Disjoint Set Analysis

Learning Objectives

1. Understand the Iterated log function
2. Know absolute best runtime of find for disjoint sets

Iterated Logarithm

The **iterated log** function:

The number of times you can take a log of a number.

$$\log^*(n) = \begin{cases} 0 & , n \leq 1 \\ 1 + \log^*(\log(n)) & , n > 1 \end{cases}$$

n	log*(n)
1	0
2	1
4	2
16	3
65536 (2^16)	4
2^65536	5

Iterated Logarithm

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1	0
2	1
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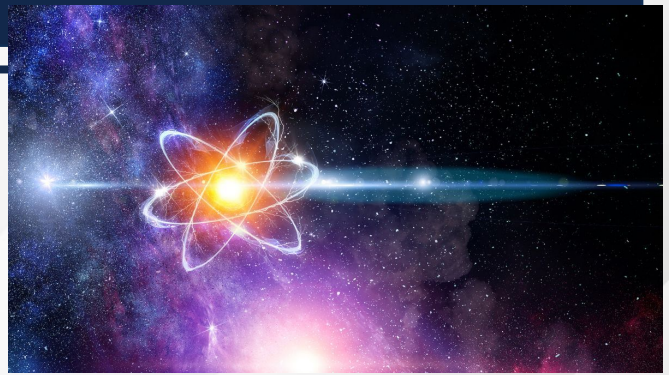
Number of atoms in the universe (2^266)



Number of possible games of chess (2^400)

Inverse Ackermann Function

$O(m * \alpha(m,n))$

$\alpha(m,n)$ grows much slower than log*(n)

Therefore, the big O of find will be _____