Exercise: Counting

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3/3 points (graded)

You are given the set of letters $\{$A, B, C, D, E$\}$.

1. How many three-letter strings (i.e., sequences of 3 letters) can be made out of these letters if each letter can be used only once? (In this and subsequent questions, your answer should be a number. Do not enter '!' or combinations in your answer.)

   60 ✔ **Answer:** 60

2. How many subsets does the set $\{$A, B, C, D, E$\}$ have?

   32 ✔ **Answer:** 32

3. How many five-letter strings can be made if we require that each letter appears exactly once and the letters A and B are next to each other, as either "AB" or "BA"? (*Hint:* Think of a sequential way of producing such a string.)

   48 ✔ **Answer:** 48

Answer:

1. There are 5 choices for the first letter, 4 choices for the second, and 3 for the last. Thus, the answer is $5 \cdot 4 \cdot 3 = 60$.

2. The number of subsets of a 5-element set is $2^5 = 32$.

3. We first choose whether the order will be "AB" or "BA" (2 choices). We then choose the position of the first letter in "AB" or "BA". There are 4 choices, namely positions 1, 2, 3, or 4. We are left with three positions in which the letters C, D, and E can be placed, in any order. The number of ways that this can be done is the number of permutations of these three letters, namely, $3! = 3 \cdot 2 \cdot 1 = 6$. Thus, the answer to this problem is $2 \cdot 4 \cdot 6 = 48$.

Submit You have used 3 of 10 attempts

✔ Correct (3/3 points)