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**DATA STRUCTURES USING C**

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1. **You are given an array A, consisting of N integers and an array B, consisting of M integers. The subsequence of A is the array that can be obtained by picking the elements at the arbitrary sorted set of positions from A.Your task is to count the number of such subsequences C of A that: C contains exactly M elements. The array (C+B) is non-decreasing. Here by + operation, we mean element-wise sum.**

**For example, the array (4, 8, and 5) plus the array (10, 20, and 30) is (14, 28, and 35).**

**Formally, (C+B) is an array of size M such that (C+B)i = Ci + Bi.**

**In case some subsequence appears more that once, you should counts it as many times**

**as it appears.Formally, two subarrays of an array a, (ai\_1, ai\_2, ... ,ai\_n) and (aj\_1, aj\_2,**

**... ,aj\_m) will be considered different if either their lengths are different i.e. n != m or**

**there exists an index k such that such that i\_k != j\_k. Since the answer can be very large,**

**we ask you to calculate it, modulo 109+7.**

**ANSWER:**

#include<stdio.h>

#define ll long long int

int main()

{

int i=0,j,n,m,flag=0;

printf(“User enter the number of elements in array A and in array B\n”);

scanf("%d %d",&n,&m);

ll a[n],b[m],k=0,temp[m],non=0;

printf(“Enter array A\n”);

while(i<n)

scanf("%lld",&a[i]);

i++;

i=0;

printf(“Enter array A\n”);

while(i<m)

scanf("%lld",&b[i]);

i++;

ll sub = 1LL<<n;

for(i=0;i<sub;i++)

{

ll count=0;

for(j=0;j<n;j++)

if((i&(1LL<<j))!=0)count++;

if(count==m)

{

flag=0;

for(j=0;j<n;j++)

if((i&(1LL<<j))!=0)

{

temp[k]=a[j];

if(k>0 && temp[k]+b[k]<temp[k-1]+b[k-1]) {flag=1;break;}

if(flag==1) break;

k++;

}

if(flag==0) non++;

k=0;

}

}

printf("%lld\n",non);

return 0;

}

1. **Chef likes arrays a lot. Today, he found an array A consisting of N positive integers.**

**Let L denote the sorted (in non-increasing order) list of size N\*(N+1)/2 containing the sums of all possible contiguous subarrays of A. Chef is interested in finding the first K elements from the list L. Can you help him in accomplishing this task?**

**ANSWER:**

#include<stdio.h>

int main()

{

int n,m,i;

printf(“Enter the size of the arrays and the maximum sum needed\n”);

scanf("%d %d",&n,&m);

int a[n0];

printf(“Enter the array\n”);

for(i=0;i<n;i++)

{

scanf("%d",&a[i]);

}

int p=0,l=0,b[n\*n];

while(p<n)

{

int k=0,z=p;

while(k<=p)

{

int sum=0;

for(i=k;i<n-z;i++)

{

sum=sum+a[i];

}

b[l]=sum;

l++;

k++;

z--;

}

p++;

}

int max=b[0];

for(i=1;i<l;i++)

{

if(max<b[i])

max=b[i];

// printf("%d",b[i]);

}

int c[max];

for(i=0;i<=max;i++)

{

c[i]=0;

}

for(i=0;i<l;i++)

{

c[b[i]]++;

}

int d,x=0;

for(i=max;i>=0;i--)

{

d=c[i];

while(d>0)

{

printf("%d ",i);

d--;

x++;

}

if(x==m)

{

break;

}

}

return 0;

}

1. **Chef has an array A [] of N elements denoted by A0, A1, AN-1.**

**He thinks about M questions of following kind: "What is the maximum element among Ai where i lies between min{x, y} and max{x, y} both inclusive?"**

**You have to help Chef to find out sum of answers of all the M questions**.

**ANSWER:**

#include<stdio.h>

int main()

{

int i,j,n,maxa,x2,y2,sum=0;

scanf("%d",&n);

int a[n];

for(i=0;i<n;i++){

scanf("%d",&a[i]);

}

int m;

scanf("%d %d %d",&m,&x2,&y2);

for(i=1;i<=m;i++)

{

if(i!=1)

{

x2=(x2+7)%(n-1);

y2=(y2+11)%n;

}

if(x2-y2==1 ||x2-y2==-1)

{

if(a[x2]>a[y2])

{

sum+=a[x2];

}

else

{

sum+=a[y2];

}

}

else

{

if(x2>y2)

{

maxa=y2;

for(j=y2+1;j<=x2;j++)

{

if(a[maxa]<a[j]){

maxa=j;

}

}

sum+=a[maxa];

}

else

{

maxa=x2;

for(j=x2+1;j<=y2;j++)

{

if(a[maxa]<a[j])

{

maxa=j;

}

}

sum+=a[maxa];

}

}

}

printf("%d",sum);

return 0;

}