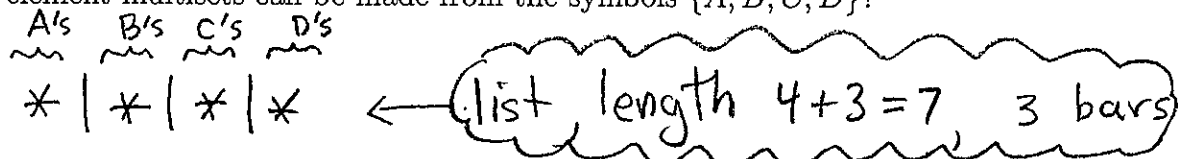
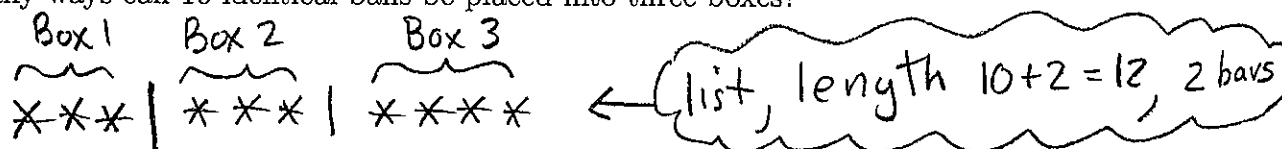


1. How many 4-element multisets can be made from the symbols
- $\{A, B, C, D\}$
- ?



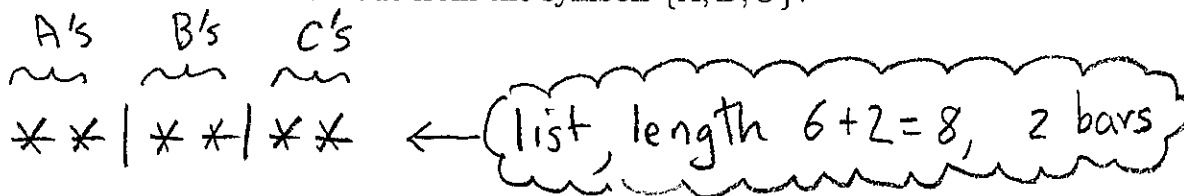
$$\text{Ans: } \binom{7}{3} = \frac{7!}{4!3!} = \frac{7 \cdot 6 \cdot 5}{3 \cdot 2} = \boxed{35}$$

2. In how many ways can 10 identical balls be placed into three boxes?



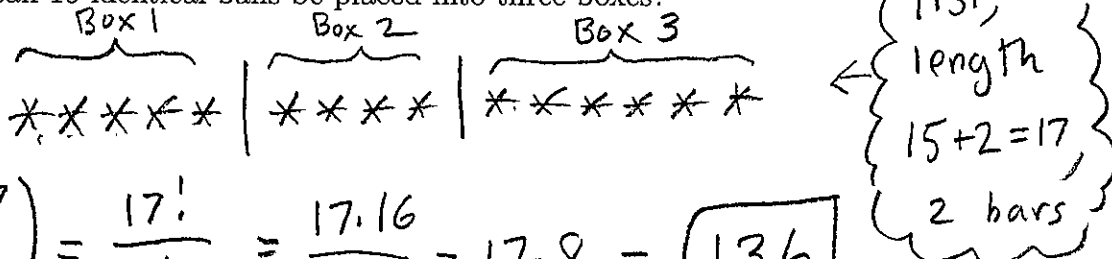
$$\text{Ans: } \binom{12}{2} = \frac{12!}{10!2!} = \frac{12 \cdot 11}{2} = \boxed{66}$$

1. How many 6-element multisets can be made from the symbols
- $\{A, B, C\}$
- ?



$$\text{Ans: } \binom{8}{2} = \frac{8!}{6!2!} = \frac{8 \cdot 7}{2} = 4 \cdot 7 = \boxed{28}$$

2. In how many ways can 15 identical balls be placed into three boxes?



$$\text{Ans: } \binom{17}{2} = \frac{17!}{15!2!} = \frac{17 \cdot 16}{2} = 17 \cdot 8 = \boxed{136}$$

1. How many 5-element multisets can be made from the symbols
- $\{A, B, C, D\}$
- ?

$\begin{array}{cccc} \text{A's} & \text{B's} & \text{C's} & \text{D's} \\ \text{---} & \text{---} & \text{---} & \text{---} \\ ** & | * & | * & | * \end{array}$
←
list, length $5+3=8$ with 3 bars.

$$\text{Ans: } \binom{8}{3} = \frac{8!}{5!3!} = \frac{8 \cdot 7 \cdot 6}{3 \cdot 2} = \boxed{56}$$

2. In how many ways can 8 identical balls be placed into three boxes?

$\begin{array}{ccc} \text{Box 1} & \text{Box 2} & \text{Box 3} \\ \text{---} & \text{---} & \text{---} \\ *** & | ** & | *** \end{array}$
←
list, length $8+2=10$, 2 bars

$$\text{Ans } \binom{10}{2} = \frac{10!}{8!2!} = \frac{10 \cdot 9}{2} = \boxed{45}$$

1. How many 5-element multisets can be made from the symbols
- $\{A, B, C\}$
- ?

$\begin{array}{ccc} \text{A's} & \text{B's} & \text{C's} \\ \text{---} & \text{---} & \text{---} \\ ** & | ** & | * \end{array}$
←
list, length $5+2=7$, 2 bars.

$$\text{Ans } \binom{7}{2} = \frac{7!}{5!2!} = \frac{7 \cdot 6}{2} = \boxed{21}$$

2. In how many ways can 10 identical balls be placed into four boxes?

$\begin{array}{cccc} \text{Box 1} & \text{Box 2} & \text{Box 3} & \text{Box 4} \\ \text{---} & \text{---} & \text{---} & \text{---} \\ *** & | ** & | *** & | ** \end{array}$
←
list, length $10+3=13$

$$\text{Ans } \binom{13}{3} = \frac{13!}{10!3!} = \frac{13 \cdot 12 \cdot 11}{6} = 13 \cdot 2 \cdot 11 = 13 \cdot 22 = \boxed{286}$$