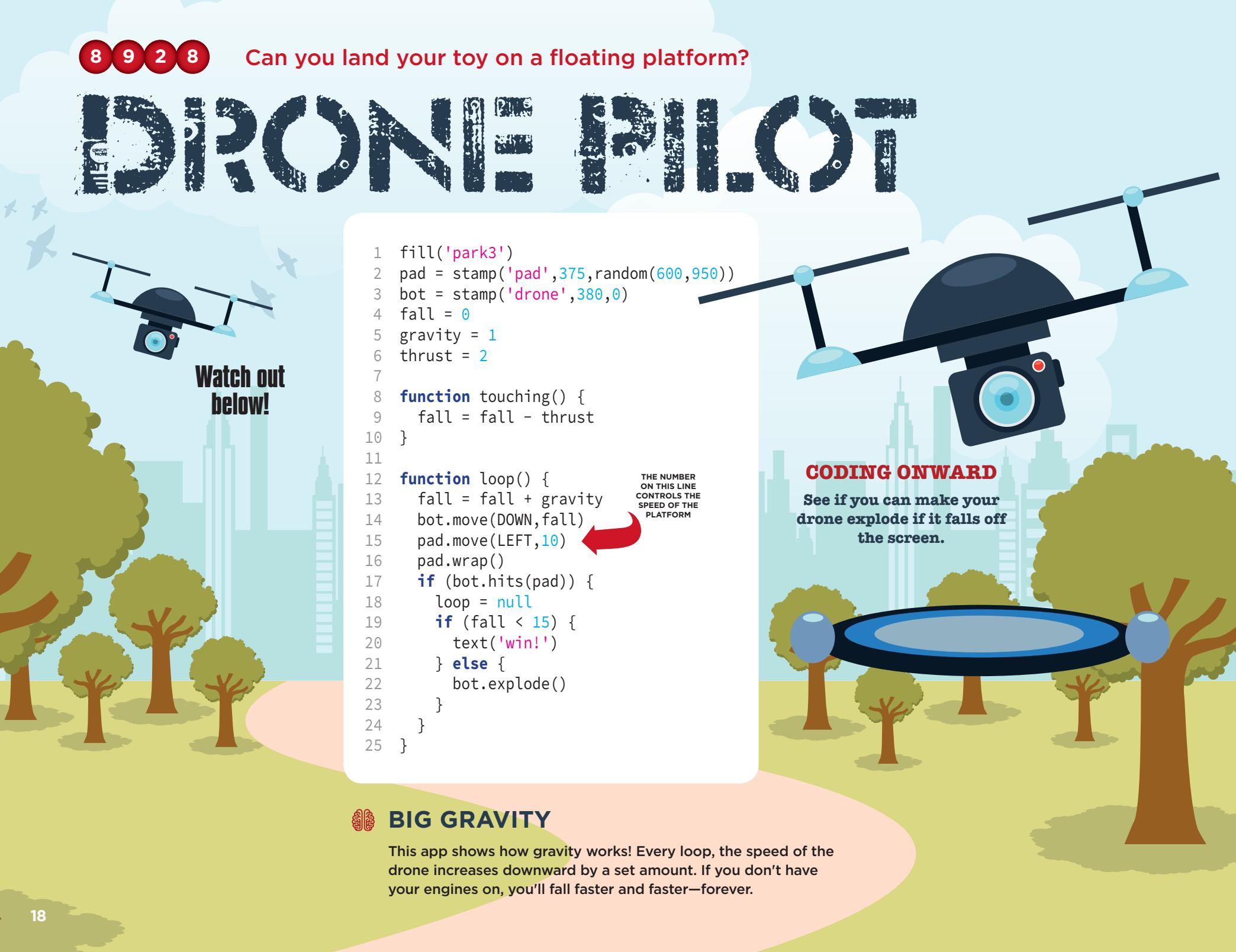
```
60
61 function zap(drone) {
62   if (drone.hits('rocket6')) {
63     drone.explode()
64     sound('nuke')
65     pts = pts + 1000
66   }
67 }
68
69 function drones() {
70   find('drone2').forEach(zap)
71   if (random(30) == 1) {
72     enemy = stamp('drone2',random(768),0)
73     enemy.move(DOWN,1500,10000)
74     sound('droid')
75   }
76 }
77 song('unstable')
```



8 9 2 8

Can you land your toy on a floating platform?

# DRONE PILOT



Watch out  
below!

```

1  fill('park3')
2  pad = stamp('pad', 375, random(600,950))
3  bot = stamp('drone', 380, 0)
4  fall = 0
5  gravity = 1
6  thrust = 2
7
8  function touching() {
9    fall = fall - thrust
10 }
11
12 function loop() {
13   fall = fall + gravity
14   bot.move(DOWN, fall)
15   pad.move(LEFT, 10)
16   pad.wrap()
17   if (bot.hits(pad)) {
18     loop = null
19     if (fall < 15) {
20       text('win!')
21     } else {
22       bot.explode()
23     }
24   }
25 }
```

THE NUMBER  
ON THIS LINE  
CONTROLS THE  
SPEED OF THE  
PLATFORM



## CODING ONWARD

See if you can make your drone explode if it falls off the screen.

### BIG GRAVITY

This app shows how gravity works! Every loop, the speed of the drone increases downward by a set amount. If you don't have your engines on, you'll fall faster and faster—forever.

# CREATIVE CODING CHALLENGES

Try coding these apps yourself!

CREATE A NEW APP WITH THIS NUMBER:

1 1 7 1

## DRONE PROGRAMMER

**CHALLENGE** Draw a park with a few trees and a small drone in its center.

**BONUS 1** As you tap, draw blue lines that are a path for the drone.

*Hint: Where in the World is Mr. X?*

**BONUS 2** Make the drone fly along the line to the spot where you tap.



'park4'



'drone'



'tree5'

SOUNDS:

'drone'  
'bird'

CREATE A NEW APP WITH THIS NUMBER:

5 2 5 6

## LAUNCH CONTROL

**CHALLENGE** Make an app with a big button on the screen. When you push the button, a rocket appears at the bottom of the screen.

**BONUS 1** If you tap a second time, some text appears that says: "READY!"

**BONUS 2** Tap a third time, and the rocket launches upward with an appropriate sound.



'button wall'



'rocket4'

SOUND:

'rocket'

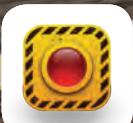
LAUNCH CONTROL: 1039  
DRONE PROGRAMMER: 4275

Need a helping hand? Create new apps with  
these numbers to get some ideas!

# Use these stamps...

...(& sounds & fills & songs) to make any app  
your own! Just don't forget to put single  
quotes around them in your code, like this:

```
stamp('gear') sound('howl') fill('dirt') song('duet')
```



alarm



badge



bike



block2



bot



bottle3



car7



coin2



cone3



drone



flag2



gem



gull



kat2



mag



mummy



pic4



pin



pot2



print



rocket6



scroll



virus

## Songs

angelo

anger

china snow

country waltz

march

mercury

polka

rock party

royal

skies

## Fills



beach



big ben



city3



egypt



gallery



north sea



park3



rooftops



sandstone



spy phone

## More stuff online



Look for more when you're coding at [bitsbox.com!](http://bitsbox.com)