CS 225 Assignment 6 - Part 1
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Set 9.2

32.c)

G	O	R						
	G	O	R					
		G	O	R				
			G	O	R			
				G	O	R		
					G	O	R	
						G	O	R

GOR can remain together in 6! additional ways, and there are 7 positions that A,L, GOR, I, T, H, M can be written.
The total number of the arrangement is 7 * 6! = 7! = **5040**

33.a)
Sit in a row with exactly 6 seats.
6 * 5 * 4 * 3 * 2 * 1 = **720 different ways of being seated.**

33.b)
Doctor is in the aisle seat. 5 remaining individuals can be seated…
5 * 4 * 3 * 2 * 1 = **120 different ways of being seated with the doctor in the aisle seat.**

33.c)
[o o] [o o] [o o]
Each bracket represents a couple (o) sitting together.
There is only one way for the husband to sit on the left and the wife on the right. The three couples can be seated in 3 blocks in 3! different ways = **6 different ways for the six to be seated together in the row.**

36)
{ s, t, u, v }

stu	*stv*	*tuv*	*suv*
sut	*svt*	*tvu*	*svu*
tus	*vts*	*vut*	*vus*
tsu	*vst*	*vtu*	*vsu*
uts	*tsv*	*utv*	*usv*
ust	*tvs*	*uvt*	*uvs*

P(4,3) = 4! / (4 - 3)!
= 4! / 1!
= 4 * 3 * 2 * 1 = **24**

39.b)
6-permutations from a set of 9 elements.
P(9, 6) = 9! / (9 - 6)!
= 9! / 3!
= 9 * 8 * 7 * 6 * 5 * 4 * ~~3!~~ / ~~3!~~
= **60480 ways to select 6 letters of the word algorithm.**

39.d)
First two positions are fixed (OR). 6 of the letters can be selected in Algorithm is the number of 4-permutations of 7 letters.
P(7, 4) = 7! / (7 - 4)!
= 7! / 3!
= 7 * 6 * 5 * 4 * ~~3! / 3!~~
= **840 ways to select 6 letters of the word algorithm if the first two letters are OR.**

Set 9.5

7.b - i)
4 women and 3 men.
Groups are (7   4) (6   3) - for the sake of formatting assume that the rows are over-under.
= (7! / 4! (7 - 4)) * (6! / (6 - 3)! * 3!))
= (7! / 4! * 3) * (6! / (3)! * 3)
= (7 * 6 * 5 * 4! / 4! * 3) * (6 * 5 * 4 * 3! / 3! * 3!) = 35 * 20 = **700**

7.b - ii)
= (13   7) - (7   7) for the sake of formatting assume that the rows are over-under.
(13   7) - 1 = 1716 - 1 = **1715**

7.b - iii)
= (7   3)(6   4) + (7   2)(6   5) + (7   1)(6   6) = **658**

14a)
(16   7)
= 16! / 7! (16 - 7)!
= 16! / 7! * 9!
= **11,440**

14b)
(16   13) + (16   14) + (16   15) + (16   16)
= (16! / 3! * 13!) + (16! / 2! * 14!) + (16! / 1! * 15!) + (16! / 0! * 16!)
= (16 * 15 * 14 / 6) + (16 * 15 / 2) + (16 / 1) + 1
= 560 + 120 + 16 + 1
= **697**

14c)
16 bit strings is 2^16
16 bit strings where there are no 1's is (16   0) = 1
16 bit strings which contains at least 1 is **2^16 - 1**

14d)
= (16   1) + (16   0)
= (16! / 1! * 15!) + (16! / 0! * 16!)
= 16 + 1
= **17**

20a)
Number of arrangements:
(11   3)(8   2)(6   2)(4   1)(3   1)(2   1)(1   1)
(11! / 3! * 8!) (8! / 2! * 6!) (6! / 2! * 4!) (4! / 1! * 3!) (3! / 1! * 2!) (2! / 1! * 1!) (1! / 0! * 1!)
= 11! / 2! * 2! * 3! * 1!
= **1,663,200**

20b)
(9   3)(6   2) (4   1) (3   1) (2   1) (1   1)
= (9! / 3! * 6!) (6! / 2! * 4!) (4! / 1! * 3!) (3! / 1! * 2!) (2! / 1! * 1!) (1! / 0! * 1!)
= 9! / 3! * 2! * 1! * 1! * 1! * 1!
= 9! / 3! * 2!
= **30,240**

20c)
CR is one block [C   R]
ON is another block [O   N]
7 positions to be taken by 2 M's, 2 L's, and 3 I's.
= 9! / 2! * 2! * 3! = **15,120**