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Siyuan 的博客

你强归你强，我永不示弱。

[2019 Multi-University Training Contest 1] Function
(<https://blog.orzsiyuan.com/archives/2019-Multi-University-Training-Contest-1-Function/>)

题目链接: HDU 6588 (<http://acm.hdu.edu.cn/showproblem.php?pid=6588>) (加强版 LOJ 6686 (<https://loj.ac/problem/6686>))

本文为加强版题解。

给定正整数 n ，请你求如下式子的值：

$$\sum_{i=1}^n \gcd(\lfloor \sqrt[3]{i} \rfloor, i)$$

答案对 998244353 取模。

数据范围： $1 \leq n \leq 10^{30}$ 。

👤 Siyuan (<https://blog.orzsiyuan.com/author/1/>) 🕒 2019 年 07 月 26 日

[2019 Multi-University Training Contest 1] Sequence
(<https://blog.orzsiyuan.com/archives/2019-Multi-University-Training-Contest-1-Sequence/>)

题目链接: HDU 6589 (<http://acm.hdu.edu.cn/showproblem.php?pid=6589>)

Tom 有一个长度为 n 的序列 a ，他想要进行 k 种不同的操作。

对于类型为 k 的操作，他会对于所有的整数 $i \in [1, n]$ 计算出 $b_i = \sum_{j=i-kx}^i a_j (x \geq 0, 1 \leq j \leq i)$ 并将 a_i 替换为 $b_i \bmod 998244353$ 。

他要求出 m 次操作后的序列。为了减小输出量，你只需要求出 $\bigoplus_{i=1}^n i \cdot a_i$ 的值。

本题有 T 组数据。

数据范围： $1 \leq T \leq 10$, $1 \leq n \leq 10^5$, $1 \leq m \leq 10^6$, $1 \leq a_i \leq 10^9$, $1 \leq k \leq 3$ 。

👤 Siyuan (<https://blog.orzsiyuan.com/author/1/>) ⌚ 2019 年 07 月 23 日

「2019 Multi-University Training Contest 1」Operation (<https://blog.orzsiyuan.com/archives/2019-Multi-University-Training-Contest-1-Operation/>)

题目链接: HDU 6579 (<http://acm.hdu.edu.cn/showproblem.php?pid=6579>)

给定一个长度为 n 的序列 a , 接下来有 m 个操作, 操作分为如下 2 种:

- 0 $l\ r$: 选择 a_l, a_{l+1}, \dots, a_r 中的一些数, 使得他们的异或和最大, 输出最大的异或和。
- 1 x : 将 x 加入到序列的最后, 并且将 n 更新为 $n+1$ 。

操作强制在线, 我们设 $lastans$ 表示上一次操作 0 的答案, 初始值为 0。

对于所有操作 0, 令 $l = (l \text{ xor } lastans) \bmod n+1$, $r = (r \text{ xor } lastans) \bmod n+1$, 如果 $l > r$ 则交换两数。

对于所有操作 1, 令 $x = x \text{ xor } lastans$ 。

本题有 T 组数据。

数据范围: $1 \leq T \leq 10$, $1 \leq n, m \leq 5 \times 10^5$, $\sum n, \sum m \leq 10^6$, $0 \leq a_i, x < 2^{30}$ 。

👤 Siyuan (<https://blog.orzsiyuan.com/author/1/>) ⌚ 2019 年 07 月 23 日

「2019 Multi-University Training Contest 1」Blank (<https://blog.orzsiyuan.com/archives/2019-Multi-University-Training-Contest-1-Blank/>)

题目链接: HDU 6578 (<http://acm.hdu.edu.cn/showproblem.php?pid=6578>)

有 n 个格子排成一行, 从左往右标号为 1 到 n 。

Tom 想要将每个格子填上 $\{0, 1, 2, 3\}$ 中的一个数字。但是他有 m 条限制: 第 i 条限制为区间 $[l_i, r_i]$ 中必须有恰好 x_i 种不同的数字。

请你求出满足所有限制的填数字的方案数量, 答案对 998244353 取模。

本题有 T 组数据。

数据范围: $1 \leq T \leq 15$, $1 \leq n \leq 100$, $0 \leq m \leq 100$, $1 \leq l_i \leq r_i \leq n$, $1 \leq x_i \leq 4$ 。

👤 Siyuan (<https://blog.orzsiyuan.com/author/1/>) ⌚ 2019 年 07 月 23 日

「Codeforces 1178F2」 Long Colorful Strip (<https://blog.orzsiyuan.com/archives/Codeforces-1178F2-Long-Colorful-Strip/>)

题目链接: Codeforces 1178F2 (<https://codeforces.com/contest/1178/problem/F2>)

世界上有 $n + 1$ 种不同的颜色, 从 0 到 n 标号。现在你有一张长度为 m 的纸, 所有位置的初始颜色均为 0。

Alice 通过如下步骤给这张纸染色。她按顺序使用颜色 1 到 n 染色, 对于第 i 种颜色, 她选择两个整数 $1 \leq a_i \leq b_i \leq m$ 满足位置 $[a_i, b_i]$ 的颜色相同, 然后把区间 $[a_i, b_i]$ 都染成颜色 i 。

通过所有操作, Alice 需要把第 i 个位置染成颜色 c_i , 你需要求出满足条件的序列对 $\{a_i\}_{i=1}^n, \{b_i\}_{i=1}^n$ 的数量, 答案对 998244353 取模。

数据范围: $1 \leq n \leq 500, n \leq m \leq 10^6, 1 \leq c_i \leq n, \forall 1 \leq j \leq n, \exists k, c_k = j$ 。

👤 Siyuan (<https://blog.orzsiyuan.com/author/1/>) © 2019 年 07 月 22 日

「TJOI 2019」唱、跳、rap 和篮球 (<https://blog.orzsiyuan.com/archives/TJOI-2019-Sing-Dance-Rap-and-Basketball/>)

题目链接: LOJ 3106 (<https://loj.ac/problem/3106>)

大中锋的学院要组织学生参观博物馆, 要求学生们在博物馆中排成一队进行参观。

他的同学可以分为四类: 一部分最喜欢唱、一部分最喜欢跳、一部分最喜欢 rap, 还有一部分最喜欢篮球。如果队列中 $k, k + 1, k + 2, k + 3$ 位置上的同学依次, 最喜欢唱、最喜欢跳、最喜欢 rap、最喜欢篮球, 那么他们就会聚在一起讨论蔡徐坤。

大中锋不希望这种事情发生, 因为这会使得队伍显得很乱。

大中锋想知道有多少种排队的方法, 不会有学生聚在一起讨论蔡徐坤。两个学生队伍被认为是不同的, 当且仅当两个队伍中至少有一个位置上的学生的喜好不同。

由于合法的队伍可能会有很多种, 种类数对 998244353 取模。



数据范围： $1 \leq n \leq 1000$, $0 \leq a, b, c, d \leq 500$, $a + b + c + d \geq n$ 。

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「Luogu 4389」付公主的背包 (<https://blog.orzsiyuan.com/archives/Luogu-4389-Princess-Backpack/>)

题目链接：Luogu 4389 (<https://www.luogu.org/problemnew/show/P4389>)

付公主有一个可爱的背包，这个背包最多可以装 10^5 大小的东西。付公主有 n 种商品，她要准备出摊了。每种商品体积为 V_i ，都有 10^5 件。

给定 m ，对于整数 $s \in [1, m]$ ，请你回答用这些商品恰好装 s 体积的方案数。

数据范围： $1 \leq n \leq 10^5$, $1 \leq V_i \leq m \leq 10^5$ 。

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「Luogu 4841」城市规划 (<https://blog.orzsiyuan.com/archives/Luogu-4841-City-Planning/>)

题目链接: Luogu 4841 (<https://www.luogu.org/problemnew/show/P4841>)

阿狸的国家有 n 个城市, 现在国家需要在某些城市对之间建立一些贸易路线, 使得整个国家的任意两个城市都直接或间接的连通。

为了省钱, 每两个城市之间最多只能有一条直接的贸易路径。对于两个建立路线的方案, 如果存在一个城市对, 在两个方案中是否建立路线不一样, 那么这两个方案就是不同的, 否则就是相同的。现在你要求出一共有多少不同的方案。

换句话说, 你需要求出 n 个点的简单 (无重边无自环) 无向连通图数目。由于这个数字可能非常大, 你只需要输出方案数对 $1004535809 = 479 \times 2^{21} + 1$ 取模的值即可。

数据范围: $1 \leq n \leq 1.3 \times 10^5$ 。

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「SPOJ 16607」IE1 - Sweets (<https://blog.orzsiyuan.com/archives/SPOJ-16607-IE1-Sweets/>)

题目链接: SPOJ 16607 (<https://www.spoj.com/problems/IE1/>)

John 有 n 个水果罐子, 每个罐子都装有不同种类的糖果, 第 i 个罐子里有 m_i 个糖果。John 决定吃一些糖果, 并且打算至少吃 a 个, 至多吃 b 个, 求一共有多少种吃法。答案对 2004 取模。

数据范围: $1 \leq n \leq 10$, $0 \leq a \leq b \leq 10^7$, $0 \leq m_i \leq 10^7$ 。

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「Codeforces 1186F」Vus the Cossack and a Graph (<https://blog.orzsiyuan.com/archives/Codeforces-1186F-Vus-the-Cossack-and-a-Graph/>)

题目链接: Codeforces 1186F (<https://codeforces.com/contest/1186/problem/F>)

Vus 有一张包含 n 个点和 m 条边的图。设 d_i 表示第 i 个点的度数。他需要保留 $\left\lceil \frac{n+m}{2} \right\rceil$ 条边, 设 f_i 表示新

图中第 i 个点的度数。他需要对于所有的 i 保证 $\left\lceil \frac{d_i}{2} \right\rceil \leq f_i$ 。

请你帮 Vus 保留一些边使这张图满足条件。

数据范围: $1 \leq n \leq 10^6$, $0 \leq m \leq 10^6$ 。




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