MTH 231 Quiz 5 HW

6.3

1) All permutations of $\{a, b, c\}$

abc acb bac cab bca cba

Note: there are 3! ways to arrange these.

3) How many combations of $\{a..g\}$ end with a: just combinations of $\{b..g\}$ = $\boxed{6!}$

9) 12 horses competing for 1st 2nd and 3rd: $12 \cdot 11 \cdot 10$

= $\boxed{1320 \text{ ways.}}$

11) How Many Bitstrings of len 10

- contain 4 1's

$\underbrace{1111}_{4}\ \underbrace{000000}_{6}$

Arrangements $\frac{10!}{4!\,6!} = \boxed{210}$

- at most 4 1's

$\frac{10!}{4!6!} + \frac{10!}{3!7!} + \frac{10!}{2!8!} + \frac{10!}{1!9!}$

$= \boxed{386}$

- at least 4 1's ↗

- #1 = #0:

$\underbrace{11111}_{5}\ \underbrace{00000}_{5}$ $= \boxed{252}$

$= \frac{10!}{5!5!} = \frac{10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5!}{5! \cdot 5!}$

$= 2 \cdot 6 \cdot 4 \cdot 7 \cdot 3 =$

13) n men, n women. How many ways to arrange alternating m/w

M W M W M W } same as doing

$\underbrace{mmm}_{n} + \underbrace{www}_{n} = 2(n!)^2$

15) 5 letters from alphabet

26^5

19) Coin flip 10 times

- total combos = $\boxed{2^{10}}$
- With 2 heads = 1100000000 ways to arrange = $10!/8!2! = \boxed{45}$
- sec & 11
- Same H and T = $\frac{10!}{5!5!} = \boxed{252}$

21) How many permutations of 'ABCDEFG'

- Contain the string BCD

$\underbrace{BCD\ A\ E\ F\ G}_{5} = 5!$

- Contain 'ABC' and 'CDE' since Permutations, these MUST be concatenated → 'ABCDE' F G $= 3!$
- Contain 'ABC' 'BED' = 0 As B would be used twice.

27) ${}_{25}C_4 = \binom{25}{4} = 12650$ (Choose 4 from 25 order no matter)

${}_{25}P_4 = P(25,4) = 303600$

31) Six Letters

- one vowel: $21^5 5 = \binom{6}{1}(21^5 5) = \ldots$
- two vowels: $\binom{15}{2}(21^4 25)$

33) 10 men 15 women

women ≥ men - 6 people

4 | 5 | 6

$\{ {}_{10}C_3 \times {}_{15}C_3$

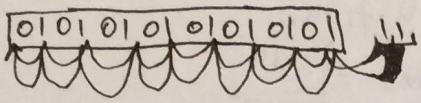
$\frac{10!}{3!(10-3)!} \times \frac{15!}{3!(15-3)!} = 54600$

35) 8 · '0' and 10 · '1' Bit Strings

If every 0 must be followed by a 1

1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1

9 free to move,



9+9 = 18?

41) $\frac{n!}{r(n-r)!}$ Circular r-permutations of n people.