Chance
Jewell

# CS104 HW 5   Counting Problems

1) $[U, N, S, A, L]$   there are only 5 unique letters in unusual.
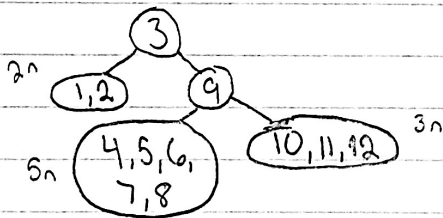
therefore there is only $\boxed{1}$ unique subset of 5 letters.

Number of strings from 5 letters $= 5! = \boxed{120}$.

2) $N = \dfrac{13!}{2! \cdot 11!} \cdot \dfrac{4!}{2! \cdot 2!} \cdot \dfrac{4!}{2! \cdot 2!} \cdot 44 = 78 \cdot 6 \cdot 6 \cdot 44 = \boxed{123,552}$

3) $N = \dfrac{16!}{1! \cdot 15!} \cdot \dfrac{15!}{6! \cdot 9!} = 16 \cdot 5{,}005 = \boxed{80,080}$

4)



For $n$: $\dfrac{2nC_n}{n+1}$

$2: \dfrac{4C_2}{3} = \dfrac{6}{3} = 2$

$3: \dfrac{6C_3}{4} = \dfrac{20}{4} = 5$

$5: \dfrac{10C_5}{6} = \dfrac{252}{6} = 42$

Total possible BST's:

$N = (2)(5)(42) = \boxed{420}$

5) 
10 patients per time slot $= 10C_1 = 10$
4 nurses $= 4C_1 = 4$
1 nurse on break $= 10C_4 = 210$

$N = \dfrac{10!}{6!} = \boxed{5040}$