

Counting Rules

Sum Rule: If you are choosing one thing between n options in one group and m in another group with no overlap, the total number of options is: $n + m$.

Product Rule: If you have a sequential process, where step 1 has n_1 options, step 2 has n_2 options, ..., step k has n_k options, and you choose one from each step, the total number of possibilities is $n_1 \cdot n_2 \cdots n_k$.

Power Sets

$$\mathcal{P}(S) = \{X: S \subseteq X\}$$

$$\mathcal{P}(\{1,2,3\}) = \{ \emptyset, \{1\}, \{2\}, \{3\}, \{1,2\}, \{1,3\}, \{2,3\}, \{1,2,3\} \}$$

How many subsets are there of S , i.e. what is $|\mathcal{P}(S)|$?

Assigning Books

We have 5 books to split to 3 people (Alice, Bob, and Charlie)

Every book goes to exactly one person, but each person could end up with no books (or all of them, or something in between).

Attempt 1: We're choosing subsets!

Alice could get any of the $2^5 = 32$ subsets of the books.

Bob could get any of the $2^5 = 32$ subsets of the books.

Charlie could get any of the $2^5 = 32$ subsets of the books.

Total is product of those three steps $32 \cdot 32 \cdot 32 = 32768$

Activity

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can adjust his explanation
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