

# How to solve Minesweeper In 3 minutes

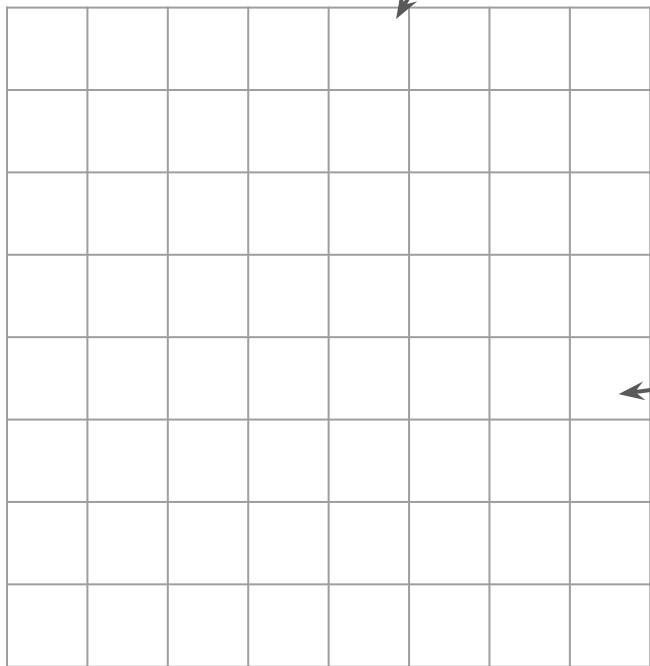
Steven Waterman

LOOK HERE IF  
YOU DON'T KNOW  
WHAT  
MINESWEEPER IS

# Basics

LOOK HERE IF  
YOU'VE PLAYED  
MINESWEEPER  
BEFORE

# Minesweeper Board!



← Rectangular!

← Cells!



Cells can be *clear* or *mines*

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 1 |   | 2 | 1 | 2 | 1 | 2 |   |
| 2 | 2 | 2 |   | 2 |   | 2 | 1 |
|   | 1 | 2 | 2 | 2 | 1 | 1 | 0 |
| 2 | 2 |   | 2 | 1 | 1 | 1 | 1 |
|   | 1 | 2 |   | 1 | 1 |   | 1 |
| 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 |
|   | 2 |   | 2 | 1 | 2 | 1 | 1 |
| 1 | 2 | 1 | 2 |   | 2 |   | 1 |

There is 1 mine in these 3 cells



# Let's Play!

9x9 board, 15 bombs



|   |   |   |   |  |  |  |  |  |
|---|---|---|---|--|--|--|--|--|
|   |   |   |   |  |  |  |  |  |
|   |   |   |   |  |  |  |  |  |
| 1 | 1 |   |   |  |  |  |  |  |
| 0 | 1 |   |   |  |  |  |  |  |
| 0 | 1 |   |   |  |  |  |  |  |
| 0 | 1 |   |   |  |  |  |  |  |
| 0 | 0 | 0 | 1 |  |  |  |  |  |
| 0 | 0 | 0 | 1 |  |  |  |  |  |
| 0 | 0 | 0 | 1 |  |  |  |  |  |



2 mines / 2 unknowns  
All are mines  
Can flag

|   |   |   |   |  |  |  |  |  |
|---|---|---|---|--|--|--|--|--|
|   |   |   |   |  |  |  |  |  |
|   |   |   |   |  |  |  |  |  |
| 1 | 1 |   |   |  |  |  |  |  |
| 0 | 1 |   |   |  |  |  |  |  |
| 0 | 1 |   |   |  |  |  |  |  |
| 0 | 1 | 2 | 2 |  |  |  |  |  |
| 0 | 0 | 0 | 1 |  |  |  |  |  |
| 0 | 0 | 0 | 1 |  |  |  |  |  |
| 0 | 0 | 0 | 1 |  |  |  |  |  |



0 / 2

None are mines  
Can Clear



0 / 3

None are mines  
Can Clear



|   |   |   |   |   |  |  |  |  |
|---|---|---|---|---|--|--|--|--|
|   |   |   |   |   |  |  |  |  |
|   |   |   |   |   |  |  |  |  |
| 1 | 1 | 1 |   |   |  |  |  |  |
| 0 | 1 | 2 |   |   |  |  |  |  |
| 0 | 1 |   |   | 3 |  |  |  |  |
| 0 | 1 | 2 | 2 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 |   |  |  |  |  |
| 0 | 0 | 0 | 1 |   |  |  |  |  |



1 / 1

Can Flag

|   |   |   |   |   |  |  |  |  |
|---|---|---|---|---|--|--|--|--|
|   |   |   |   |   |  |  |  |  |
|   |   |   |   |   |  |  |  |  |
| 1 | 1 | 1 |   |   |  |  |  |  |
| 0 | 1 | 2 |   |   |  |  |  |  |
| 0 | 1 |   |   | 3 |  |  |  |  |
| 0 | 1 | 2 | 2 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 |   |  |  |  |  |
| 0 | 0 | 0 | 1 |   |  |  |  |  |



0 / 2  
Can Clear

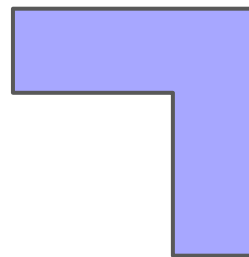


0 / 1  
Can Clear

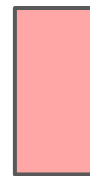
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|---|---|---|---|---|--|--|--|--|
|   |   |   |   |   |  |  |  |  |
|   |   |   |   |   |  |  |  |  |
| 1 | 1 | 1 | 1 |   |  |  |  |  |
| 0 | 1 | 2 | 3 |   |  |  |  |  |
| 0 | 1 |   |   | 3 |  |  |  |  |
| 0 | 1 | 2 | 2 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 |   |  |  |  |  |
| 0 | 0 | 0 | 1 | 2 |  |  |  |  |

Stuck :(

|   |   |   |   |   |  |  |  |  |
|---|---|---|---|---|--|--|--|--|
|   |   |   |   |   |  |  |  |  |
|   |   |   |   |   |  |  |  |  |
|   |   |   |   |   |  |  |  |  |
| 1 | 1 | 1 | 1 |   |  |  |  |  |
| 0 | 1 | 2 | 3 |   |  |  |  |  |
| 0 | 1 |   |   | 3 |  |  |  |  |
| 0 | 1 | 2 | 2 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 |   |  |  |  |  |
| 0 | 0 | 0 | 1 | 2 |  |  |  |  |

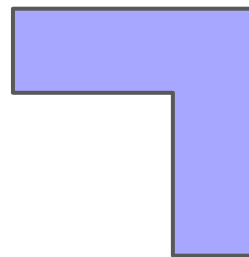


1 / 5

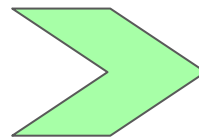


1 / 2

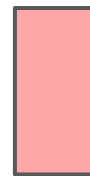
|   |   |   |   |   |  |  |  |  |
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|   |   |   |   |   |  |  |  |  |
|   |   |   |   |   |  |  |  |  |
| 1 | 1 | 1 | 1 |   |  |  |  |  |
| 0 | 1 | 2 | 3 |   |  |  |  |  |
| 0 | 1 |   |   | 3 |  |  |  |  |
| 0 | 1 | 2 | 2 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 |   |  |  |  |  |
| 0 | 0 | 0 | 1 | 2 |  |  |  |  |



1 / 5

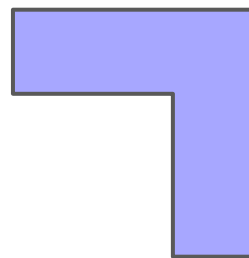


Contains



1 / 2

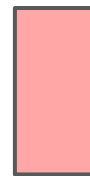
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|   |   |   |   |   |  |  |  |  |
|   |   |   |   |   |  |  |  |  |
| 1 | 1 | 1 | 1 |   |  |  |  |  |
| 0 | 1 | 2 | 3 |   |  |  |  |  |
| 0 | 1 |   |   | 3 |  |  |  |  |
| 0 | 1 | 2 | 2 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 |   |  |  |  |  |
| 0 | 0 | 0 | 1 | 2 |  |  |  |  |



1 / 5



minus



1 / 2

1-1 mines  
5-2 cells  
0 / 3

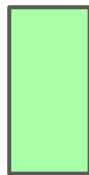


0 / 3

Can Clear

The grid shows a path from (0,0) to (4,4) with obstacles. The path is highlighted in green, and obstacles are in red. Arrows indicate the direction of movement from (0,0) to (1,0) and from (2,4) to (3,4).

|   |   |   |   |   |  |  |  |  |  |
|---|---|---|---|---|--|--|--|--|--|
|   |   |   |   |   |  |  |  |  |  |
|   | 2 | 0 | 1 |   |  |  |  |  |  |
|   | 2 | 0 | 1 |   |  |  |  |  |  |
| 1 | 1 | 1 | 1 | 2 |  |  |  |  |  |
| 0 | 1 | 2 | 3 |   |  |  |  |  |  |
| 0 | 1 |   |   | 3 |  |  |  |  |  |
| 0 | 1 | 2 | 2 | 3 |  |  |  |  |  |
| 0 | 0 | 0 | 1 | 3 |  |  |  |  |  |
| 0 | 0 | 0 | 1 |   |  |  |  |  |  |
| 0 | 0 | 0 | 1 | 2 |  |  |  |  |  |



2 / 2

Can Flag



1 / 1

Can Flag

|   |   |   |   |   |  |  |  |  |
|---|---|---|---|---|--|--|--|--|
|   |   | 2 | 0 | 1 |  |  |  |  |
| 1 | 1 | 1 | 1 | 2 |  |  |  |  |
| 0 | 1 | 2 | 3 |   |  |  |  |  |
| 0 | 1 |   |   | 3 |  |  |  |  |
| 0 | 1 | 2 | 2 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 |   |  |  |  |  |
| 0 | 0 | 0 | 1 | 2 |  |  |  |  |



0 / 1

## Can Clear



|   |   |   |   |   |  |  |  |  |
|---|---|---|---|---|--|--|--|--|
| 2 |   | 2 | 0 | 1 |  |  |  |  |
| 2 |   | 2 | 0 | 1 |  |  |  |  |
| 1 | 1 | 1 | 1 | 2 |  |  |  |  |
| 0 | 1 | 2 | 3 |   |  |  |  |  |
| 0 | 1 |   |   | 3 |  |  |  |  |
| 0 | 1 | 2 | 2 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 |   |  |  |  |  |
| 0 | 0 | 0 | 1 | 2 |  |  |  |  |



0 / 1

Can Clear

|   |   |   |   |   |  |  |  |  |
|---|---|---|---|---|--|--|--|--|
| 2 |   | 2 | 0 | 1 |  |  |  |  |
| 2 |   | 2 | 0 | 1 |  |  |  |  |
| 1 | 1 | 1 | 1 | 2 |  |  |  |  |
| 0 | 1 | 2 | 3 |   |  |  |  |  |
| 0 | 1 |   |   | 3 |  |  |  |  |
| 0 | 1 | 2 | 2 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 |   |  |  |  |  |
| 0 | 0 | 0 | 1 | 2 |  |  |  |  |

1 / 3

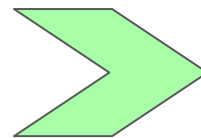
Contains

1 / 2

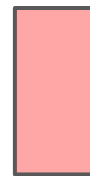
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| 2 |   | 2 | 0 | 1 |  |  |  |  |
| 2 |   | 2 | 0 | 1 |  |  |  |  |
| 1 | 1 | 1 | 1 | 2 |  |  |  |  |
| 0 | 1 | 2 | 3 |   |  |  |  |  |
| 0 | 1 |   |   | 3 |  |  |  |  |
| 0 | 1 | 2 | 2 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 | 3 |  |  |  |  |
| 0 | 0 | 0 | 1 |   |  |  |  |  |
| 0 | 0 | 0 | 1 | 2 |  |  |  |  |



1 / 3



Contains



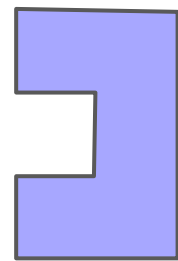
1 / 2



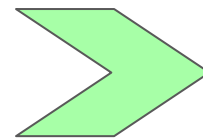
0 / 1

Can Clear

|   |   |   |   |   |   |  |  |  |
|---|---|---|---|---|---|--|--|--|
| 2 |   | 2 | 0 | 1 |   |  |  |  |
| 2 |   | 2 | 0 | 1 |   |  |  |  |
| 1 | 1 | 1 | 1 | 2 | 2 |  |  |  |
| 0 | 1 | 2 | 3 |   |   |  |  |  |
| 0 | 1 |   |   | 3 |   |  |  |  |
| 0 | 1 | 2 | 2 | 3 |   |  |  |  |
| 0 | 0 | 0 | 1 | 3 |   |  |  |  |
| 0 | 0 | 0 | 1 |   |   |  |  |  |
| 0 | 0 | 0 | 1 | 2 |   |  |  |  |



1 / 5

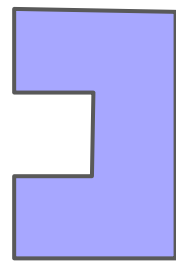


Contains

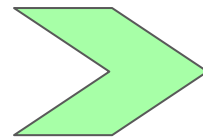


1 / 2

|   |   |   |   |   |   |  |  |  |
|---|---|---|---|---|---|--|--|--|
| 2 |   | 2 | 0 | 1 |   |  |  |  |
| 2 |   | 2 | 0 | 1 |   |  |  |  |
| 1 | 1 | 1 | 1 | 2 | 2 |  |  |  |
| 0 | 1 | 2 | 3 |   |   |  |  |  |
| 0 | 1 |   |   | 3 |   |  |  |  |
| 0 | 1 | 2 | 2 | 3 |   |  |  |  |
| 0 | 0 | 0 | 1 | 3 |   |  |  |  |
| 0 | 0 | 0 | 1 |   |   |  |  |  |
| 0 | 0 | 0 | 1 | 2 |   |  |  |  |



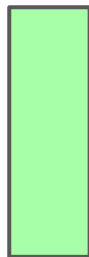
1 / 5



Contains



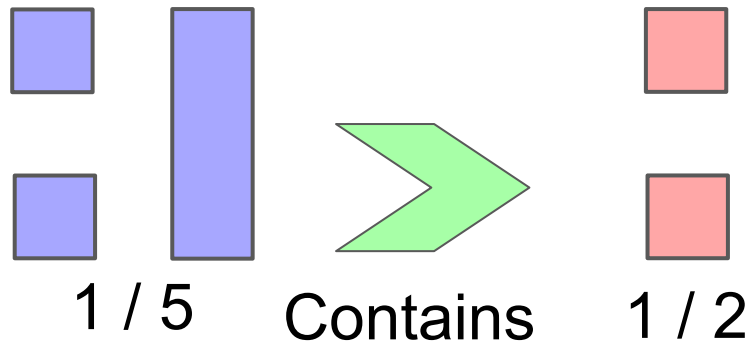
1 / 2



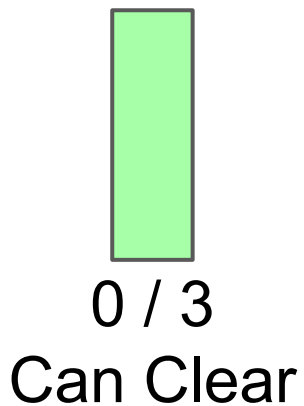
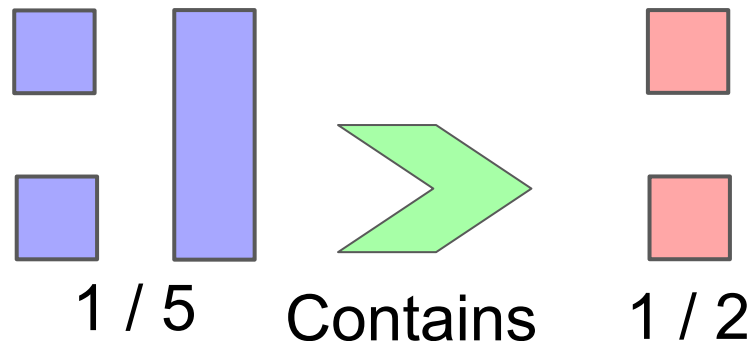
0 / 3

Can Clear

|   |   |   |   |   |   |   |  |  |
|---|---|---|---|---|---|---|--|--|
| 2 |   | 2 | 0 | 1 |   |   |  |  |
| 2 |   | 2 | 0 | 1 |   | 1 |  |  |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 |  |  |
| 0 | 1 | 2 | 3 |   |   | 1 |  |  |
| 0 | 1 |   |   | 3 |   |   |  |  |
| 0 | 1 | 2 | 2 | 3 |   |   |  |  |
| 0 | 0 | 0 | 1 | 3 |   |   |  |  |
| 0 | 0 | 0 | 1 |   |   |   |  |  |
| 0 | 0 | 0 | 1 | 2 |   |   |  |  |



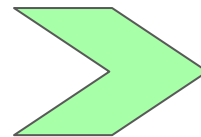
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| 2 |   | 2 | 0 | 1 |   | 1 |  |  |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 |  |  |
| 0 | 1 | 2 | 3 |   |   | 1 |  |  |
| 0 | 1 |   |   | 3 |   |   |  |  |
| 0 | 1 | 2 | 2 | 3 |   |   |  |  |
| 0 | 0 | 0 | 1 | 3 |   |   |  |  |
| 0 | 0 | 0 | 1 |   |   |   |  |  |
| 0 | 0 | 0 | 1 | 2 |   |   |  |  |



|   |   |   |   |   |   |   |   |  |
|---|---|---|---|---|---|---|---|--|
| 2 |   | 2 | 0 | 1 |   |   |   |  |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |  |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 |  |
| 0 | 1 | 2 | 3 |   |   | 1 | 2 |  |
| 0 | 1 |   |   | 3 |   |   |   |  |
| 0 | 1 | 2 | 2 | 3 |   |   |   |  |
| 0 | 0 | 0 | 1 | 3 |   |   |   |  |
| 0 | 0 | 0 | 1 |   |   |   |   |  |
| 0 | 0 | 0 | 1 | 2 |   |   |   |  |



1 / 4



Contains



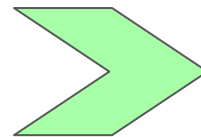
1 / 2



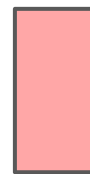
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| 2 |   | 2 | 0 | 1 |   |   |   |  |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 |  |
| 0 | 1 | 2 | 3 |   |   | 1 | 2 |  |
| 0 | 1 |   |   | 3 |   |   |   |  |
| 0 | 1 | 2 | 2 | 3 |   |   |   |  |
| 0 | 0 | 0 | 1 | 3 |   |   |   |  |
| 0 | 0 | 0 | 1 |   |   |   |   |  |
| 0 | 0 | 0 | 1 | 2 |   |   |   |  |



1 / 4



Contains



1 / 2



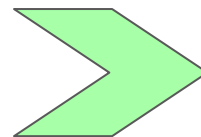
0 / 2

Can Clear

|   |   |   |   |   |   |   |   |  |
|---|---|---|---|---|---|---|---|--|
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |  |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |  |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 |  |
| 0 | 1 | 2 | 3 |   |   | 1 | 2 |  |
| 0 | 1 |   |   | 3 |   |   |   |  |
| 0 | 1 | 2 | 2 | 3 |   |   |   |  |
| 0 | 0 | 0 | 1 | 3 |   |   |   |  |
| 0 | 0 | 0 | 1 |   |   |   |   |  |
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1 / 3

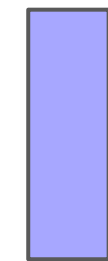


Contains

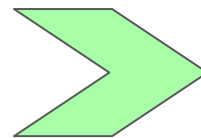


1 / 2

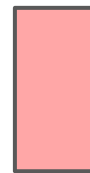
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| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 |  |
| 0 | 1 | 2 | 3 |   |   | 1 | 2 |  |
| 0 | 1 |   |   | 3 |   |   |   |  |
| 0 | 1 | 2 | 2 | 3 |   |   |   |  |
| 0 | 0 | 0 | 1 | 3 |   |   |   |  |
| 0 | 0 | 0 | 1 |   |   |   |   |  |
| 0 | 0 | 0 | 1 | 2 |   |   |   |  |



1 / 3



Contains



1 / 2



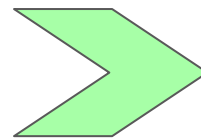
0 / 2

Can Clear

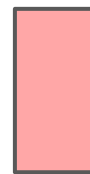
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|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   |   | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   |   |   |
| 0 | 1 | 2 | 2 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 2 |   |   |   |   |



2 / 3



Contains

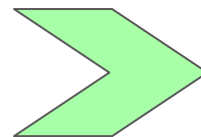


1 / 2

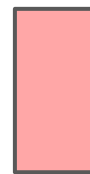
|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   |   | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   |   |   |
| 0 | 1 | 2 | 2 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 2 |   |   |   |   |



2 / 3



Contains



1 / 2



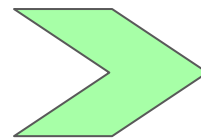
1 / 1

Can Flag

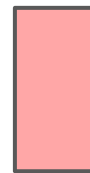
|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   |   | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   |   |   |
| 0 | 1 | 2 | 2 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 2 |   |   |   |   |



1 / 3

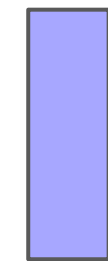


Contains

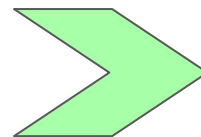


1 / 2

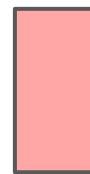
|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   |   | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   |   |   |
| 0 | 1 | 2 | 2 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 2 |   |   |   |   |



1 / 3



Contains



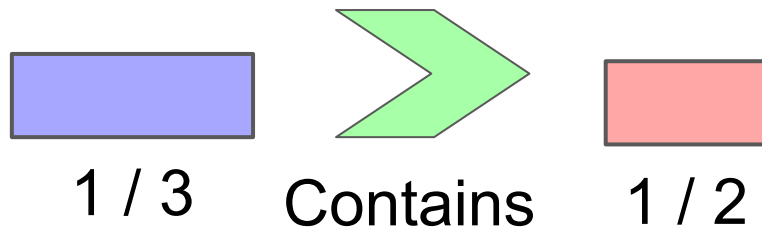
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0 / 1

Can Clear

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   |   |   |
| 0 | 1 | 2 | 2 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 2 |   |   |   |   |





|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   |   |   |
| 0 | 1 | 2 | 2 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 2 |   |   |   |   |



0 / 1

Can Clear

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 2 |   |   |   |   |



1 / 1

Can Flag

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 2 |   |   |   |   |



0 / 1

Can Clear

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 | 1 | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 2 |   |   |   |   |

Stuck :(

# Let's Play!

9x9 board, 15 bombs

# Let's Play!

9x9 board, 15 bombs

# Let's Play!

9x9 board, 15 bombs

15

bombs

15

bombs

15

bombs

Let's Play!

15

9x9 board,

15 bombs

bombs

15

bombs



|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 | 1 | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 2 |   |   |   |   |

15 / 81

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 | 1 | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 2 |   |   |   |   |

7 / 20

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 | 1 | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 2 | 1 |   |   |   |

6 / 18

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 | 1 | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 2 |   |   |   |   |

5 / 18

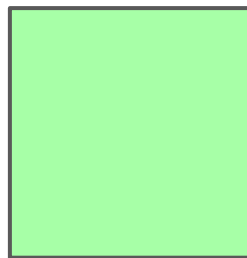
4 / 18

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 | 1 | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 | 1 |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 2 |   |   |   |   |

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 | 1 | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   |   | 4 |   |
| 0 | 0 | 0 | 1 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 2 |   |   |   |   |

0 / 18

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 | 1 | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 |   |   |   |   |   |
| 0 | 0 | 0 | 1 | 2 |   |   |   |   |



0 / 9

Can Clear

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 | 1 | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   | 3 | 2 | 2 |
| 0 | 0 | 0 | 1 |   |   | 2 | 0 | 0 |
| 0 | 0 | 0 | 1 | 2 |   | 1 | 0 | 0 |



2 / 2  
Can Flag



|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 | 1 | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   |   |   |   |
| 0 | 0 | 0 | 1 | 3 |   | 3 | 2 | 2 |
| 0 | 0 | 0 | 1 |   |   | 2 | 0 | 0 |
| 0 | 0 | 0 | 1 | 2 |   | 1 | 0 | 0 |



0 / 1

Can Clear

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 | 1 | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   | 4 |   |   |
| 0 | 0 | 0 | 1 | 3 |   | 3 | 2 | 2 |
| 0 | 0 | 0 | 1 |   |   | 2 | 0 | 0 |
| 0 | 0 | 0 | 1 | 2 |   | 1 | 0 | 0 |



2 / 2  
Can Flag

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 | 1 | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 |   |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   | 4 |   |   |
| 0 | 0 | 0 | 1 | 3 |   | 3 | 2 | 2 |
| 0 | 0 | 0 | 1 |   |   | 2 | 0 | 0 |
| 0 | 0 | 0 | 1 | 2 |   | 1 | 0 | 0 |



0 / 1  
Can Clear

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 | 1 | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 | 3 |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   | 4 |   |   |
| 0 | 0 | 0 | 1 | 3 |   | 3 | 2 | 2 |
| 0 | 0 | 0 | 1 |   |   | 2 | 0 | 0 |
| 0 | 0 | 0 | 1 | 2 |   | 1 | 0 | 0 |



1 / 1

Can Flag

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 | 1 | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 | 3 |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   | 4 |   |   |
| 0 | 0 | 0 | 1 | 3 |   | 3 | 2 | 2 |
| 0 | 0 | 0 | 1 |   |   | 2 | 0 | 0 |
| 0 | 0 | 0 | 1 | 2 |   | 1 | 0 | 0 |



0 / 1  
Can Clear

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 | 1 | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 | 3 |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   | 4 |   |   |
| 0 | 0 | 0 | 1 | 3 |   | 3 | 2 | 2 |
| 0 | 0 | 0 | 1 |   |   | 2 | 0 | 0 |
| 0 | 0 | 0 | 1 | 2 | 2 | 1 | 0 | 0 |

...What now?

It's time for...

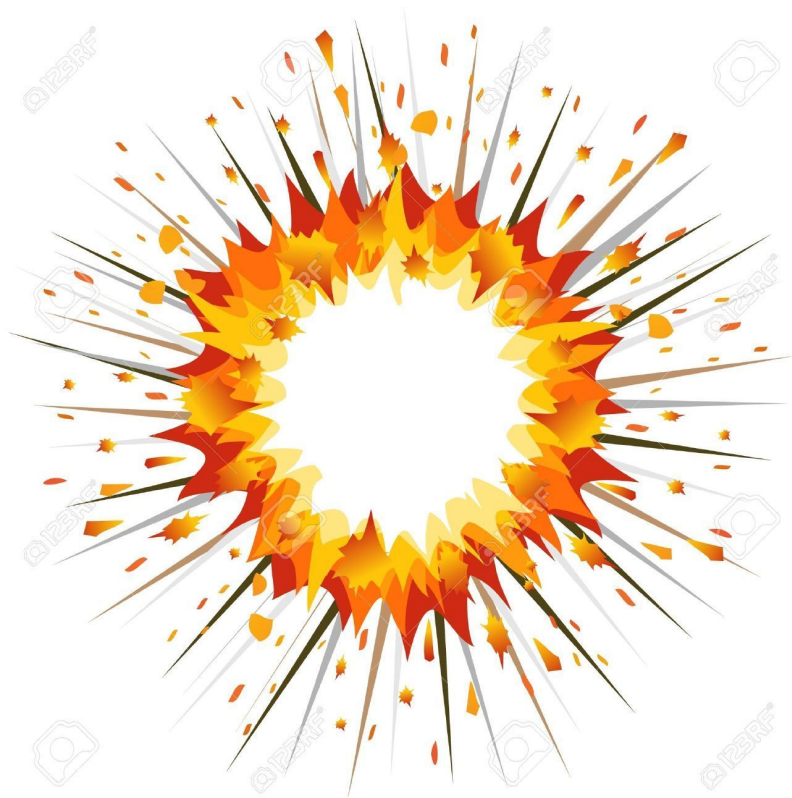


Super Advanced Technique  
Super Advanced Technique

# Guessing

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 2 |   | 2 | 0 | 1 | 1 | 1 | 1 |   |
| 2 |   | 2 | 0 | 1 |   | 1 | 1 |   |
| 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 |
| 0 | 1 | 2 | 3 |   | 2 | 1 | 2 |   |
| 0 | 1 |   |   | 3 | 3 |   | 4 |   |
| 0 | 1 | 2 | 2 | 3 |   | 4 |   |   |
| 0 | 0 | 0 | 1 | 3 |   | 3 | 2 | 2 |
| 0 | 0 | 0 | 1 |   |   | 2 | 0 | 0 |
| 0 | 0 | 0 | 1 | 2 | 2 | 1 | 0 | 0 |





:(

(bad solver code on github @stevenwaterman)

## Next time:

- Constraint Reduction
- Inexact Constraints
- Proof of Completeness
- How to actually implement it
- How to do it without taking exponential time

So get excited for *How to solve minesweeper in a series of 20 hour-long lectures!*