The grid below represents the pixels on a computer screen.

Be the computer and use the letters in the squares to make an image.







W (White)

| W | W | В | В | W | W | W | W |
|---|---|----|---|----|----|----|----|
| W | В | В | В | В | W | W | W |
| R | В | Br | В | В | W | W | Br |
| W | В | В | В | Br | Br | Br | Br |
| W | В | В | В | Br | Br | Br | Br |
| W | W | В | В | В | В | В | W |
| W | W | В | В | В | W | W | W |
| W | W | R | W | R | W | W | W |





#FFFF32

Complete the table below using the colour mixer to work out what each colour should be.

#000000

#FFFFF

#0000FF

Use the colour mixer below to help you find

bit.ly/3bzoqvk

#FF1A1A

#19AC19 (

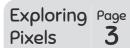
#FFAE19

#764A1D

Then use your completed table to complete the drawing by matching the hex number in each pixel.

| #0000FF |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| #0000FF | #0000FF | #0000FF | #764A1D | #764A1D | #764A1D | #0000FF |
| #0000FF | #0000FF | #764A1D | #764A1D | #764A1D | #764A1D | #764A1D | #0000FF |
| #0000FF | #0000FF | #764A1D | #0000FF | #0000FF | #0000FF |
| #0000FF | #0000FF | #FFFF32 | #764A1D | #000000 | #764A1D | #0000FF |
| #0000FF | #FFFF32 | #FFFF32 | #764A1D |
| #FFFF32 | #FFFF32 | #0000FF | #764A1D |
| #FFFF32 | #0000FF | #0000FF | #0000FF | #764A1D |
| #0000FF | #0000FF | #0000FF | #0000FF | #764A1D |
| #0000FF | #0000FF | #0000FF | #0000FF | #764A1D | #0000FF |
| #19AC19 | #19AC19 | #19AC19 | #19AC19 | #19AC19 | #764A1D | #19AC19 | #19AC19 |
| #19AC19 | #19AC19 | #19AC19 | #19AC19 | #19AC19 | #19AC19 | #764A1D | #19AC19 | #19AC19 |
| #19AC19 | #FFAE19 | #764A1D | #764A1D | #FFAE19 | #764A1D | #19AC19 | #19AC19 | #19AC19 |
| #19AC19 | #FFAE19 | #19AC19 | #19AC19 | #FFAE19 | #19AC19 | #19AC19 | #19AC19 | #19AC19 |
| #19AC19 | #19AC19 | #19AC19 | #19AC19 | #19AC19 | #FFAE19 | #FFAE19 | #FFAE19 | #FFAE19 | #FFAE19 | #FFAE19 | #19AC19 | #19AC19 | #19AC19 | #19AC19 |





Here's a larger picture for you to colour in!

Use the colour table you made on the previous page to look up what colour each pixel should be. #FFFF32 | #FFFF532 | #FFFF532 | #FFF #FFFF32 | #FFFF532 | #FFFF532 | #FFF #FFFF32 | #FFFF32 | #764A1D | #0000FF | #000000 #0000FF #19AC19 #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 #19AC19 | #FFFFFF | #764A1D | #FFFF32 | #FFF732 | #FFFF32 | #FFFF732 | #FFFF772 | #FFFF32 | #FFFF32 | #FFFF32 | #764A1D | #764A1D | #0000FF | #0000FF | #0000FF #FFFF32 | #FFF732 | #FFFF32 | #FFF732 | #FFFF32 | #FFF732 | #FFF73 #FFFF32 | #FFFF32 | #FFFF52 | #FFFFFF | #FFFFFF | #FFFFFF | #FFFFFF | #FFFFFF | #FFFFFF | #FFFFF | #FFFF32 | #FFFFA32 | #FFFA32 | #FFFFA32 | #FFFFA32 | #FFFA32 | #FFA32 | #FA32 | #FFFF32 | #FFF732 | #FFFF32 | #FFF72 | #FFFF32 | #FFF732 #FFFF32 | #FFF72 | #FFFF32 | #FFFF53 #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 | #0000FF #764A1D | #764A1 #764A1D | #764A1D | #764A1D | #0000FF | #FFFF32 | #FFFF32 | #764A1D | #764A1D | #764A1D | #764A1D | #764A1D | #FFFF32 #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 | #0000FF | #0000FF #0000FF #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 | #0000FF | #0000FF #0000FF | #0000FF | #0000FF | #0000FF | #764A1D | #764A1D | #FFFF32 | #FFF32 | #FFFF32 | #FFF532 | #FFFF532 | #FFF532 | #FFF532 | #FFF532 | #FFF53 #FFFF32 | #0000FF #0000FF #0000FF | #0000FF | #19AC19 | #0000FF | #FFFF32 | #FFFFA32 | #FFFA32 | #FFFFA32 | #FFFFA32 | #FFFFA32 | #FFFFA32 | #FFFFA32 | #FFFA32 | #FFFFA32 | #FFFFA32 | #FFFFA32 | #FFFFA32 | #FFFA32 | #FFF #FFFF32 | #FFF732 | #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 | #FFF732 | #FFF73 #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 | #764A1D | #764A1D | #764A1D | #764A1D | #FFFF32 | #64A1D | #764A1D #19AC19 | #0000FF | #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 #FFFF32 | #764A1D | #764A1D | #764A1D | #764A1D | #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 | #FFFF32 | #19AC19 | #0000FF | #19AC19 #764A1D | #764A1D | #764A1D | #FFFF32 | #FFFF3 #764A1D | #FFFF32 | #FFFF532 | #FFFF532 | #FFFF532 | #FFFF532 | #FFFF532 | #FFFFF532 | #FFFFF532 | #FFFF532 | #FFFF532 | #FFFF532 | #FFFF532 | #FFFF532 | #FFFFF532 |

Find out more about how computers represent data: csfieldguide.org.nz/en/chapters/data-representation/

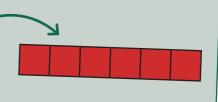


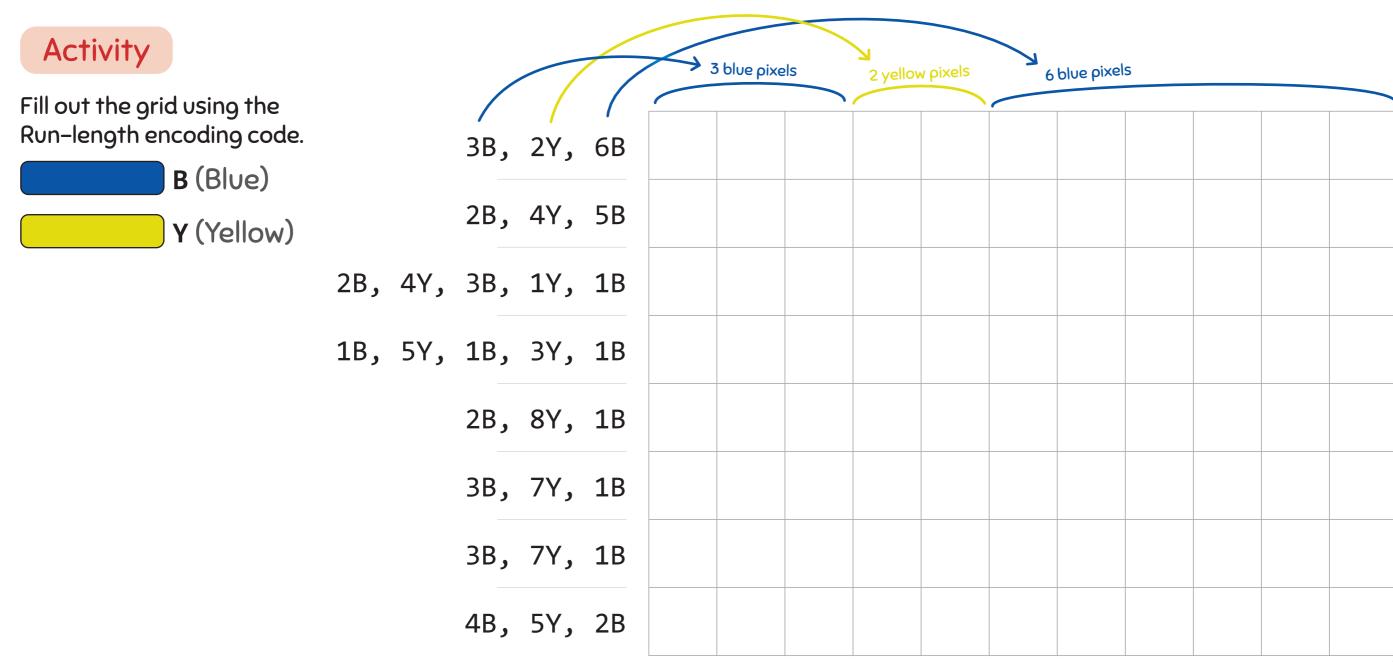
Squishing it down!

You may have noticed that lots of pixels next to each other are the same colour. So we can use a code call Run-length encoding that squishes each row of pixels into a much shorter code.

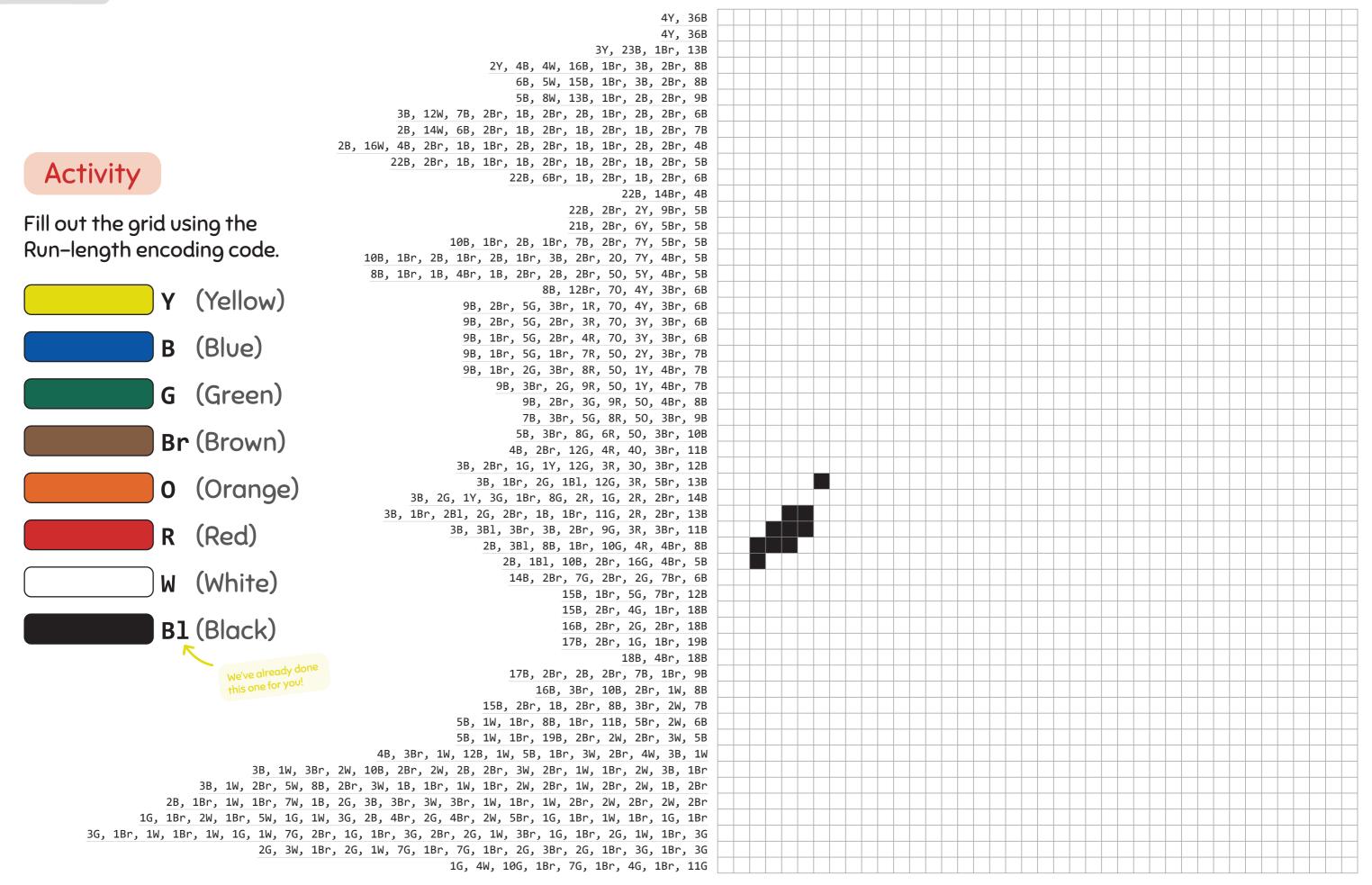
Example

If you had to read out these pixels, instead of saying "R, R, R, R, R, R" you might say "6 lots of R".











Here's a challenge for you! Remember run length encoding?

We have given you the encoding for the large image below. Use the next page to create the image.



You may want to cross out each row as you complete it to keep track of where you are up to!

```
3B, 13G, 25B, 2Br, 36B
Row 1
        2B, 15G, 5B, 3W, 15B, 2Br, 36B, 1W
Row 2
        1B, 17G, 3B, 5W, 5B, 19Br, 15B, 3W, 8B, 3W
Row 3
Row 4
        20G, 7W, 3B, 21Br, 12B, 6W, 6B, 4W
        20G, 8B, 4Br, 17R, 4Br, 8B, 9W, 9B
        21G, 6B, 3Br, 3R, 3W, 1R, 3W, 1R, 3W, 1R, 1W, 1R, 1W, 3R, 3Br, 6B, 11W, 2B, 4G, 2B
        22G, 4B, 2Br, 5R, 1W, 4R, 1W, 3R, 1W, 2R, 3W, 5R, 2Br, 3W, 13B, 8G
Row 7
        22G, 2B, 3Br, 6R, 3W, 1R, 3W, 2R, 1W, 3R, 1W, 7R, 3Br, 2W, 10B, 10G
Row 8
        23G, 1B, 33R, 3W, 7B, 12G
Row 9
        23G, 1B, 33R, 9B, 13G
Row 10
        23G, 1B, 33Y, 9B, 13G
Row 11
        23G, 1B, 2Y, 4W, 1Y, 5W, 1Y, 7W, 1Y, 5W, 1Y, 4W, 2Y, 8B, 14G
Row 12
        23G, 1B, 2Y, 4W, 1Y, 5W, 1Y, 7W, 1Y, 5W, 1Y, 4W, 2Y, 7B, 15G
Row 13
        23G, 1B, 2Y, 4W, 1Y, 5W, 1Y, 7W, 1Y, 5W, 1Y, 4W, 2Y, 6B, 16G
Row 14
        22G, 2B, 2Y, 4W, 1Y, 5W, 1Y, 7W, 1Y, 5W, 1Y, 4W, 2Y, 7B, 15G
Row 15
        21G, 3B, 2Y, 4W, 1Y, 5W, 1Y, 7W, 1Y, 5W, 1Y, 4W, 2Y, 10B, 12G
Row 16
Row 17
        20G, 4B, 2Y, 4W, 1Y, 5W, 1Y, 7W, 1Y, 5W, 1Y, 4W, 2Y, 8B, 14G
        1B, 18G, 5B, 2Y, 4W, 1Y, 5W, 1Y, 7W, 1Y, 5W, 1Y, 4W, 2Y, 7B, 14G, 1Br
       1B, 17G, 6B, 2Y, 4W, 1Y, 5W, 1Y, 7W, 1Y, 5W, 1Y, 4W, 2Y, 6B, 15G, 1Br
```

```
Row 21 2B, 3G, 2Br, 7G, 2Br, 8B, 2Y, 4W, 1Y, 5W, 1Y, 7W, 1Y, 5W, 1Y, 4W, 2Y, 5B, 12G, 2Br, 1G, 2Br
Row 22 3B, 1G, 4Br, 5G, 3Br, 8B, 2Y, 4W, 1Y, 5W, 1Y, 7W, 1Y, 5W, 1Y, 4W, 2Y, 5B, 13G, 4Br
Row 23 4B, 5Br, 3G, 3Br, 9B, 2Y, 4W, 1Y, 5W, 1Y, 7W, 1Y, 5W, 1Y, 4W, 2Y, 6B, 9G, 2Br, 3G, 2Br
Row 24 7B, 2Br, 3G, 2Br, 10B, 2Y, 4W, 1Y, 5W, 1Y, 7W, 1Y, 5W, 1Y, 4W, 2Y, 5B, 5G, 2Br, 4G, 2Br, 2G, 2Br
Row 25 8B, 2Br, 1G, 2Br, 11B, 33Y, 4B, 6G, 4Br, 3G, 5Br
Row 26 8B, 5Br, 11B, 33Y, 4B, 7G, 5Br, 3G, 3Br
       8B, 5Br, 11B, 33Y, 3B, 10G, 5Br, 1G, 3Br
Row 28 8B, 5Br, 11B, 33R, 4B, 10G, 8Br
       8B, 5Br, 11B, 33R, 4B, 12G, 6Br
Row 30 8B, 5Br, 11B, 33R, 5B, 13G, 4Br
       8B, 5Br, 11B, 1R, 30, 3R, 19Y, 3R, 30, 1R, 8B, 10G, 4Br
Row 32 8B, 5Br, 11B, 1R, 30, 3R, 1Y, 17R, 1Y, 3R, 30, 1R, 8B, 8G, 2B, 4Br
Row 33 1B, 4G, 3B, 4Br, 12B, 1R, 30, 2R, 2Y, 17R, 2Y, 2R, 30, 1R, 9B, 6G, 3B, 4Br
Row 34 6G, 2B, 4Br, 12B, 5R, 2Y, 19R, 2Y, 5R, 11B, 2G, 5B, 4Br
Row 35 7G, 1B, 4Br, 4B, 2G, 6B, 5R, 1Y, 10R, 1Y, 10R, 1Y, 5R, 19B, 3Br
Row 36 7G, 3Br, 3G, 1Br, 1B, 4G, 5B, 1R, 3W, 1R, 1Y, 9R, 3Y, 9R, 1Y, 1R, 3W, 1R, 12B, 2G, 5B, 3Br
Row 37 6G, 2Br, 12G, 4B, 1R, 3W, 1R, 1Y, 8R, 5Y, 8R, 1Y, 1R, 3W, 1R, 13B, 2G, 4B, 3Br
Row 38 13Y, 1B, 1Y, 1B, 1Y, 1B, 6Y, 1R, 3W, 1R, 1Y, 9R, 3Y, 9R, 1Y, 1R, 3W, 1R, 9Y, 3G, 2Y, 2G, 1Y, 10, 1Y, 3Br
Row 39 9Y, 30, 1Y, 5B, 6Y, 5R, 1Y, 10R, 1Y, 10R, 1Y, 5R, 7Y, 6G, 1Y, 2G, 1Y, 10, 1Y, 3Br
       4Br, 3R, 2Br, 10, 1R, 10, 2Br, 3B, 7Br, 5R, 2Y, 19R, 2Y, 5R, 6Y, 1G, 5Y, 2G, 1Y, 1G, 30, 3Br
Row 41 3Br, 2R, 1B, 2R, 1Br, 30, 3Br, 1G, 4Br, 3R, 1Br, 1R, 30, 2R, 2Y, 17R, 2Y, 2R, 30, 1R, 8Y, 3G, 2Y, 3G, 30, 3Br
Row 42 2Y, 10, 1Br, 3R, 3Br, 1G, 4Br, 1G, 4Br, 1R, 1Y, 1R, 1Br, 1R, 30, 3R, 1Y, 17R, 1Y, 3R, 30, 1R, 7Y, 6G, 1Y, 2G, 3W, 3Br
Row 43 30, 2Br, 1G, 4Br, 1G, 4Br, 3B, 2Br, 3R, 1Br, 1R, 30, 3R, 19Y, 3R, 30, 1R, 6Y, 1G, 5Y, 1G, 1Y, 2G, 3W, 3Br
Row 44 3R, 2Br, 1G, 8Br, 2B, 10, 2B, 2Br, 1G, 2Br, 33R, 5Y, 1G, 2Y, 3G, 1Y, 4G, 30, 3Br
Row 45 2G, 8Br, 3Y, 2Br, 3B, 3Br, 1G, 2Br, 33R, 7Y, 8G, 50, 2Br
Row 46 1G, 9Br, 1Y, 10, 1Y, 2Br, 2G, 4Br, 1G, 1Br, 1Y, 33R, 7Y, 1G, 3Y, 4G, 5W, 2Br
       1G, 3Br, 1R, 1Br, 1R, 1Br, 1R, 1Br, 3Y, 3Br, 2G, 4Br, 3Y, 1G, 29Br, 1G, 13Y, 2G, 7W, 1Br
        4Br, 5R, 2Br, 1G, 1Br, 1G, 2Br, 1G, 4Br, 3Y, 2G, 29Br, 2G, 12Y, 2G, 7O, 1Br
Row 49 3B, 2Br, 3R, 3Br, 2G, 7Br, 3Y, 3G, 29Br, 3G, 12Y, 90
Row 50 3Y, 1B, 2Br, 1G, 4Br, 1G, 6Br, 3Y, 5G, 29Br, 5G, 19Y
Row 51 4B, 2Br, 1G, 9Br, 3Y, 6G, 3W, 25Br, 3W, 6G, 4Y, 13Br
Row 52 3B, 3Br, 1G, 8Br, 3Y, 6G, 4W, 25Br, 4W, 6G, 4Y, 3Br, 9G
Row 53 1Br, 1G, 11Br, 3Y, 6G, 5W, 27Br, 5W, 6G, 4Y, 3Br, 3G, 1R, 1G, 1R, 1G
Row 54 1Br, 2G, 8Br, 3Y, 6G, 8W, 3Y, 2Br, 3Y, 9W, 3Y, 2Br, 3Y, 8W, 6G, 4Y, 3Br, 5G
Row 55 1Br, 1G, 7Br, 3Y, 6G, 9W, 3Y, 2Br, 3Y, 11W, 3Y, 2Br, 3Y, 9W, 6G, 4Y, 3Br, 2G, 1R
Row 56 8Br, 3Y, 5G, 10W, 3Y, 2Br, 3Y, 13W, 3Y, 2Br, 3Y, 10W, 5G, 5Y, 3Br, 1G
Row 57 6Br, 3Y, 6G, 10W, 3Y, 2Br, 3Y, 15W, 3Y, 2Br, 3Y, 10W, 6G, 5Y, 2Br
Row 58 8Y, 6G, 10W, 3Y, 2Br, 3Y, 17W, 3Y, 2Br, 3Y, 10W, 6G, 6Y
Row 59 6Y, 6G, 11W, 3Y, 2Br, 3Y, 19W, 3Y, 2Br, 3Y, 11W, 6G, 4Y
```

Row 20 2B, 15G, 7B, 2Y, 4W, 1Y, 5W, 1Y, 7W, 1Y, 5W, 1Y, 4W, 2Y, 5B, 11G, 2Br, 3G, 1Br



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