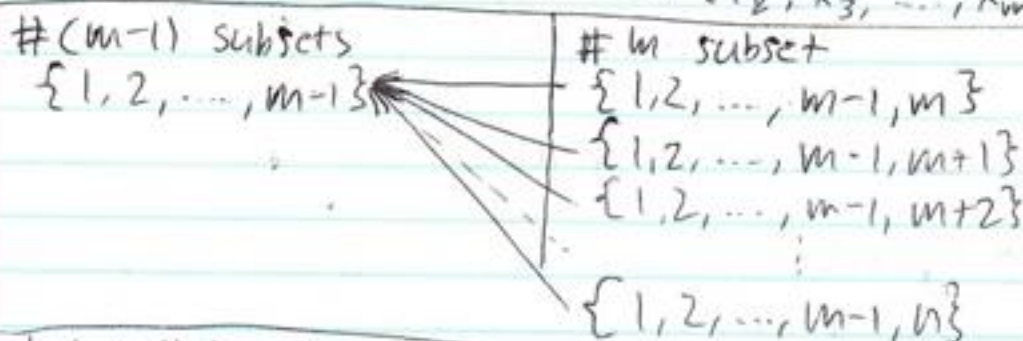
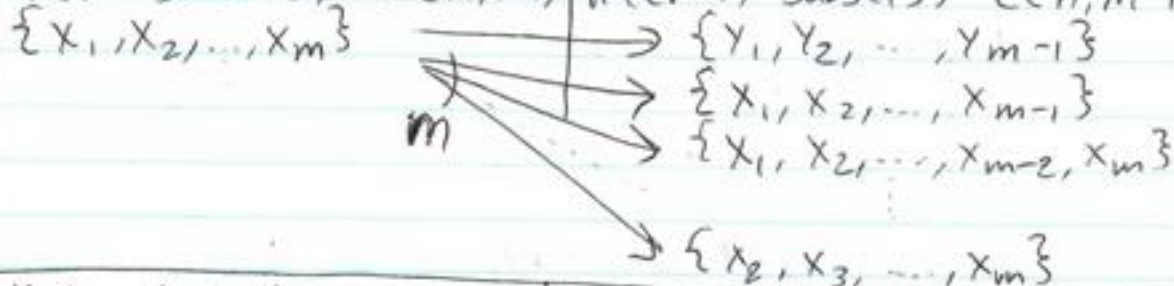


CSC 2259 1/23/20

$\{1, 2, \dots, n\}$, $m \leq n$

$\#(m\text{-subsets}) = C(n, m) \quad \#((m-1)\text{-subsets}) = C(n, m-1)$



total $\#(\text{lines}) = m C(n, m-1) = (n-m+1) C(n, m)$

$C(n, m) = \frac{n-m+1}{m} \cdot C(n, m-1)$ ← recursive equation
 "C is expressed in terms of C"

$C(n, m) = \frac{n \cdot (n-1) \cdot \dots \cdot (n-m+1)}{m \cdot (m-1) \cdot \dots \cdot 1}$ ← not a recursive eq.

n fix

compute $C(n, 0), C(n, 1), \dots, C(n, n)$

$0 \leq m \leq n, C(n, m)$

ex: row 4 PT $C(4, 0), C(4, 1), C(4, 2), C(4, 3), C(4, 4)$

int[] C = new int[n+1];

C[0] = 1;

// $C(n, 0) = 1$ 0-subset {} "empty set"

C[1] = n;

for (int i = 2; i ≤ n; i++)

or for (int m = 2; m ≤ n; m++)

C[i] = C[i-1] * $\frac{n-i+1}{i}$

C[m] = C[m-1] * $\frac{n-m+1}{m}$

$\#(x/\div) = 2, \#(+/-) = 3, \#(\text{arith.}) = 5, \#(\text{assignment}) = 1$

$\#(\text{iterations}) = n-1, \text{total (for all iterations of loop body)} = (n-1)(6)$

long quiz tuesday?

$$C(n, m) = \frac{n(n-1) \dots (n-m+1)}{m(m-1) \dots (1)}$$

lose curly brackets when
unnecessary;

```
for (int m=2; m<=n; m++)
```

```
    int top=n, bottom=m;
    for (int i=2, i<=m; i++)
    {
        top *= (n-i+1);
        bottom *= (m-i+1);
    }
    C[m] = top / bottom;
```

8 operations in loop body

(operations: arithmetic and assignments per iteration
in i-loop-body) = 8

(iterations of i-loop) = $m-1$

total for m-loop $(n-1)(8(m-1)+4)$

total for i loop $8(m-1)$

is that correct?

$$8(2-1)+4 + 8(3-1)+4 + 8(4-1)+4 + \dots + 8(n-1)+4$$

$$4(n-1) + 8(1+2+3+\dots+n-1)$$

$$= 4(n-1) + 8\left(\frac{(n-1)(n)}{2}\right) = 4(n-1) + 4(n-1)(n)$$

$$= 4(n-1)(1+n) = 4(n^2-1)$$

$$4(n^2-1) \text{ vs } 6(n-1)$$

$$4(n+1) < 6$$

$$n+1 < \frac{3}{2}$$

$$n < \frac{1}{2}$$

note: you can assume n will
be positive integer > 0 .

non recursive formula requires much more
computation $4(n^2-1)$ than using recursive
formula $6(n-1)$