Bars and stars

1) Sum of k tuples adding upto N (all positive)

N-1 C K-1

2) Sum of k tuples adding upto N (all non-negative)

N+K-1 C N or N+K-1 C K-1

3)Dearrangement Formula :

d(1) = 0 d(2) = 0;

d(n) = (n-1)\*( d(n-1) + d(n-2))

// To compute x^y under modulo m

ll power(ll base,ll pw,ll mod)

{

if (pw == 0)

return 1;

ll p12 = power(base, pw/2, mod) % mod;

p12 = (p12 \* p12) % mod;

if(pw%2==0)

return p12;

else

return ((base%mod)\*(p12))%mod;

}

ll modInverse(ll a, ll m)

{

return power(a, m-2, m);

}

//Using Extended Euclid

ll gcdExtended(ll a, ll b, ll \*x, ll \*y)

{

// Base Case

if (a == 0)

{

\*x = 0, \*y = 1;

return b;

}

ll x1, y1; // To store results of recursive call

ll gcd = gcdExtended(b%a, a, &x1, &y1);

// Update x and y using results of recursive

// call

\*x = y1 - (b/a) \* x1;

\*y = x1;

return gcd;

}

ll modinv(ll a, ll m)

{

ll x, y;

ll g = gcdExtended(a, m, &x, &y);

// m is added to handle negative x

ll res = (x%m + m) % m;

return res;

}