2020/05/02-2020/05/08周报

团队训练

本周无团队训练

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专题

没有专题

比赛

没有比赛

题目

TJOI2019 唱、跳□rap□篮球 分类：生成函数□FFT 一句话题意：有四类人排队，每类人分别喜欢唱、跳□rap□篮球，分别有a,b,c,d个人，队伍长度n□如果任意k□k□k+1,k+2,k+3四个位置上的人依次喜欢唱、跳□rap□篮球，则不合法，求和法的排列方法□n□a,b,c,d⇐1e3 解法：注意任意两个四人组不可能有交，分别求至少包含1，2，…，个四人组不合法，求法使用指数型生成函数，最后容斥 <code cpp> #include <bits/stdc++.h> using namespace std; const int N = 4040; long long a[N],b[N],nn = 1,rev[N],w1[N],w2[N]; const int mod = 998244353;

inline int power(int di,int ci) {

```
int ret = 1;
while (ci) {
    if (ci&1)
        ret = (long long)ret*di%mod;
    di = (long long)di*di%mod;
    ci >>= 1;
}
return ret;
```

} inline long long inv(int x) {

```
return power(x,mod-2);
```

} inline void NTT(long long *x,int l) {

```
int i,j;
long long t0,t1,*w;
int k;
for (i = 0;i < nn; i++)
    if (rev[i] > i)
        swap(x[rev[i]],x[i]);
w = (I == 1?w1:w2);
for (i = 1;i < nn; i <<= 1) {
    for (j = 0;j < nn; j += (i<<1)) {
        for (k = 0;k < i; k++) {
            t0 = x[j|k],t1 = (long long)w[i|k]*x[i|j|k]%mod;
            x[j|k] = (t0+t1)%mod;
            x[i|j|k] = ((t0-t1)%mod+mod)%mod;
        }
    }
}
if (I == -1)
    for (int i = 0;i < nn; i++)
        x[i] = (long long)x[i]*inv(nn)%mod;
```

} int half; int aa,bb,cc,dd,n; void calc() {

```
for (int i = 0;i < half; i++)
    w1[i|half] = power(3,(mod-1)/nn*i);
for (int i = half-1;i>0; --i)
    w1[i] = w1[i<<1];
for (int i = 1;i < nn; i++)
    w2[i] = inv(w1[i]);
NTT(a,1);
NTT(b,1);
for (int i = 0;i < nn; i++)
    a[i] = (long long)b[i]*a[i]%mod;
NTT(a,-1);
for (int i = n+1;i <= nn; i++)
    a[i] = 0;
```

} long long njc[1010]; inline void work(int p) {

```
memset(a,0,sizeof(a));
memset(b,0,sizeof(b));
for (int i = 0;i <= min(aa-p,n); i++)
    a[i] = njc[i];
for (int i = 0;i <= min(bb-p,n); i++)
    b[i] = njc[i];
calc();
memset(b,0,sizeof(b));
for (int i = 0;i <= min(cc-p,n); i++)
    b[i] = njc[i];
calc();
```

```
memset(b,0,sizeof(b));
for (int i = 0;i <= min(dd-p,n); i++)
    b[i] = njc[i];
calc();
```

}

long long C[1010][1010]; long long f[1010]; int main() {

```
scanf("%d%d%d%d%d",&n,&aa,&bb,&cc,&dd);
C[0][0] = 1;
for (int i = 0;i <= 1000; i++) {
    C[i][i] = C[i][0] = 1;
    for (int j = 1;j < i; j++)
        C[i][j] = (C[i-1][j]+C[i-1][j-1])%mod;
}
njc[0] = 1;
while (nn <= n+n)
    nn <<= 1;
half = nn/2;
for (int i = 1;i < nn; i++)
    rev[i] = (rev[i>>1]>>1)|((i&1)?half:0);
for (int i = 1;i <= n; i++) {
    njc[i] = njc[i-1]*inv(i)%mod;
}
long long ans = 0;
for (int i = 0;i <= n/4; i++) {
    if (i > aa || i > bb || i > cc || i > dd)
        break;
    work(i);
    f[i] = a[n-4*i]*inv(njc[n-4*i])%mod*C[n-3*i][i]%mod;
    if (i&1)
        ans -= f[i];
    else
        ans += f[i];
//  cout<< i << " " << f[i] << endl;
}
for (int i = n/4;~i; i--) {
    for (int j = i+1;j <= n/4; j++)
        (f[i] -= f[j]*C[j][i]) %= mod;
}
f[0] += mod;
f[0] %= mod;
ans %= mod;
ans += mod;
ans %= mod;
```

cout « ans « endl; printf(“%lld”,f[0]); return 0; } <\code> ====== 本周推荐 ====== ===== 李元恺 =====