

memset0's Notebook

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LOJ2541 「PKUWC2018」猎人杀

2019-01-16 | 题解

设 $P(S)$ 为钦点 S 中所有元素都在 1 之后挂掉的概率，显然：

$$P(s) = \frac{a_1}{\text{sum}(S) + a_1}$$

于是我们可以发现最后答案为：

$$\text{ans} = \sum_{S \in [2, n]} P(S) (-1)^{|S|}$$

于是分治 + NTT 即可。

至此除斗地主外的所有 PKUWC 2018 题目已经订正完毕，祝也去参加 PKUWC 的读者和自己 RP = $+\infty$ qwq !

```
// =====
//  author: memset0
//  date: 2019.01.16 18:25:25
//  website: https://memset0.cn/
// =====
#include <bits/stdc++.h>
#define ll long long
namespace ringo {
```



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```
template <class T> inline void read(T &x) {
    x = 0; register char c = getchar(); register bool f = 0;
    while (!isdigit(c)) f ^= c == '-', c = getchar();
    while (isdigit(c)) x = x * 10 + c - '0', c = getchar();
    if (f) x = -x;
}

template <class T> inline void print(T x) {
    if (x < 0) putchar('-'), x = -x;
    if (x > 9) print(x / 10);
    putchar('0' + x % 10);
}

template <class T> inline void print(T x, char c) { print(x), putchar(c); }

const int N = 8e5 + 10, mod = 998244353;
typedef std::vector<int> vector;

int n, ans, a[N];
int _f[N], _g[N], _r[N], _w[N];

int inv(int x) {
    if (!x || x == 1) return 1;
    return (1ll)(mod - mod / x) * inv(mod % x) % mod;
}

int fpow(int a, int b) {
    int s = 1;
    for (; b >>= 1; a = (1ll)a * a % mod)
        if (b & 1) s = (1ll)s * a % mod;
    return s;
}

inline void ntt(int *a, int lim) {
    for (int i = 0; i < lim; i++) if (i < _r[i]) std::swap(a[i], a[_r[i]]);
    for (int len = 1; len < lim; len <= 1)
        for (int i = 0; i < lim; i += (len < 1))
            for (int j = 0; j < len; j++) {
                int x = a[i + j], y = (1ll)a[i + j + len] * _w[len + j] % mod;
```



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```

        a[i + j] = (x + y) % mod, a[i + j + len] = (x - y + mod) % mo
    }
}

inline vector operator * (const vector &f, const vector &g) {
    int lim = 1, k = 0, fs = f.size(), gs = g.size();
    while (lim <= (fs + gs - 1)) lim <= 1, ++k;
    for (int i = 0; i < lim; i++) {
        _r[i] = (_r[i >> 1] >> 1) | ((i & 1) << (k - 1));
        _f[i] = i < fs ? f[i] : 0, _g[i] = i < gs ? g[i] : 0;
    } ntt(_f, lim), ntt(_g, lim);
    for (int i = 0; i < lim; i++) _f[i] = (ll)_f[i] * _g[i] % mod;
    std::reverse(_f + 1, _f + lim), ntt(_f, lim), lim = inv(lim); vector r(fs
    for (int i = 0; i < r.size(); i++) r[i] = (ll)_f[i] * lim % mod;
    return r;
}

vector solve(int l, int r) {
    if (l == r) { vector r(a[l] + 1); r[0] = 1, r[a[l]] = mod - 1; return r;
    int mid = (l + r) >> 1; vector L = solve(l, mid), R = solve(mid + 1, r);
    return L * R;
}

void main() {
    for (int len = 1, wn; (len << 1) < N; len <= 1) {
        _w[len] = 1, wn = fpow(3, (mod - 1) / (len << 1));
        for (int i = 1; i < len; i++) _w[i + len] = (ll)_w[i + len - 1] * wn
    }
    read(n);
    for (int i = 1; i <= n; i++) read(a[i]);
    vector vet = solve(2, n);
    for (int i = 0; i < vet.size(); i++) {
        ans = (ans + (ll)a[1] * inv(i + a[1]) % mod * vet[i]) % mod;
    }
    print(ans, '\n');
}

} signed main() { return ringo::main(), 0; }
```



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