

Division of 998001 by 999

(on 1:5 abacus)

1/9	2/9	3/9	4/9	5/9	6/9	7/9	8/9
1/9>1+1	2/9>2+2	3/9>3+3	4/9>4+4	5/9>5+5	6/9>6+6	7/9>7+7	8/9>8+8

Rules of division by 9

$9/9 > 9+9$

Rule for multi-digit divisor

9 9 8 0 0 1 9 9 9

A B C D E F G H I J K L M

Enter dividend 998001 in A-F
 Optionally, enter divisor 999 in K-M

9 18 8 0 0 1 9 9 9

A B C D E F G H I J K L M

Focus on A and use rule:
 $9/9 > 9+9$

i.e change 9 in A to 9 (nothing to do) and add 9 to B

9 10 7 0 0 1 9 9 9

A B C D E F G H I J K L M

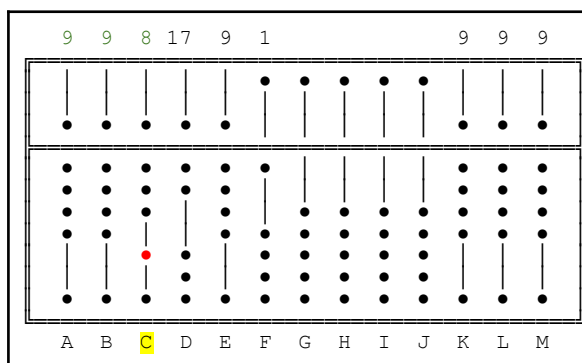
Subtract $A \times L = 9 \times 9 = 81$ from BC

<div style="text-align: center; font-family: monospace; font-size: 1.2em;"> 9 9 8 9 0 1 9 9 9 </div> <div style="display: flex; justify-content: space-around; font-size: 0.8em; margin-top: 5px;"> A B C D E F G H I J K L M </div>	<p>Subtract $A \times M = 9 \times 9 = 81$ from CD</p>
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<div style="text-align: center; font-family: monospace; font-size: 1.2em;"> 9 9 17 9 0 1 9 9 9 </div> <div style="display: flex; justify-content: space-around; font-size: 0.8em; margin-top: 5px;"> A B C D E F G H I J K L M </div>	<p>Focus on B and use rule: $9/9 > 9+9$</p> <p>i.e change 9 in B to 9 (nothing to do) and add 9 to C, which leads to next diagram</p>
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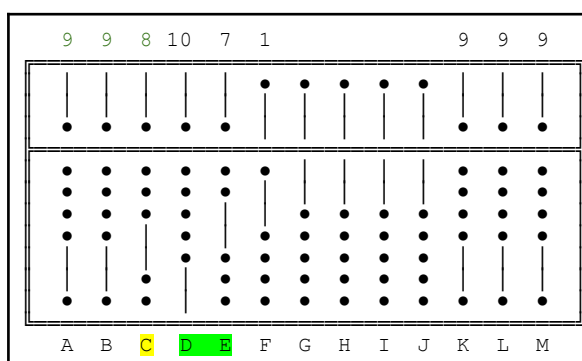
<div style="text-align: center; font-family: monospace; font-size: 1.2em;"> 9 9 9 8 0 1 9 9 9 </div> <div style="display: flex; justify-content: space-around; font-size: 0.8em; margin-top: 5px;"> A B C D E F G H I J K L M </div>	<p>Subtract $B \times L = 9 \times 9 = 81$ from CD</p>
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<div style="text-align: center; font-family: monospace; font-size: 1.2em;"> 9 9 8 9 9 1 9 9 9 </div> <div style="display: flex; justify-content: space-around; font-size: 0.8em; margin-top: 5px;"> A B C D E F G H I J K L M </div>	<p>Subtract $B \times M = 9 \times 9 = 81$ from DE</p>
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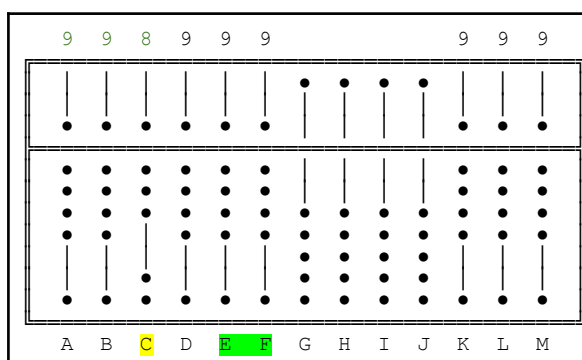


Focus on C and use rule:
 $8/9 > 8 + 8$

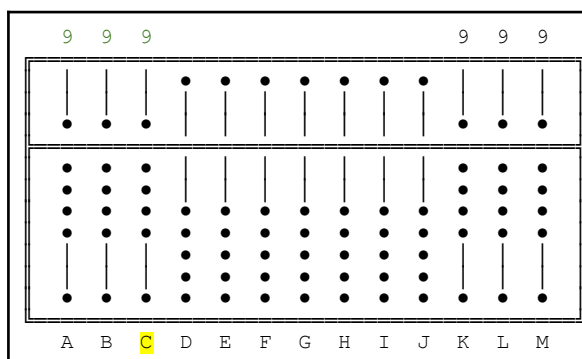
i.e change 8 in C to 8 (nothing to do) and add 8 to d, which leads to next diagram



Subtract $C \times L = 8 \times 9 = 72$ from DE



Subtract $C \times M = 8 \times 9 = 72$ from EF



Revise up: add 1 to C and subtract 999 from DEF

Remainder in DEF is zero, so that

$$998001 / 999 = 999$$

Done!