

Code 1

```
#include<bits/stdc++.h>
using namespace std;

int main(){
    int n,i,j,inc_max=0,dec_max=0;

    cout<<"Enter the Value of N: ";
    cin>>n;

    int arr[n+5];
    vector<int>inc[n+5],dec[n+5];

    cout<<"Enter N Integers: ";
    for(i=0;i<n;i++){
        cin>>arr[i];
    }

    for(i=0;i<n;i++){
        inc[i].push_back(arr[i]);
        dec[i].push_back(arr[i]);
        for(j=i+1;j<n;j++){
            if(arr[j]>inc[i].back()){
                inc[i].push_back(arr[j]);
            }
            if(arr[j]<dec[i].back()){
                dec[i].push_back(arr[j]);
            }
        }
        if(inc[i].size()>inc[inc_max].size()){
            inc_max=i;
        }
        if(dec[i].size()>dec[dec_max].size()){
            dec_max=i;
        }
    }

    cout<<"\nMax Increasing Subsequence: ";
    for(i=0;i<inc[inc_max].size();i++){
```

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        cout<<inc[inc_max][i]<<" ";
    }

    cout<<"\nMax Decreasing Subsequence: ";
    for(i=0;i<dec[dec_max].size();i++){
        cout<<dec[dec_max][i]<<" ";
    }
    cout<<endl;

    return 0;
}

```

Code 2

```

#include<bits/stdc++.h>
using namespace std;
typedef long long ll;
#define Max 1000000007

```

```

ll po(ll a,ll n){
    ll rs=1;
    while(n){
        if(n%2){
            rs=(rs*a)%Max;
        }
        n=n/2;
        a=(a*a)%Max;
    }
    return rs;
}

```

```

ll fact(int n){
    if(n==0){
        return 1;
    }
}

```

```

    }
    else{
        return ((n%Max)*fact(n-1))%Max;
    }
}

```

```

void per(int n,int r){
    cout<<"\nThe Permutation of "<<n<<" and "<<r<<" is: "<<((fact(n)%Max)*(po(fact(n-
r),Max-2)%Max))%Max<<endl;
}

```

```

void com(int n,int r){
    cout<<"\nThe Combination of "<<n<<" and "<<r<<" is:
"<<((fact(n)%Max)*(po(fact(r)*fact(n-r),Max-2)%Max))%Max<<endl;
}

```

```

int main(){
    int n,r;

    cout<<"Enter the Value of N and R: ";
    cin>>n>>r;
    if(r>n){
        cout<<"Invalid Input"<<endl;
    }

    else{
        per(n,r);
        com(n,r);
    }

    return 0;
}

```

Code 3

```
#include<bits/stdc++.h>

using namespace std;
typedef long long ll;
#define Max 1000000007

ll po(ll a,ll n){
    ll rs=1;
    while(n){
        if(n%2){
            rs=(rs*a)%Max;
        }
        n=n/2;
        a=(a*a)%Max;
    }
    return rs;
}

ll fact(int n){
    if(n==0){
        return 1;
    }
    else{
        return ((n%Max)*fact(n-1))%Max;
    }
}

ll com(int n,int r){
    return ((fact(n)%Max)*(po(fact(r)*fact(n-r),Max-2)%Max))%Max;
}

int main(){
    int n,i;

    cout<<"Enter the Value of N: ";
    cin>>n;
```

```

cout<<"(x+y)^(n) = ";
cout<<"("x^n";
for(i=1;i<n;i++){
    cout<<" + (com(n,i)(x^(n-i)(y^i));
}
cout<<" + (y^n)"<<endl;

return 0;
}

```

End