# 数论

## 组合数学

```
LL fact[N], infact[N];

LL qmi(LL a, LL b) {
    LL res = 1;
    for (; b; b >>= 1, a = a * a % mod)
        if (b & 1) res = res * a % mod;
    return res;
}

LL C(LL n, LL m) {
    if (m > n || m < 0) return 0;
    return fact[n] * infact[m] % mod * infact[n - m] % mod;
}

void init() {
    fact[0] = infact[0] = 1;
    for (int i = 1; i <= 2e6; i++) {
        infact[i] = qmi(fact[i] = fact[i - 1] * i % mod, mod - 2);
    }
}
```

## 拓展欧几里得

```
// 求x, y, 使得ax + by = gcd(a, b)
int exgcd(int a, int b, int &x, int &y) {
    if (!b) {
        x = 1; y = 0;
        return a;
    }
    int d = exgcd(b, a % b, y, x);
    y -= (a / b) * x;
    return d;
}

x = (c / d) * x, y = (c / d) * y;
通解就是 x + k * (b / d), y - k * (a / d)
```