CSCI 104 HW 5 Counting Problems

1. total combinations $= 7 \times 5! = 7 \times 120 = 840$

from each of the 840 subsets we can create 5! combinations

$5! \times 840 = 100800$ combinations (strings)

2. $\frac{13 \times 12 \times 11}{2} = 858$

3. 16 songs in 1 hour
7 couples
1 couple fought
15 songs to 6 couples
13 songs played, 2 need to distributed
$5+4+3+2+1 = 15$ ✓
total combinations = 1

4. 2 nodes = 2 trees
3 nodes = 5 trees
12 nodes = $\frac{29_{C_{12}}}{13} = 208012$ (root is fixed)

total combinations $= 208012/2 = 104006$ (right child is fixed)

total $= \frac{104006}{2} + \frac{104006}{4} =$ 78000 (approx)

5.

One nurse can serve: $1+k$ patients

four nurses:

$4 + \sum_{i=1}^{4} k_i$ Max patients in one time slot

in one time slot:

$3 + \sum_{i=1}^{3} k_i$ for $4 + \sum_{i=1}^{4} k_i$ (combinations, where k is patients served by each of the nurses