Listing 1: C++ Template

```cpp
// catalan numbers
long long C(int n) {
  return (C(n-1)*2*n*(2*n-1))/(n*(n+1));
  return NCR(2*n, n) - NCR(2*n, n+1);
  return NCR(2*n, n)/(n+1);
}

// derangements
long long D(int n) {
  return n*D(n-1) + pow(-1, n);
  return (n-1)*(D(n-1) + D(n-2));
}

// iterate over all the subsets with no more than m
    elements
for (int i = 0; i < (1<<n); i=Integer.bitCount(i) < m ? i
    +1 : (i|(i-1))+1)

// iterate over all the subsets
for (int i=0; i < (1<<n); i++)
    // iterate over all the subsets of the i-th subset
    for(int i2 = i; i2 > 0; i2 = (i2-1) & i)
        // generate the subset induced by i2
```