

BIT MANIPULATION TECHNIQUES

BIT MANIPULATION TECHNIQUES

THE FIRST THING TO UNDERSTAND IS
THE BIT OPERATORS

AND: &

XOR: ^

SHIFT RIGHT: >>

OR: |

NOT: ~

SHIFT LEFT: <<

WE'VE STUDIED THIS IN SOME DETAIL

BIT MANIPULATION TECHNIQUES

IN ORDER TO SOLVE BIT PROBLEMS
THERE SOME TRICKS WHICH YOU'LL
NEED TO INTERNALIZE

1	0	0	1	0	0	1	1
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B IS AN INTEGER VARIABLE

BIT MANIPULATION TECHNIQUES

$$b \ \& \ 0 = 0$$

b

1	0	0	1	0	0	1	1
---	---	---	---	---	---	---	---

&

0

0	0	0	0	0	0	0	0
---	---	---	---	---	---	---	---

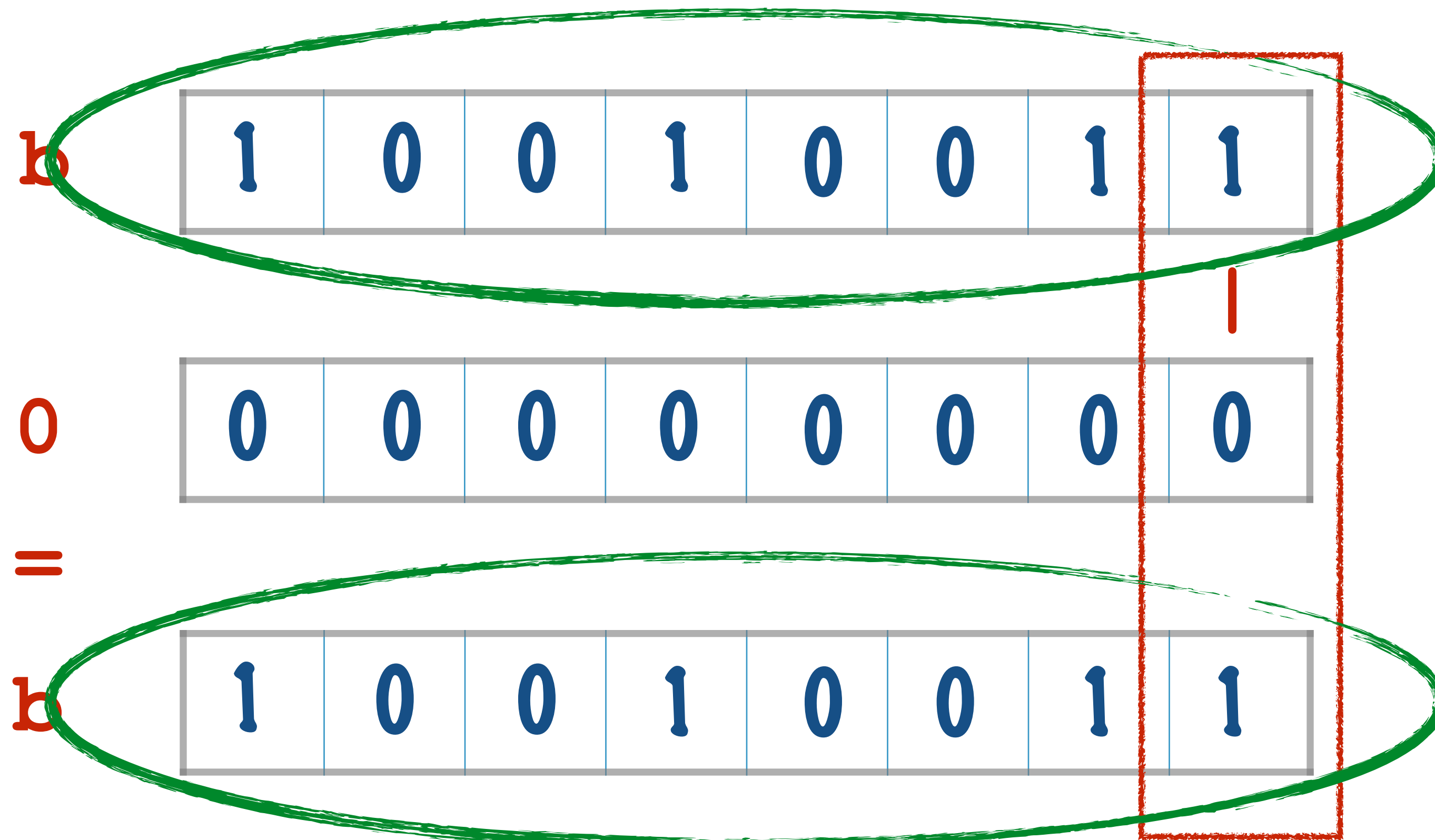
=

0

0	0	0	0	0	0	0	0
---	---	---	---	---	---	---	---

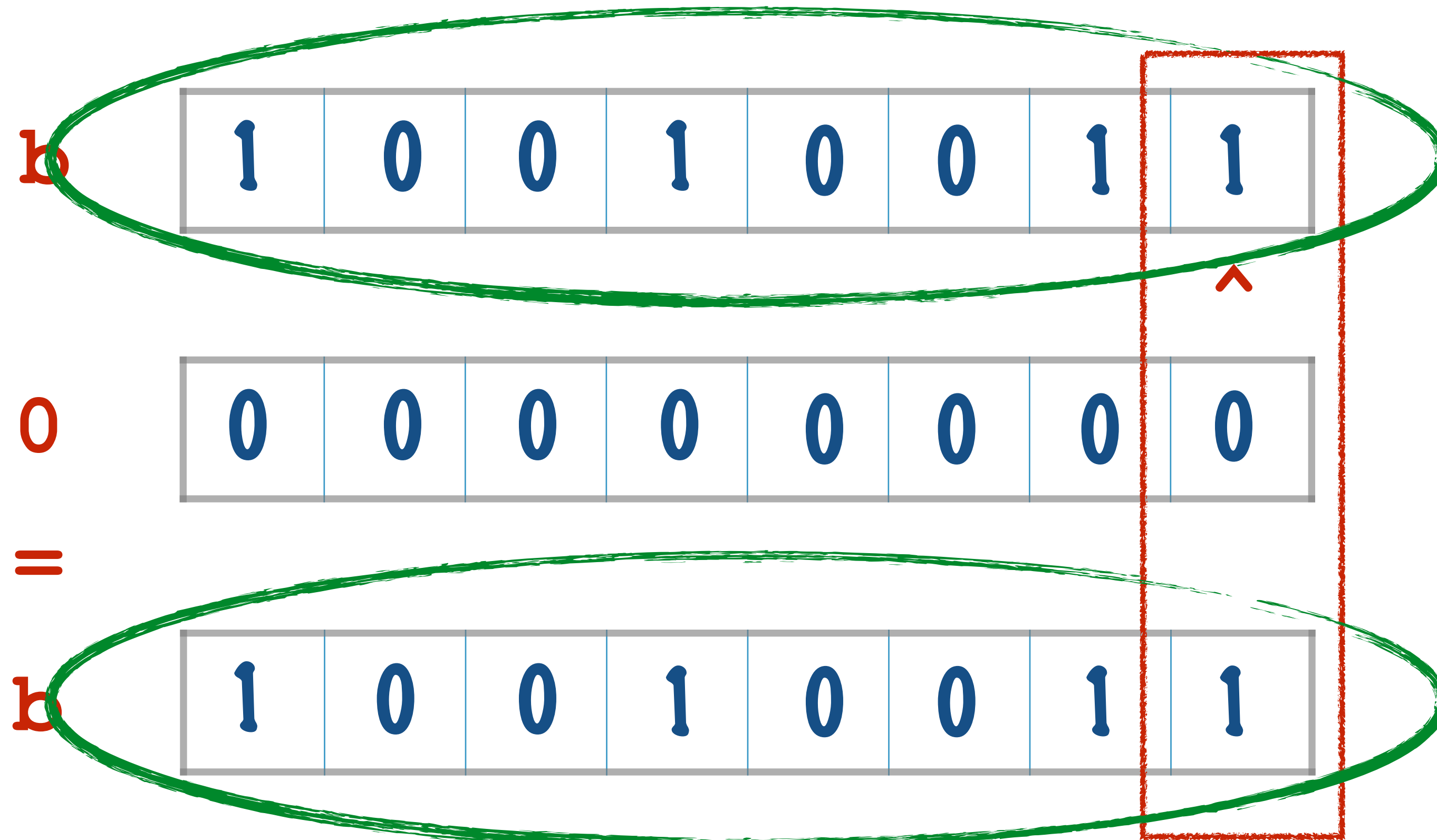
BIT MANIPULATION TECHNIQUES

$$b \mid 0 = b$$



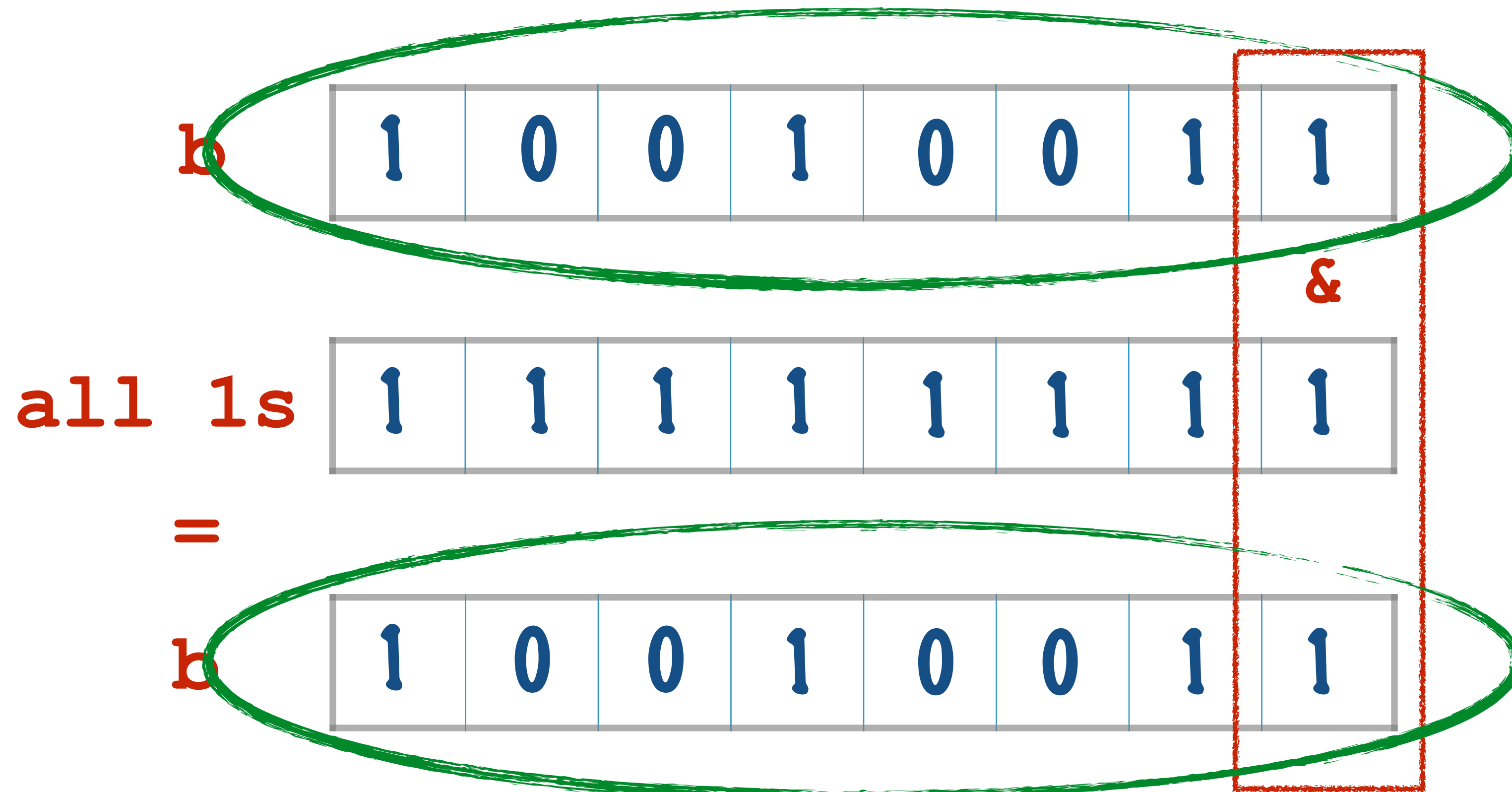
BIT MANIPULATION TECHNIQUES

$$b \wedge 0 = b$$



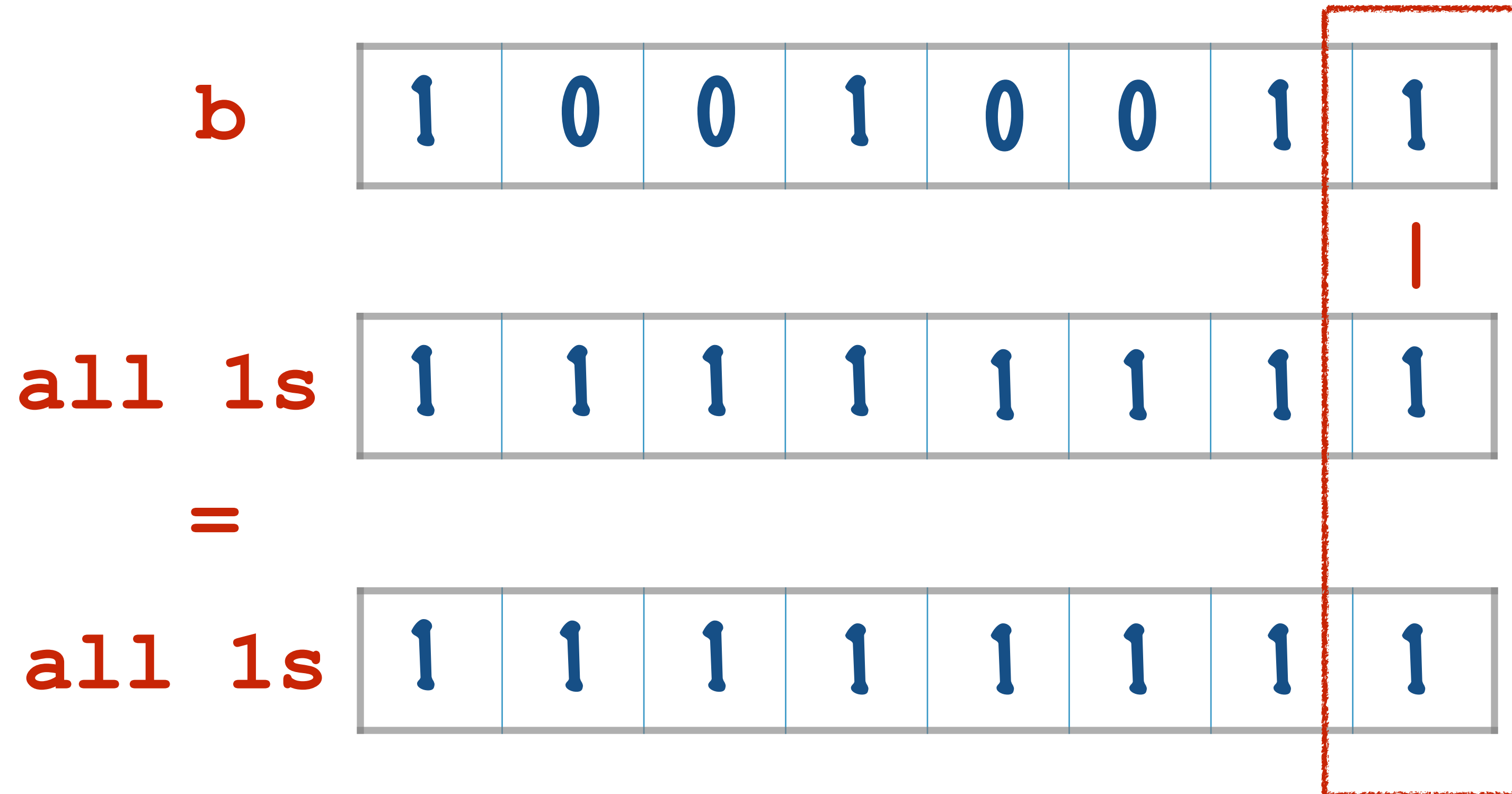
BIT MANIPULATION TECHNIQUES

$$b \ \& \ \text{all 1s} = b$$



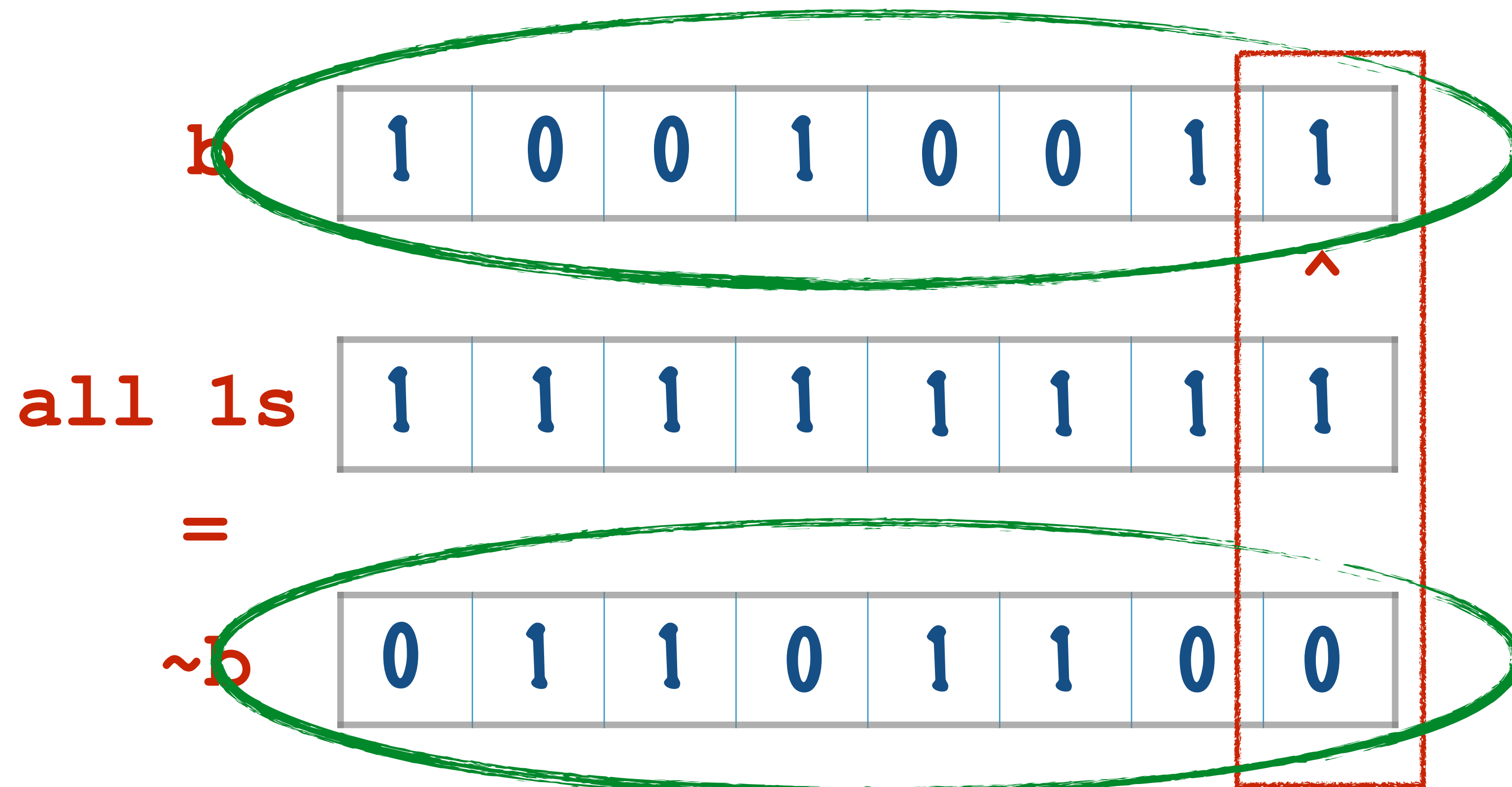
BIT MANIPULATION TECHNIQUES

b | all 1s = all 1s



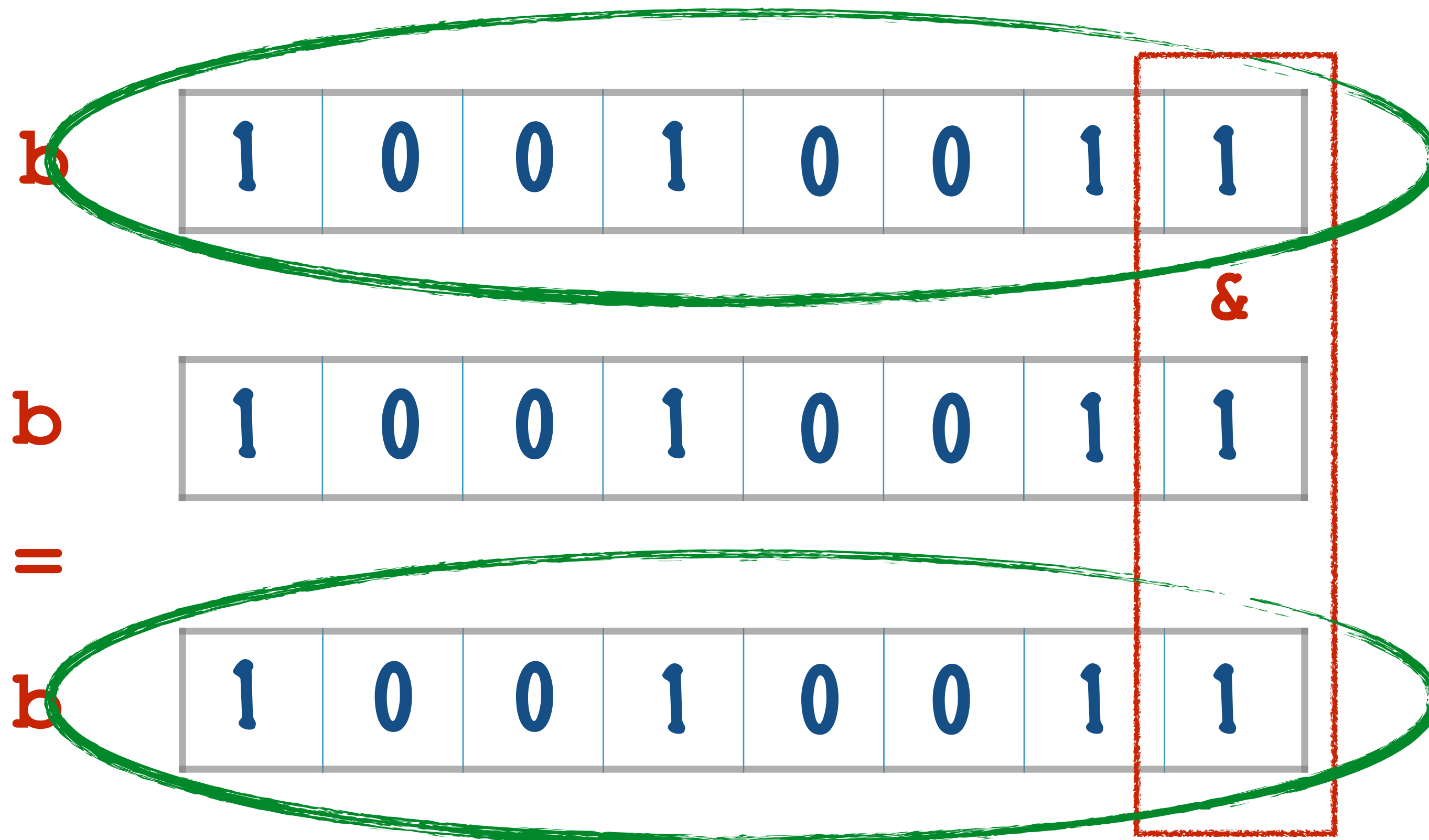
BIT MANIPULATION TECHNIQUES

$$b \wedge \text{all 1s} = \sim b$$



BIT MANIPULATION TECHNIQUES

$$b \ \& \ b = b$$



BIT MANIPULATION TECHNIQUES

$$b \mid b = b$$

b

1	0	0	1	0	0	1	1
---	---	---	---	---	---	---	---

b

1	0	0	1	0	0	1	1
---	---	---	---	---	---	---	---

=

b

1	0	0	1	0	0	1	1
---	---	---	---	---	---	---	---

BIT MANIPULATION TECHNIQUES

$$b \wedge b = 0$$

