MathFLIX CHALLENGE
Factorials & Permutations

Word	# of letters	Permutation Examples	Factorial Expression	Multiplication	Number of Permutations
a	1	a	1!	1	1
be	2	be, eb	2!	2×1	
can	3			$3 \times 2 \times 1$	
math					
plane	5				

Do you think that you will have 4! ($4 \times 3 \times 2 \times 1$) permutations for every 4 letter word? What if words have repeating letters such as moon, noon, mama? See if you can discover the factorial computation patterns for the following words. Then prove that the answer is correct by providing all of the possible permutations.

Word	Factorial Expression	Computation	Number of Permutations	Permutations
noon	$\dfrac{4!}{2!\,2!}$	$\dfrac{4 \times 3 \times 2 \times 1}{2 \times 1 \times 2 \times 1}$	6	NOON OONN NNOO ONON NONO ONNO
moon	$\dfrac{4!}{2!}$			
mama				

Word	Factorial Expression	Computation	Number of Permutations	A Few Permutations...
ALASKA	$\dfrac{6!}{3!}$	$\dfrac{6 \times 5 \times 4 \times 3 \times 2 \times 1}{3 \times 2 \times 1}$	1200	LASKAA, KALSAA
ILLINOIS	$\dfrac{8!}{3!\,2!}$			

What state's name has the most permutations?