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Question: An n-digit number is a list of $n \geq 1$ digits where the first digit is not zero.

1. How many n-digit numbers contain no 1's?

2. How many n-digit numbers contain at least one 2?

Solution: 1) The first digit can be any one of 2 through 9, the remaining $(n-1)$ digits can be any one of 0 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9. Hence the required number of numbers contain no 1's is $8 * 9^{n-1}$.

2) Let us first find n-digit numbers contains no 2's. Similar to case(1), it is $8 * 9^{n-1}$. All possible n-digit numbers with first digit not zero is $9 * 10^{n-1}$. Hence the required n-digit numbers contain at least one 2 is $9 * 10^{n-1} - 8 * 9^{n-1}$.