

10:53



Bit Prerequisites for Trie



Description



L5. Bit PreRequisites for TRIE Problems



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Bit Prerequisites for Trues



TUF

Bit Prerequisites for Trues

9 → 1001

0000...1001
32 bits | 64 bits



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Bit Prerequisites for Trues

9 → 1001

31 30 32 1 0
0000...1001
32 bits | 64 bits

$$\begin{array}{r} 1 \times 2^0 = 2^1 \\ 1 \times 2^3 = 8 \\ \hline 9 \end{array}$$



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Bit Prerequisites for Trues

$$\begin{array}{r} 9 \rightarrow 1001 \\ \begin{array}{cccc} 31 & 30 & & 22 & 21 & 0 \\ 0 & 0 & 0 & 0 & \dots & 1 & 0 & 0 & 1 \end{array} \\ \hline 32 \text{ bits} \mid 64 \text{ bits} \end{array}$$
$$\begin{array}{r} 1 \times 2^0 = 2^1 \\ 1 \times 2^3 = 8 \\ \hline 9 \end{array}$$



TUF

XOR



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XOR

1/0

$$\begin{array}{l} 1 \wedge 0 = 1 \\ 0 \wedge 1 = 1 \end{array}$$

$$\begin{array}{l} 1 \wedge 1 = 0 \\ 0 \wedge 0 = 0 \end{array}$$



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110

even no. of 1's $\rightarrow 0$
odd no. of 1's $\rightarrow 1$

$$\begin{aligned} 1 \wedge 1 &= 0 \\ 0 \wedge 0 &= 0 \end{aligned}$$



check if a bit is set or not

$q \rightarrow$ 0000 ... 1001
 \swarrow \searrow
 31 0



Check if a bit is set or not

3rd bit $\rightarrow 1$

??

$q \rightarrow$ 0000 ... 1001
31 63

(num >> 3)



TUF

check if a bit is set or not

3rd bit $\rightarrow 1$

??



$(num \gg 3)$

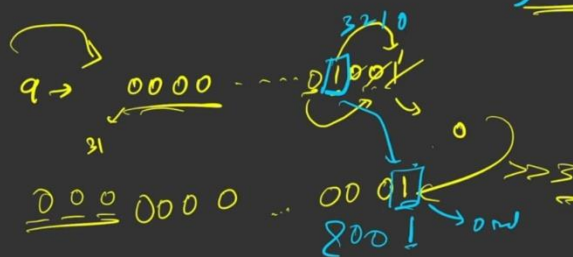


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check if a bit is set or not

3rd bit $\rightarrow 1$

??



$(num \gg 3) \& 1$

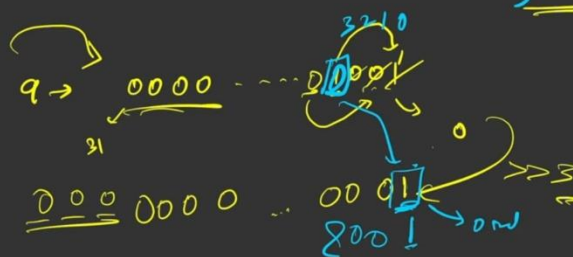


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check if a bit is set or not

3rd bit $\rightarrow 1$

??



$(num \gg 3) \& 1$



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$$\begin{array}{r} 10001000 \\ \hline 10001000 \end{array}$$

$$(num \gg 3) \& 1$$

$$(num \gg 1) \& 1 \quad (=0) \quad \checkmark$$



TUF

$$\begin{array}{r} 10001000 \\ \hline 10001000 \end{array}$$

$$(num \gg 3) \& 1$$

$$(num \gg 1) \& 1 \quad (=0) \quad \checkmark$$



TUF

How do you turn on a bit?



TUF

How do you turn on a bit?

$q \rightarrow 000 \dots 1001 \quad i = 2$



TUF

How do you turn on a bit?

$q \rightarrow \begin{array}{cccc} & & 210 & \\ & & 1001 & \\ 000 & & 000 & \\ 000 & & 0100 & \end{array} \quad i = 2$

The diagram shows a 4x4 grid of bits. The top row has bits 2, 1, 0, and an unlabeled bit. The second row has bits 1, 0, 0, and 1. The third row has bits 0, 0, 0, and 0. The fourth row has bits 0, 0, 0, and 1. A red box highlights the bit at position (2, 1). Red arrows indicate a shift operation from the rightmost column to the leftmost column.

$(\ll 2)$



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How do you turn on a bit?

$q \rightarrow \begin{array}{cccc} & & 210 & \\ & & 1001 & \\ 000 & & 000 & \\ 1000 & & 0100 & \end{array} \quad i = 2$

The diagram shows a 4x4 grid of bits. The top row has bits 2, 1, 0, and an unlabeled bit. The second row has bits 1, 0, 0, and 1. The third row has bits 0, 0, 0, and 0. The fourth row has bits 1, 0, 0, and 0. A red box highlights the bit at position (2, 1). A blue line is drawn under the bottom row of bits, and the result 1101 is written below it.

$(\ll 2)$



TUF

How do you turn on a bit?

$q \rightarrow$

000	1001
1000	0100
<hr/>	
000	1101

$i = 2$

$(1 \ll 2)$



TUF

How do you turn on a bit?

$q \rightarrow$

000	1001
1000	0100
<hr/>	
000	1101

$i = 2$

$\boxed{\text{num} | (1 \ll i)}$



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