Math/CS 475

Shih-Hsien Chuang

Prof. Miller

homework
due Feb 3rd.

7. How many ways can Tom, Dick, Harry and Bob be seated in a row of 15 numbered seats so that between any two occupied sets there are at least two occupied seats?

7 OK

8 OK

$S = \langle a_1, a_2, a_3, a_4 \rangle : \{ 1 \le a_1 < a_1 + 2 < a_2 < a_2 + 2 < a_3 < a_3 + 2 < a_4 \le 15 \}$.

$T = \langle b_1, b_2, b_3, b_4 \rangle : \{ 1 \le b_1 < b_2 < b_3 < b_4 \le 9 \}$.

$f : T \to S$.

$\langle b_1, b_2, b_3, b_4 \rangle \longmapsto \langle b_1, b_2 + 2, b_3 + 4, b_4 + 6 \rangle$

$|T| = |S|$

$C(9,4) \times \underbrace{4!}_{\text{distinguishable people}} = 3024$.

8. How many ways can 6 women and 3 men seat themselves around a circular table so that no two men are sitting next to each other? Assume that the three men are indistinguishable, i.e. MAN, MAN, MAN, but the six women are distinguishable, i.e. Alice, Mary, Sally, Sue, Dolly and Lee

seating 6 distinguishable women is $\dfrac{6 \times 5 \times 4 \times 3 \times 2 \times 1}{6} = 5!$ (rotation) ←

Inserting 3 indistinguishable men to the 6 available spots between women is given by $C(6,3) = 20$

Then by multiplication principle, there are $20 \times 5!$ ways $= 2400$ ways.