

Original Sudoku problem

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
|   |   |   | 2 | 6 |   | 7 |   | 1 |
| 6 | 8 |   |   | 7 |   |   | 9 |   |
| 1 | 9 |   |   |   | 4 | 5 |   |   |
| 8 | 2 |   | 1 |   |   |   | 4 |   |
|   |   | 4 | 6 |   | 2 | 9 |   |   |
|   | 5 |   |   |   | 3 |   | 2 | 8 |
|   |   | 9 | 3 |   |   |   | 7 | 4 |
|   | 4 |   |   | 5 |   |   | 3 | 6 |
| 7 |   | 3 |   | 1 | 8 |   |   |   |

Obj

max  
0

| 1      | 1   | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | RS  | 2      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|--------|-----|---|---|---|---|---|---|---|---|-----|--------|---|---|---|---|---|---|---|---|---|
| binary |     |   |   |   |   |   |   |   |   |     | binary |   |   |   |   |   |   |   |   |   |
| 1      | 0   | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1   | 1      | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 2      | 0   | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1   | 2      | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3      | 1   | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1   | 3      | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4      | 0   | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1   | 4      | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5      | 0   | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1-1 | 5      | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 6      | 0   | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1   | 6      | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 7      | 0   | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1   | 7      | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 8      | 0   | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1   | 8      | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9      | 0   | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1   | 9      | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| CS     | 1-1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |     | 1-1    | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 4      | 1   | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |     | 5      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| binary |     |   |   |   |   |   |   |   |   |     | binary |   |   |   |   |   |   |   |   |   |
| 1      | 1   | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1   | 1      | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2      | 0   | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1   | 2      | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 3      | 0   | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1   | 3      | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 4      | 0   | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1   | 4      | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 5      | 0   | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1-1 | 5      | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 6      | 0   | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1   | 6      | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7      | 0   | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1   | 7      | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8      | 0   | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1   | 8      | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 9      | 0   | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1   | 9      | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
|        | 1-1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |     | 1-1    | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 7      | 1   | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |     | 8      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| binary |     |   |   |   |   |   |   |   |   |     | binary |   |   |   |   |   |   |   |   |   |
| 1      | 0   | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1   | 1      | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 2      | 0   | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1   | 2      | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

|   |              |   |   |   |   |   |   |   |   |   |
|---|--------------|---|---|---|---|---|---|---|---|---|
| 3 | 0            | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4 | 0            | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5 | 0            | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 6 | 0            | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7 | 0            | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 8 | 0            | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 9 | 1            | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
|   | <del>1</del> | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |   |

|   |              |              |              |              |              |              |              |              |              |   |
|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---|
| 3 | 0            | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            |   |
| 4 | 1            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            |   |
| 5 | <del>0</del> | <del>0</del> | <del>0</del> | <del>0</del> | <del>1</del> | <del>0</del> | <del>0</del> | <del>0</del> | <del>0</del> |   |
| 6 | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 0            | 1 |
| 7 | 0            | 0            | 0            | 0            | 0            | 0            | 1            | 0            | 0            |   |
| 8 | 0            | 0            | 1            | 0            | 0            | 0            | 0            | 0            | 0            |   |
| 9 | 0            | 0            | 0            | 0            | 0            | 1            | 0            | 0            | 0            |   |
|   | <del>1</del> | 1            | 1            | 1            | 1            | 1            | 1            | 1            | 1            |   |

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| 1            | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1            | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1            | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1            | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| <del>1</del> | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1            | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1            | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1            | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1            | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

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| 1            | 1 | 1 |

Solution

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
| 4 | 3 | 5 | 2 | 6 | 9 | 7 | 8 | 1 |
| 6 | 8 | 2 | 5 | 7 | 1 | 4 | 9 | 3 |
| 1 | 9 | 7 | 8 | 3 | 4 | 5 | 6 | 2 |
| 8 | 2 | 6 | 1 | 9 | 5 | 3 | 4 | 7 |
| 3 | 7 | 4 | 6 | 8 | 2 | 9 | 1 | 5 |
| 9 | 5 | 1 | 7 | 4 | 3 | 6 | 2 | 8 |
| 5 | 1 | 9 | 3 | 2 | 6 | 8 | 7 | 4 |
| 2 | 4 | 8 | 9 | 5 | 7 | 1 | 3 | 6 |
| 7 | 6 | 3 | 4 | 1 | 8 | 2 | 5 | 9 |

| RS | 3 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | RS |
|----|---|---|---|---|---|---|---|---|---|---|----|
| 1  | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1  |
| 1  | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1  |
| 1  | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1  |
| 1  | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1  |
| 1  | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1  |
| 1  | 6 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1  |
| 1  | 7 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1  |
| 1  | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1  |
| 1  | 9 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1  |
|    |   | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |    |

| 1 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 1 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 1 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 1 | 0 |

|   |   | 6 | 1      | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |   |  |
|---|---|---|--------|---|---|---|---|---|---|---|---|---|--|
|   |   |   | binary |   |   |   |   |   |   |   |   |   |  |
| 1 | 1 | 1 | 0      | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |  |
| 1 | 2 | 1 | 0      | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  |
| 1 | 3 | 1 | 0      | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |  |
| 1 | 4 | 1 | 0      | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  |
| 1 | 5 | 1 | 0      | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |  |
| 1 | 6 | 1 | 0      | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |  |
| 1 | 7 | 1 | 0      | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |  |
| 1 | 8 | 1 | 0      | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |  |
| 1 | 9 | 1 | 0      | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  |
|   |   | 1 | 1      | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |   |  |

| 4 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 0 | 1 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 1 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 1 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 |

|   | 9 | binary |   |   |   |   |   |   |   |   |   |
|---|---|--------|---|---|---|---|---|---|---|---|---|
|   |   | 1      | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |   |
| 1 | 1 | 0      | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 1 | 2 | 0      | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |

| 7 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 1 | 0 |

|              |   |   |   |   |   |   |   |   |   |   |              |
|--------------|---|---|---|---|---|---|---|---|---|---|--------------|
| 1            | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1            |
| 1            | 4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1            |
| <del>1</del> | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | <del>1</del> |
| 1            | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1            |
| 1            | 7 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1            |
| 1            | 8 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1            |
| 1            | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1            |
|              |   | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |              |

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 1 | 0 | 0 | 0 | 0 | 0 |

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|--------------|---|---|
| 1            | 1 | 1 |
| <del>1</del> | 1 | 1 |
| 1            | 1 | 1 |

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| 1            | 1 | 1 |
| <del>1</del> | 1 | 1 |
| 1            | 1 | 1 |

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| 1            | 1 | 1 |
| <del>1</del> | 1 | 1 |
| 1            | 1 | 1 |

| 7 | 8 | 9 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 3 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

| 7 | 8 | 9 | 5 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 0 | 0 | 0 | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| 7 | 8 | 9 | 8 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |





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| 0 | 0 |
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| 0 | 1 |
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[illegible]